SAN JUAN COUNTY

COOPERATIVE EXTENSION OFFICE

SAN JUAN COUNTY
NEW MEXICO
SINCE 1887

BID #23-24-24 REBID

Proj.No. 240805

STATE OF NEW MEXICO
CARLYN R. RODAHL
NO. 1788
REGISTERED ARCHITECT

R&H ARCHITECTURE

RODAHL & HUMMELL ARCHITECTURE, P.C.
609 NORTH DUSTIN
FARMINGTON, N.M.
(505)326-6442 (PHONE)

ACKNOWLEDGEMENT OF RECEIPT FORM

Cooperative Extension Office
BID 23-24-24 Re-Bid
October 8, 2024
2:00 PM

BIDDER INFORMATION:

In acknowledgement of receipt of the above referenced Bid Packet, the undersigned agrees that he/she has received a complete copy. Only potential Bidders who elect to return this form will be added to the Plan Holder's list and will receive copies of any future addendums to the Bid, if issued.

_____
BUSINESS NAME

_____
SIGNATURE OF AUTHORIZED REPRESENTATIVE

_____
PRINTED NAME OF AUTHORIZED REPRESENTATIVE

ADDRESS: _____

CITY: _____ STATE: _____ ZIP CODE: _____

PHONE NO.: _____

E-MAIL: _____

Please select which you would like to be listed as:

___ **General Contractor** __ **Sub-Contractor** __ **Supplier** __ **Plan Room**

RETURN TO:
Jaime Jones
Contract Analyst
SAN JUAN COUNTY
PHONE (505) 334-4548
jjones@sjcounty.net

Emailed copies of the Acknowledgement of Receipt form will be accepted.
Emailed Bid responses will not be accepted.

SECTION 00 0001

FORWARD

These Specifications are prepared on the Thirty-Three (33) Division Format of the Construction Specifications Institute.

This Format is designed to coordinate the Contractor's and the Architect/Engineer's filing, specifications and accounting system into a single unified system.

Within each Division, the title of each Section will appear on the first page of each Section.

Specification Sections carry the numerical designation of the CSI Uniform System. Sections are bound into this Project Manual in proper interrupted numerical sequence. Where there are voids in the Section numbering, the work and/or materials covered by these numbers is not included in this project.

Check the full contents of the Specifications against the listings in the Table of Contents in Section 00 0002 to insure that a complete set of documents is received.

The first two digits of the Section number indicate the Division to which the section belongs.

Pages within each Section are numbered in numerical uninterrupted sequence and the last page of each Section will show the statement "END OF SECTION" followed by the Section number.

END OF SECTION

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Cooperative Extension Office Re-Bid

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END OF SECTION

SECTION 00 0003
ADVERTISEMENT FOR BIDS
BID 23-24-24 Re-Bid

Bidders are invited to submit sealed bids for **Construction Services of a New Cooperative Extension Office.**

Bids to complete this work will be received by San Juan County, New Mexico, Office of Central Purchasing, at 213 South Oliver Drive, Aztec, New Mexico, 87410, until **2:00 p.m. (local time), October 8, 2024** at which time and place all bids will be publicly opened and tabulated. Bids received after 2:00 pm shall not be accepted.

The Bid and Contract Documents may be obtained on the San Juan County Website. When utilizing the County's website, please complete the Acknowledgement Form that is posted within the Project Manual so you can be listed as Plan Holder, and will automatically receive addendums, if issued. You are reminded that you are solely responsible for checking the County's website for updates. **Please feel free to visit our Website, www.sjcounty.net, Click on the "Bids, Proposals & Vendors" icon to access the bid. Hard copies of the project will NOT be provided.**

A Pre-Bid Conference will be held at **10:00 a.m. (local time)** on **September 26, 2024** in the **Central Purchasing Conference Room, 213 S. Oliver Dr., Aztec, NM 87410.**

NOTICE OF REGISTRATION REQUIREMENT. Bidders are reminded that in order to be considered for bid award, all contractors (including their subcontractors if at a specific cost threshold) **must be actively registered under the Labor Enforcement Fund with the New Mexico Department of Workforce Solutions on the date bids are unconditionally accepted for consideration for bid award and must remain actively registered in order to perform work under this solicitation.** The Contractor selected for award of a contract shall provide documentation to verify compliance with this paragraph prior to execution of a contract.

The Owner reserves the right to reject any or all Bids and to waive information or irregularities in the Bidding.

NIGP Code: 909.30Building Construction

LEGAL NOTICE: Publish: **September 16, 2024**
Albuquerque Journal
Tri City Record

END OF SECTION

SECTION 00 0004
BID DOCUMENTS / INSTRUCTIONS TO BIDDERS

BID 23-24-24 Re-Bid

SAN JUAN COUNTY
Office of Central Purchasing
213 S. Oliver
Aztec, NM 87410
(505) 334-4551

I. INTRODUCTION.

San Juan County is requesting sealed bids for the **New Cooperative Extension Office.**

The project location is 400 Gossett Drive, Aztec, New Mexico, 87410.

SCOPE: Contractor performing this Work shall furnish all material, labor, tools, expendable equipment, utility and transportation services and all incidental items necessary to perform and complete in a workmanlike manner, the Work required for the construction of the new Cooperative Extension Office.

EXAMINATION: Contractors shall thoroughly examine the proposed Contract Documents and visit the construction site as necessary to obtain first-hand knowledge of all proposed work, any existing infrastructure and local site conditions. Contractors will not be entitled to additional compensation or any extension of the contract time for failure to do so. There shall be no allowance for anticipated profits. San Juan County will provide reasonable access, as requested. Contractors shall also familiarize themselves with Federal, State and local laws, ordinances, rules and regulations that may in any manner affect cost, progress or performance of work. Submission of a Bid constitutes a representation by the Contractor that the Contractor has made all appropriate examinations, investigations and tests and has made provision as to the cost thereof in his Bid.

INTERPRETATIONS: Contractors and Subcontractors shall promptly notify the Owner of any ambiguity, inconsistency or error regarding the proposed Contract Documents in writing at least ten (10) calendar days prior to Bid opening. If appropriate, the Owner will issue a written addendum that shall thereafter be a part of the Bid Documents and proposed Contract Documents. Only written clarifications will be binding. All Bids shall be responsive to and include the provisions of all Addenda issued prior to bid opening.

II. NOTICE.

The New Mexico Procurement Code, N.M.S.A. 1978, §§13-1-28 through 13-1-199 (Repl. 1997)(as amended), imposes civil and criminal penalties for its violation. In addition, the New Mexico Criminal Code, N.M.S.A. 1978, §§ 30-1-1 et seq. (Repl. 1994)(as amended), imposes criminal penalties for illegal bribes, gratuities, and kickbacks. Bidders should carefully consider the consequences of their behavior during the pendency of this solicitation, and should seek the advice of legal counsel when in doubt.

III. SUBMISSION OF BIDS.

A. DATE/TIME. ALL BIDS MUST BE RECEIVED NO LATER THAN **2:00 P.M. LOCAL TIME ON October 8, 2024** AT WHICH TIME AND PLACE ALL BIDS WILL BE PUBLICLY OPENED AND TABULATED. Bids that are delivered after that date and time will not be accepted, and will be returned to the sender unopened.

B. ADDRESS. Each Bid must be delivered to the Office of Central Purchasing, 213 S. Oliver Dr., Aztec, New Mexico, 87410, on or before the date and time of the bid opening.

C. FORM OF SUBMISSION. Each Bid shall be submitted on an unaltered Bid Offer Form supplied by San Juan County, which can be found in the Bid Documents. The completed Bid Offer Form, along with any required enclosures, shall be submitted to the address stated previously in a sealed

envelope. The envelope should be clearly labeled on the outside with the bidder's name and complete address, the bid number and project name. If a bid is forwarded by mail or delivery service, the sealed bid should be enclosed within a separate mailing envelope, which shall clearly state that a bid is enclosed. Failure to follow these instructions may result in disqualification of the bid. Any bid forwarded by mail or delivery service which is mistakenly opened prematurely as a result of the failure of the bidder to enclose the sealed bid within a separate mailing envelope may be subject to disqualification.

Deliver bids to:	**San Juan County** **Office of Central Purchasing** **213 S. Oliver Drive** **Aztec, NM 87410**
Mailed bids should read:	**(Bidder's Names and Address)** **ATTN: Sealed Bid Enclosed** **Bid 23-24-24 Re-Bid** **Cooperative Extension Office**

D. REQUIRED SUBMISSIONS.

1. BID OFFER FORM. Each bid shall be submitted on an unaltered Bid Offer Form supplied by San Juan County, as described in Section III(C), above.

2. BID SECURITY. Bid security is required on this project **if the bid amount exceeds $25,000**. Each bid shall be accompanied by a cashier's check, money order or bank draft payable to San Juan County in the amount of five (5) percent of the amount of the bid. Alternatively, a bid bond in the amount of five (5) percent of the bid may be submitted along with the bid. If a bid bond is submitted, it shall be issued by a surety company authorized by the State of New Mexico to issue such bonds, and shall be submitted on AIA Document A310, current edition. The attorney executing the bid bond on behalf of the surety company shall affix to the bond a certified and current copy of his or her Power of Attorney. If, within ten (10) days after the notice of acceptance of the bid, the bidder refuses to enter into a contract or fails to furnish performance and labor and material payment bonds as required, the bid security shall be forfeited as liquidated damages, not as a penalty. The bid security of the three (3) lowest bidders shall be retained until one of the following occurs: (1) a contract is signed and required bonds and insurance documents are filed; (2) the specified time has elapsed to permit withdrawal of bids; or (3) all bids have been rejected.

3. SUBCONTRACTOR'S LIST. Bidders shall submit the following information pursuant to Public Works Section 13-4-31 through 13-4-43, NMSA 1978, for completion of the subcontractor's list form, provided in the project manual. Each Contractor who submits a bid shall list on the form, each category of the work that will be done by each Subcontractor, and the name of each Subcontractor, proposed to perform the project work, in excess of **$15,500,** along with the City or County of the place of business of each Subcontractor, and other relevant information. The completed list must be submitted along with the Contractor's sealed bid. Any bid submitted which fails to comply with this paragraph will be deemed a non-responsive bid and will not be accepted. When a bidder enters into a Contract and therefore becomes the Contractor, the County will promptly inform the Contractor whether or not the Owner (the County), after due investigation, has reasonable objection to any such proposed Subcontractor. Failure of the Owner (the County) to inform the Contractor promptly of its objections to each proposed Subcontractor shall not constitute notice of no reasonable objection.

In addition, the Contractor shall also indicate on the form provided, ***the New Mexico Department of Workforce Solutions Registration/Certification Number for those proposed Subcontractors whose bid amounts are $60,000.00 and above***. The Contractor shall list only one (1) Subcontractor for each category/nature of work.

Pursuant to the Public Works Section 13-4-33, NMSA 1978, Definitions, a "Subcontractor" means a contractor who contracts directly with the contractor.

In compliance with Public Works Section 13-4-36 C & D, NMSA 1978, Substitution of Subcontractor, no Contractor whose bid is accepted shall permit any subcontract to be voluntarily assigned or transferred or

allow it to be performed by anyone other than the original Subcontractor listed in the original bid without the consent of San Juan County.

No Contractor whose bid is accepted, other than in the performance of change orders causing changes or deviations from the original contract, shall sublet or subcontract any portion of the work in excess of the listing threshold as to which his original bid did not designate a Subcontractor unless:

(1) The Contractor fails to receive a bid from a category of work. Under such circumstances, the Contractor may subcontract. The Contractor shall designate on the listing form that *NO BID WAS RECEIVED or;*

(2) *The Contractor fails to receive more than one bid for a category of work. Under such circumstances, the Contractor may subcontract. The Contractor shall state on the listing form that ONLY ONE SUBCONTRACTOR'S BID WAS RECEIVED, together with the name of the subcontractor. This designation shall not occur more than one time on the subcontractor list.*

4. LABOR ENFORCEMENT FUND CERTIFICATION. Each Contractor who submits a bid (including their Subcontractors if at a specific cost threshold) must be registered under the Labor Enforcement Fund with the New Mexico Department of Workforce Solutions on the date bids are unconditionally accepted for consideration for bid award and must remain actively registered in order to perform work under this solicitation. The Contractor selected for award of a contract shall provide documentation to verify compliance with this paragraph prior to execution of a contract.

E. AMENDMENT. A Contractor may submit an amended bid, so long as the amended bid is submitted prior to the date and time when bids are opened. An amended bid must be complete, as it will be substituted for the earlier bid(s) and must be clearly identified as an amendment to the bid. No reference to the amount of the original bid(s) shall be made in any amended bid. Any such reference in an amended bid may disqualify that bid.

F. WITHDRAWAL. A Contractor may withdraw its bid at any time prior to the date and time when bids are opened. A Contractor requesting to withdraw a bid must submit a written request signed by the Contractor's duly authorized representative(s). A Contractor may request withdrawal of a bid by fax, but to be effective, written confirmation shall also be mailed and postmarked on or before the date of the bid opening. Withdrawal of a bid pursuant to this section shall not disqualify any Contractor from submitting a subsequent bid, so long as the subsequent bid complies fully with the requirements for submissions of bids herein.

G. EXECUTION OF BID. Each bid shall be signed by person(s) legally authorized to bind the Contractor to a Contract. A bid submitted by an agent shall have a current Power of Attorney attached certifying the agent's authority to bind the Contractor.

H. COLLUSION- GENERAL BID The Bidder, by submitting a bid, certifies that the bid is genuine and is not sham or collusive, or made in the interest, or on the behalf of any person not named as bidder, and that the bidder has not directly or indirectly induced or solicited any other bidder to put in a sham bid, or any other person, firm or corporation, to refrain from bidding, and that the bidder has not in any manner sought by collusion to secure himself an advantage over any other bidder. The Procurement Code Sections 13-1-28 through 13-1-99 N.M.S.A. 1978, imposes civil and criminal penalties for its violation. In addition, the New Mexico criminal statutes impose felony penalties for bribes, gratuities and kickbacks.

IV. PRE-BID CONFERENCE.

A **Pre-Bid Conference** will be held on **September 26, 2024** at **10:00 am** in the Central Purchasing Conference Room**, 213 S. Oliver Dr., Aztec, NM 87401.** A site visit will follow, if needed.

V. SPECIFICATIONS

Specifications are contained in the Project Manual and Drawings.

VI. LIMITING SPECIFICATIONS AND SUBSTITUTION.

A. LIMITING SPECIFICATIONS. Any specification that limits or eliminates a qualified bidder must be brought to the attention of the County not less than ten (10) days before the date when bids are due. Failure to bring such a matter to the attention of the County shall bar the bidder from asserting a later claim in this regard.

B. SUBSTITUTIONS. Identification of material or equipment by manufacturer's name or trade name is not meant to give preference to any manufacturer but merely to establish a standard. To obtain approval to use an unspecified product or design, the bidder shall submit a detailed written request at least ten (10) days prior to the bid opening. Each request shall clearly describe the product or design for which approval is requested, including all information necessary to evaluate the acceptability of the proposed change. If the product or change is accepted, an Addendum shall be issued approving the product or change.

VII. CONDITIONS APPLICABLE TO BIDS.

A. WAGE RATES. Wage rates are required on this project **if the bid amount exceeds $60,000**. Employees of any contractor or subcontractor participating in the work shall be paid not less than the minimum wage rates of the State of New Mexico as published by the State Labor and Industrial Commission. A copy of the wage rates which have determined to be applicable to the work are included in bid specifications. **Bidders are reminded that all contractors and their subcontractors must submit certified weekly payroll records biweekly to the San Juan County Finance Department, 100 South Oliver Drive, Aztec, New Mexico 87410, subject to the terms of the New Mexico Public Works Minimum Wage Act.**

B. USE OF NEW MEXICO MATERIALS; NEW MEXICO TIMBER. Preference shall be given to materials produced, grown, processed or manufactured in New Mexico by citizens or residents of New Mexico or provided or offered by a New Mexico state business enterprise, and such materials shall be used where they are deemed satisfactory for the intended use, pursuant to N.M.S.A. 1978, § 13-4-5. Whenever softwood species of timber, such as Douglas fir and ponderosa pine, grown in New Mexico, are necessary for construction, erection or repair and available in this state, such species shall be used, pursuant to N.M.S.A. 1978, §§ 13-4-6 and 13-4-7.

C. LICENSING. The bidder awarded the contract shall possess and shall obtain and hold such licenses as are reasonably required to accomplish his or her duties.

D. CERTIFICATION OF BIDDER REGARDING EQUAL EMPLOYMENT OPPORTUNITY. Contractors and their Sub-Contractors shall comply with this section if applicable and required in the performance of their work. However, bidders are not required to submit a completed certificate with their bid submission.

E. TERMINATION. In addition to the grounds for termination set forth elsewhere in the Bid Documents or in the Contract Documents, any contract awarded as a result of the Invitation for Bids may be terminated if sufficient appropriations or authorizations do not exist. The County's decision concerning whether sufficient appropriations or authorizations exist will be final.

F. DISQUALIFICATION. The Owner reserves the right to disqualify Bids, before or after opening, upon evidence of collusion with intent to defraud or other illegal practices upon the part of the Bidder. The Procurement Code, Sections 13-1-21 through 13-1-199 NMSA, imposes civil and criminal penalties for its violation. In addition, New Mexico criminal statutes impose felony penalties for illegal bribes, gratuities and kickbacks.

G. QUALIFICATION OF BIDDER. Owner and/or the Owner's Design Professional may make such investigations as necessary to determine the ability of the Bidder to perform the work, and the Bidder shall furnish to the Owner and/or the Owner's Design Professional all such information and data for this purpose as Owner and/ or the Owner's Design Professional may request, including but not limited to proof of financial resources, production or services facilities, personnel and experience adequate to complete the project. Owner reserves the right to reject any Bid if the evidence submitted by, or

investigation of, such Bidder fails to satisfy the Owner and / or the Owner's Design Professional that such Bidder is qualified to carry out the obligations of the Contract and to complete the work described herein. Bidder shall also construe this provision to incorporate any necessary investigation and/ or monitoring during the life of the Contract to enforce any current policy of San Juan County, such as, but not limited to, no smoking, no alcoholic beverages on Owner's property. As a general rule, any such regulation or law applying to Owner's personnel shall be deemed to be in force for Contractor's work force occupying any work site.

H. LEGAL REVIEW. Since bidders will be bound by the specifications, terms and conditions herein, it is strongly recommended that each bidder obtain legal advice concerning the request for bids.

I. CONTRACTOR. Contractor shall be licensed to do this type of work under applicable licensing statutes of the State of New Mexico and other applicable regulatory agencies. The Contractor, and their subcontractors shall comply with Federal regulations when applicable. All work and material shall meet all applicable codes. Contractor must adhere to County policies and procedures in secure areas. Contractors are cautioned that their employees may be subject to search or security clearance.

J. PERFORMANCE AND PAYMENT BONDS. Performance and Payment Bonds shall be furnished by the successful Contractor in accordance with the Supplementary Conditions of the Contract (AIA A201-2007).

A Subcontractor shall provide a Performance and Payment Bond on a public works project if the Subcontractor's contract for work to be performed on a project is one hundred twenty-five thousand dollars ($125,000) or more pursuant to NMSA 1978, § 13-1-148.1 (2007).

K. INSURANCE. A current Certificate of Insurance shall be furnished by the successful Bidder in accordance with the Supplementary Conditions of the Contract (AIA A201-2007).

L. OWNERSHIP OF PLANS. The Contractor awarded the contract acknowledges that the reports, plans, specifications, field data, field notes, laboratory test data, calculations, estimates and other similar documents of the successful Bidder are instruments of service, not products. Plans, drawings, and other similar documents shall not be not be reproduced, copied or duplicated without the express written authorization of the County.

VIII. EVALUATION/AWARD.

A. EVALUATION.

1. INVESTIGATION. The County may, at its option, contact a given bidder for clarification of its bid or for additional information. Discussions with the County shall not be initiated by the Bidder(s). The County may make such investigations as necessary to determine the ability of the bidder to meet the specifications and adhere to the terms and conditions set forth within these Bid Documents and in the accompanying documents. The County will reject any Bid which is non-responsive or any bidder who submits a non-responsive bid as defined in N.M.S.A. 1978. § 13-1-82 and N.M.S.A. 1978. § 13-1-84.

4. IN-STATE RESIDENT / NATIVE AMERICAN RESIDENT CONTRACTOR PREFERENCE. To be eligible for the 8% resident contractor / Native American contractor preference, the contractor shall include a copy of their certificate with their bid and in-state resident preference number on the Bid Offer Page, pursuant to Section 13-4-2 NMSA 1978. Each Bidder may obtain a New Mexico In-State Resident Contractor Preference Certificate Number through the State of New Mexico, Department of Taxation and Revenue, 505-827-0951.

5. RESIDENT VETERAN'S / NATIVE AMERICAN VETERAN'S CONTRACTOR PREFERENCE. To be considered for the 10% resident veteran /Native American veteran contractor preference, the contractor shall include a copy of their certificate with their bid and include their resident veteran preference number on the Bid Offer Page, pursuant to Section 13-4-2 NMSA 1978. Each contractor may obtain a Resident Veteran Contractor Preference Certificate Number through the State of New Mexico, Department of Taxation and Revenue, 505-827-0951. This preference is separate from the in-state preference and is not cumulative with that preference.

4. NEW MEXICO DEPARTMENT OF WORKFORCE SOLUTIONS: LABOR ENFORCEMENT FUND CERTIFICATION. In order to be considered for bid award, all Contractors (including their Subcontractors if at a specific cost threshold) must be registered under the Labor Enforcement Fund with the New Mexico Department of Workforce Solutions on the date bids are unconditionally accepted for consideration for bid award and must remain actively registered in order to perform work under this solicitation. The Contractor selected for award of a contract shall provide documentation to verify compliance with this paragraph prior to execution of a contract. Contractors may obtain additional information on the requirements of the Labor Enforcement Fund program at www.dws.state.nm.us (Public Works - Public Works Projects – Additional Forms - Labor Enforcement Fund Form) or by calling (505) 841-4405. The Contractor selected for award of a contract shall provide documentation to verify compliance with this paragraph prior to execution of a contract.

B. AWARD. A contract may be offered to the lowest responsible bidder submitting an acceptable technical offer for the work (and applicable Options or Alternatives which are selected), taking into account the resident preference set forth above, so long as the lowest bid is within the amount of funds designated to finance the Contract. If the lowest responsible bidder has otherwise qualified, but submitted a bid that was up to 10% in excess of the amount of funds designated to finance the Contract, the lowest bidder may negotiate with the County for a lower total bid. Such negotiation shall not be permitted if the lowest bid was more than 10% over budgeted funds. NMSA 1978, §13-1-105 (Repl. 1992).

The Owner shall have the right to accept Alternates in the order specifically provided in the Bidding Documents, and to determine the low Bidder on the basis of the sum of the Base Bid and Alternates accepted.

C. RIGHT TO DISCONTINUE PROCUREMENT. The County reserves the right to waive minor irregularities in a bid. The County also reserves the right to waive mandatory requirement(s) so long as all responding bidders fail to meet the mandatory requirement(s) and the failure to do so does not otherwise materially effect the procurement. The County reserves the right to cancel this Request for Bids at any time, and to reject any or all bids, or otherwise to proceed in the best interests of the County. This Request for Bids in no manner obligates the County or any of its agencies to the eventual sale or lease of any product or service, whether explicitly described or implied herein, until confirmed by a written contract and/or Purchase Order.

D. NOTICE OF AWARD. A Notice of Award will be presented to the successful Bidder/Contractor along with the Agreement. The Contractor will be required to sign and return the Notice of Award and agreement, along with the required certificates of insurance, and performance and payment bonds, within ten (10) calendar days from the date of issuance.

E. NOTICE TO PROCEED. Upon return of the signed Notice of Award, signed Agreement, and Insurance and Bonds, a Notice to Proceed will be presented to the Contractor for signature, setting the time frame for substantial completion. Until such time that the Notice to Proceed has been issued by the County, the Contractor should refrain from performing any work on the project.

IX. QUESTIONS.

All questions pertaining to this Bid shall be submitted in writing no later than 10 days prior to Bid opening and shall be directed to:

Mr. Carlyn Rodahl
Rodahl & Hummell Architecture
609 N. Dustin Avenue
Farmington, NM 87401
Phone: (505) 326-6442
carlyn@rodahl-hummell.com

Copy To: Jaime Jones
Contract Analyst
213 S. Oliver Drive
Aztec, NM 87410
Phone: (505) 334-4548
jjones@sjcounty.net

X. BID / CONTRACT DOCUMENTS.

The Bid and Contract Documents may be obtained on the San Juan County Website. When utilizing the County's website, please complete the Acknowledgement Form that is posted within the Project Manual

so you can be listed as a Plan Holder, and will automatically receive addendums, if issued. You are reminded that you are solely responsible for checking the County's website for updates. **Please feel free to visit our Website, www.sjcounty.net, Click on the "Bids, Proposals & Vendors" icon to access the bid. Hard copies of the project will NOT be provided.**

The Contract Documents contain the provisions required for the construction of the project. Information obtained from an officer, agent, employee pf San Juan County, or any other person shall not affect the risks or obligations assumed by the Contractor or relive him from fulfilling any of the conditions of the Contract.

SECTION 00 0004

BID OFFER FORM

BID 23-24-24 Re-Bid

Cooperative Extension Office

NOTE: TO ENSURE A VALID BID, EACH BIDDER MUST FILL IN EACH BLANK SPACE ON THE BID OFFER FORM IN INK OR TYPEWRITER AND SUBMIT THE ORIGINAL TOGETHER WITH ALL SUPPLEMENTAL DOCUMENTS, TO THE COUNTY.

The undersigned agrees:

1. To complete all the work set forth in the Bid Documents and Contract documents of the project designated as **Bid 23-24-24 Re-Bid, Cooperative Extension Office**, in accordance with the Bid Documents and Contract Documents, for the consideration hereinafter set forth.

2. To hold this bid open for thirty (30) days after the opening of the bids and to accept the provisions of the Instruction to Bidders regarding the disposition of Bid Security.

3. To enter into and execute a contract, if awarded, on the basis of this Bid. To furnish a Performance Bond and a Labor and Materials Payment Bond in accord with the General Conditions and General Requirements of the Bid Documents and Contract Documents, and to deliver to the County an executed Owner-Contractor Agreement within ten (10) days after notification of award. A subcontractor shall provide a performance and payment bond on a public works project if the subcontractor's contract for work to be performed on a project if one hundred twenty five thousand dollars ($125,000) or more NMSA 1978, § 13-1-148.1 (2007).

BASE BID AMOUNT – (Do not include Gross Receipt Taxes): The undersigned hereby proposes and agrees to perform the foregoing for the Lump Sum of:

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

ADDITIVE ALTERNATE NO. 1: Build Out of the Classroom Area: The undersigned hereby proposes and agrees to perform the foregoing for the Lump Sum of:

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

ADDITIVE ALTERNATE NO. 2: Build Out of the Kitchen Area: The undersigned hereby proposes and agrees to perform the foregoing for the Lump Sum of:

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

NMGRT @ 8.1875% ON BASE BID AND ALTERNATES:

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

TOTAL BID AMOUNT:

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

TIME OF COMPLETION:

If awarded a contract, the undersigned bidder agrees to complete the work within the following number of calendar days after issuance of the Notice to Proceed:

_____ **CALENDAR DAYS FOR COMPLETION. (Bidder to indicate number of days proposed.)**

Bidder further agrees to pay as liquidated damages, the following sum for each consecutive calendar day thereafter that the work remains uncompleted.

$250.00/PER CALENDAR DAY

The undersigned has attached the required Bid Security _____.

The undersigned acknowledges receipt of Addenda No. _____ through _____.

In submitting this Bid, it is understood that the Owner reserves the right to reject any and all bids and to waive irregularities in the Bidding and to Award the Contract to the Low bidder, as determined by the Base Bid and any Alternates accepted.

Dated this _____ day of _____ 2024.

_____
Contractor Name

_____
If a corporation, indicate the state of incorporation.

_____
If an out-of-state business, state whether the business is authorized to do business in the State of New Mexico.

_____
Contractor Address
_____

_____
Contractor's New Mexico License Number

_____
Contractor's NM Resident / Native American /
Veteran / Native American Veteran Preference Number

_____ _____
NMDWS Certification/Registration Number Federal Employer Identification Number (FEIN)

_____
Contractor Authorized Officer (Printed Name)

Signature of Contractor Authorized Officer

Area Code/Telephone Number

Email Address

(A Bid of a corporation shall have the seal affixed hereto, and shall be signed by a person authorized by the corporation to execute contracts. If available, a Resolution of the corporation authorizing the person signing to execute the contract should be attached. A Bid of a partnership shall give the names of all the partners, and be executed by all the partners or the general partner. A bid of a sole proprietor shall be executed by the proprietor and any trade name under which the individual is doing business.)

CONTRACTOR'S CHECKLIST:

The following items shall be included with the Bid Offer Form:

1. Bid Offer Form.
2. Bid Bond.
3. Subcontractor List Form.
4. NM Preference Certificate (if applicable).

SUBCONTRACTOR LIST

Subcontractor Listing Threshold for this project **$15,500**

Bidders shall submit the following information pursuant to Section 13-4-31 through 13-4-43 NMSA 1978 with emphasis added for completion of this form.

Each Contractor who submits a bid **shall** list on this form, the name of each Subcontractor proposed to perform work in excess of **$15,500** for each category of the work that will be done by each Subcontractor, the City or County of the place of business of each Subcontractor, the License Number of each Subcontractor, and other relevant information. In addition, the Contractor shall also indicate on this form ***the New Mexico Department of Workforce Solutions Registration/Certification Number for those proposed Subcontractors whose bid amounts are $60,000.00 and above***. The Contractor shall list only one (1) Subcontractor for each category/nature of work.

Pursuant to the Public Works Section 13-4-33, NMSA 1978, Definitions, a "Subcontractor" means a contractor who contracts directly with the contractor.

(Emphasis Added) In compliance with Public Works Section 13-4-36 C & D, NMSA 1978, Substitution of Subcontractor, no Contractor whose bid is accepted shall permit any subcontract to be voluntarily assigned or transferred or allow it to be performed by anyone other than the original Subcontractor listed in the original bid without the consent of San Juan County.

No Contractor whose bid is accepted, other than in the performance of change orders causing changes or deviations from the original contract, shall sublet or subcontract any portion of the work in excess of the listing threshold as to which his original bid did not designate a Subcontractor unless:

(1) The Contractor fails to receive a bid from a category of work. Under such circumstances, the Contractor may subcontract. The Contractor shall designate on the listing form that *NO BID WAS RECEIVED or;*

(2) *The Contractor fails to receive more than one bid for a category of work. Under such circumstances, the Contractor may subcontract. The Contractor shall state on the listing form that ONLY ONE SUBCONTRACTOR'S BID WAS RECEIVED, together with the name of the Subcontractor. This designation shall not occur more than one time on the subcontractor list.*

Subcontractor:	Category of Work:	City or County of Business:	Phone #:	License No.:	Over $60,000? √	NM Workforce Solutions No. (if over $60,000)
_____	_____	_____	_____	_____	____	_____
	FEIN#: _____					
_____	_____	_____	_____	_____	____	_____
	FEIN#: _____					
_____	_____	_____	_____	_____	____	_____
	FEIN#: _____					

SUBCONTRACTOR LIST Continued

Subcontractor:	Category of Work:	City or County of Business:	Phone #:	License No.:	Over $60,000? √	NM Workforce Solutions No. (if over $60,000)
FEIN#:						
FEIN#:						
FEIN#:						
FEIN#:						
FEIN#:						
FEIN#:						
FEIN#:						
FEIN#:						

AIA® Document A310™ – 2010

Bid Bond

CONTRACTOR:
(Name, legal status and address)

SURETY:
(Name, legal status and principal place of business)

OWNER:
(Name, legal status and address)
San Juan County
100 S. Oliver Dr.
Aztec, NM 87410

BOND AMOUNT: $

PROJECT:
(Name, location or address, and Project number, if any)
Cooperative Extension Office
400 Gossett Drive
Aztec, NM 87410

The Contractor and Surety are bound to the Owner in the amount set forth above, for the payment of which the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein. The conditions of this Bond are such that if the Owner accepts the bid of the Contractor within the time specified in the bid documents, or within such time period as may be agreed to by the Owner and Contractor, and the Contractor either (1) enters into a contract with the Owner in accordance with the terms of such bid, and gives such bond or bonds as may be specified in the bidding or Contract Documents, with a surety admitted in the jurisdiction of the Project and otherwise acceptable to the Owner, for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) pays to the Owner the difference, not to exceed the amount of this Bond, between the amount specified in said bid and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect. The Surety hereby waives any notice of an agreement between the Owner and Contractor to extend the time in which the Owner may accept the bid. Waiver of notice by the Surety shall not apply to any extension exceeding sixty (60) days in the aggregate beyond the time for acceptance of bids specified in the bid documents, and the Owner and Contractor shall obtain the Surety's consent for an extension beyond sixty (60) days.

If this Bond is issued in connection with a subcontractor's bid to a Contractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Project, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

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

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

Init.
/

Signed and sealed this day of ,

	(Contractor as Principal) *(Seal)*
(Witness)	*(Title)*
	(Surety) *(Seal)*
(Witness)	*(Title)*

PUBLIC WORKS PROJECT REQUIREMENTS

As a participant in a Public Works project valued at more than $60,000 in the state of New Mexico, the following list addresses many of the responsibilities that are defined by statute or regulation to each project stakeholder.

Contracting Agency

- Ensure that all contractors wishing to bid on a Public Works project when the project is $60,000 or more are actively registered with the Public Works and Apprenticeship Application (PWAA) website: http://www.dws.state.nm.us/pwaa (Contractor Registration) prior to bidding.
- Please submit Notice of Award (NOA) and Subcontractor List(s) to the PWAA website promptly after the project is awarded.
- Please update the Subcontractor List(s) on the PWAA website whenever changes occur.
- All sub-contractors and tiers (excluding professional services) regardless of contract amount must be listed on the Subcontractor List and must adhere to the Public Works Minimum Wage Act.
- Ninety days after project completion please go into the PWAA system and close the project. Only contracting agencies are allowed to close the project. Agents or contractors are not allowed to close projects.

General Contractor

- Provide a complete Subcontractor List and Statements of Intent (SOI) to Pay Prevailing Wages for all contractors, regardless of amount of work, to the contracting agency within 3 (three) days of award.
- Ensure that all subcontractors wishing to bid on a Public Works project have an active Contractor Registration with the Public Works and Apprenticeship Application (PWAA) website: http://www.dws.state.nm.us/pwaa prior to bidding when their bid will exceed $60,000.
- Make certain the Public Works Apprentice and Training Act contributions are paid either to an approved Apprenticeship Program or to the Public Works Apprentice and Training Fund.
- Confirm the Wage Rate poster, provided in PWAA, is displayed at the job site in an easily accessible place.
- When the project has been completed, make sure the Affidavits of Wages Paid (AWP) are sent to the contracting agency.
- All subcontractors and tiers (excluding professional services) regardless of contract amount must pay prevailing wages, be listed on the Subcontractor List, and adhere to the Public Works Minimum Wage Act.

LABOR RELATIONS DIVISION WWW.DWS.STATE.NM.US
401 Broadway NE Albuquerque, NM 87102

Phone: 505-841-4400
Fax: 505-841-4424

New Mexico Department of WORKFORCE SOLUTIONS

Subcontractor

- Ensure that all subcontractors wishing to bid on a Public Works project have an active Contractor Registration with the Public Works and Apprenticeship Application (PWAA) website: http://www.dws.state.nm.us/pwaa prior to bidding when their bid willexceed $60,000.
- Make certain the Public Works Apprentice and Training Act contributions are paid either to an approved Apprenticeship Program or to the Public Works Apprentice and TrainingFund.
- All subcontractors and tiers (excluding professional services) regardless of contract amount must pay prevailing wages, be listed on the Subcontractor List, and adhere to the Public Works Minimum Wage Act.

Additional Information

Reference material and forms may be found in the New Mexico Department of Workforce Solutions Public Works web pages at: https://www.dws.state.nm.us/Labor-Relations/Labor-Information/Public-Works.

CONTACT INFORMATION

Contact the Labor Relations Division for any questions relating to Public Works projects by email at public.works@state.nm.us or call (505) 841-4400.

New Mexico Department of WORKFORCE SOLUTIONS

2024 SUBSISTENCE, ZONE, AND INCENTIVE PAY RATES

All contractors are required to pay subsistence, zone, and incentive pay according to the particular trade

Asbestos workers or heat and frost insulators

(1) Zone 1 shall consist of the area lying within the city limits of a circle whose radius is 66 miles from the city hall in Albuquerque or the city hall in El Paso - $0.00 per day.

(2) Zone 2 shall consist of Los Alamos county - $40.00 per day if not furnished a company owned vehicle.

(3) Zone 3 shall consist of the area lying beyond a circle whose radius is over 66 miles from the city hall in Albuquerque or the city hall in El Paso - $85.00 per day.

Boilermakers/Blacksmiths

(1) Per diem is calculated from city hall of the dispatch city or the employee's home address, whichever is closer to the job location,

(2) Per diem is $55.00 per day for travel between 70 and 120 miles and $85.00 per day for travel over 120 miles.

Bricklayers

(1) For Albuquerque area contractors, the starting point shall be at the intersection of I-40 and I-25 and shall continue to the job site. All other areas, the starting point shall be the employer's main office address.

(2) Between 50 and 75 miles from the starting point, $35.00 per day.

(3) 76 or more miles from the starting point, $55.00 per day.

(4) All covered refactory work over 75 miles from the intersection of I-40 and I-25, $80.00 per day.

Cement Masons

(1) For employees who travel to Santa Fe from Albuquerque or vice versa, $20.00 per day.

(2) In all other work performed more than 50 miles from the employer's main office, $50.00 per day.

(3) Mutually agreed-upon lodging or transportation paid for by the employer will substitute for subsistence pay.

New Mexico Department of WORKFORCE SOLUTIONS

Drywall Finishers and Tapers

(1) $40.00 per day ($5.00 per hour for eight hours work) for over 60 miles over the most typically traveled route, or other mutually agreed upon suitable lodging or transportation.

(2) If an employee has worked the full week on four 10-hour days, the employee shall be paid the full week of per diem of $200.00.

(3) Special provision for Santa Fe and Albuquerque: Employees who travel between Santa Fe and Albuquerque will be paid $15.00 per day or other mutually agreed upon lodging or transportation.

Electricians (inside classifications)

(1) For Albuquerque only:

- **(a)** Zone 1 is classified as being within 40 miles from the main post office.
- **(b)** Zone 2 shall extend up to 10 miles beyond zone 1. Work performed within zone 2 shall be compensated nine percent above the journeyman rate for zone 1.
- **(c)** Zone 3 shall extend up to 20 miles beyond zone 1. Work performed within zone 3 shall be compensated fifteen percent above the journeyman rate for zone 1.
- **(d)** Zone 4 shall extend 20 miles or more beyond zone 1. Work performed within zone 4 shall be compensated twenty six percent above the journeyman rate for zone 1.

(2) For Los Alamos County only: work performed within the county shall be compensated fifteen percent above the zone 1 journeyman rate.

(3) For all other counties:

- **(a)** Zone 1 is:
  - **(i)** within six miles from the main post office for Raton, Tucumcari, and Farmington.
  - **(ii)** within eight miles from the main post office for Las Vegas.
  - **(iii)** within ten miles from the main post office for Santa Fe and Gallup.
  - **(iv)** within twelve miles from the main post office for Belen, Carrizozo, Clovis, Los Lunas, Portales, Roswell, Ruidoso, Artesia, Carlsbad, Hobbs, and Lovington.
  - **(v)** within fourteen miles from the main post office for Espanola.
- **(b)** Zone 2 shall extend up to 20 miles beyond zone 1. Work performed within zone 2 shall be compensated nine percent above the journeyman rate for zone 1.

(c) Zone 3 shall extend up to 30 miles from zone 1. Work performed within zone 3 shall be compensated fifteen percent above the journeyman rate for zone 1.

(d) Zone 4 shall extend beyond 30 miles from zone 1. Work performed within zone 4 shall be compensated twenty six percent above the journeyman rate for zone 1.

(4) When workers are ordered to report to the shop and then to the job and from job to job, and return to the shop, they shall be paid for the time spent traveling and shall be furnished transportation by the Employer. Under these conditions the Zone 1 rate and any applicable overtime will be paid.

Electricians (outside classification)

Zone 2: $50.00 per diem to be paid for work 30 miles outside of Santa Fe and 60 miles outside of Albuquerque. No per diem in Los Alamos County.

Glaziers

(1) When out-of-town travel is required, the employer shall provide suitable lodging with no more than two people per room and $20.00 per night for food.

(2) Employees required to use a personal vehicle for travel to a jobsite beyond a 30 mile radius of the main post office in town where the employer's shop is located shall be compensated at the current Internal Revenue Service (IRS) rate for actual mileage incurred beyond the 30 mile radius, plus their regular rate of pay for travel time.

Ironworkers

(1) Travel more than 50 miles from the interchange of Interstate 40 and Interstate 25 or from the employee's home should be paid at $9.00 per hour.

(2) If travel is within Santa Fe County, travel time shall be paid at $3.00 per hour.

Laborers

(1) Type A:

(a) Work travel between 50 and 85 miles from the employer's primary address should be compensated at $3.50 per hour.

(b) Work travel 86 miles or greater from the employer's primary address should be compensated at $5.00 per hour.

(2) Types B and C:

(a) Work travel over 70 miles from the union halls of Albuquerque, Espanola, Farmington, or Las Cruces shall be paid at $7.00 per hour in travel pay, not to exceed 10 hours per day;

(b) If an overnight stay is necessary, the employer shall pay $40.00 per day for meals, in addition to travel pay.

(3) Type H – no zone subsistence pay:

(4) If an employer provides the employee transportation and mutually agreeable, suitable lodging with no more than two people in a room in areas where overnight stays are necessary, subsistence rates do not apply.

Millwrights

(1) All zone pay shall be calculated from the address of the city hall of the respective dispatch point.

(2) Zone 1: Work traveled up to 45 miles from the city hall of the respective dispatch points is a free zone.

(3) Zone 2: Work traveled between 45 miles and 100 miles shall be compensated at $4.00 per hour above base wage.

(4) Zone 3: Work traveled 101 miles or more shall be compensated at $6.00 per hour above base wage.

(5) If employer fails to provide suitable lodging, employer shall pay $110.00 per diem.

(6) If an employee's principal place of residence is within 45 road miles from the project, no subsistence or travel time shall be paid.

Operating Engineers

(1) Type A operators should be compensated for zone and subsistence as follows:

(a) Work travel between 50 and 85 miles from the interchange of Interstate 25 and Interstate 40 in Albuquerque, or from the Farmington City Hall in Farmington, should be compensated at $2.50 per hour.

(b) Work travel 86 miles or more from the interchange of Interstate 25 and Interstate 40 in Albuquerque or from the Farmington City Hall in Farmington, should be compensated at $4.00 per hour.

(2) Type B and C operators:

(a) Base points for operators are 30 miles and beyond:

(i) Bernalillo county courthouse in Albuquerque;

(ii) State capital building in Santa Fe;

(iii) City hall in Farmington.

(b) Zone and subsistence for Albuquerque, Santa Fe, and Farmington are as follows:

(i) work travel between 30 and 50 miles from the base point compensated at $20.00 per day;

(ii) work travel between 51 and 100 miles from the base point compensated at $50.00 per day;

(iii) work travel over 100 miles from the base point that involves an overnight stay compensated at $100.00 per day.

(c) Zone and subsistence for Los Alamos county, $100.00 per day. This takes precedence over the 50 mile radius for Santa Fe zone and subsistence.

(d) If an employer provides the employee transportation and mutually agreeable suitable lodging in area where overnight stays are necessary, subsistence rates do not apply.

(3) Type H operators are not eligible for zone and subsistence pay.

Painters

(1) When out-of-town travel is required, the employer shall provide suitable lodging with no more than two people per room and $30.00 per day for expenses.

(2) When out-of-town travel is required and employer and employer does not provide lodging, employer shall pay $100 per day for expenses, plus their regular rate of pay.

(3) Employees required to use a personal vehicle for travel to a jobsite beyond a 60-mile radius from their residence or the employer's shop, whichever is closest to the job, shall be compensated at the current IRS rate for actual mileage incurred beyond the 60-mile radius, plus their regular rate of pay for travel time.

(4) Employer shall furnish transportation or gasoline for all work performed beyond the 30-mile radius that encompasses the free cities of Albuquerque, Santa Fe, and Belen.

Paper hangers

(1) Zone 1: Base pay for an area within a 30 mile radius from the main post office in the city or town where the employee permanently resides. Albuquerque, Santa Fe, and Belen shall be considered Zone I.

(2) Zone 2: Work travel between 30 and 75 miles from the main post office in the town where an employee permanently resides shall be compensated at $1.00 per hour above base pay.

(3) Zone 3: Work travel 75 miles or more from the main post office in the town where an employee permanently resides shall be compensated at $2.50 per hour above base pay.

(4) When the employee is required to stay overnight, the employer should provide and pay for suitable lodging.

(5) Employer will furnish transportation or gasoline for all work performed beyond the 30 mile radius that encompasses the free cities of Albuquerque, Santa Fe or Belen.

Plasterers

(1) Employees who travel from Albuquerque to Santa Fe should be compensated at $20.00 per day.

(2) Except for employees who travel from Santa Fe to Albuquerque, work travel 75 miles or more from the employer's office over the most typically traveled route should be compensated at $5.00 per hour and capped at $40.00 per day.

Plumbers and pipefitters

(1) Work travel for 90 or more miles from an employee's primary residence, and involving an overnight stay, should be compensated at $80.00 per day.

(2) No zone or subsistence pay is required should the employer elect to cover the room cost.

Roofers

Work travel requiring an overnight stay should be compensated at $35.00 per day for food. Employer should provide and pay for a suitable hotel. When employees are assigned to jobs located 60 or more miles from the employer's place of business, transportation to and from the job site must be provided.

Sheet metal workers

(1) Work travel 90 miles or more from contractor's home base and employee's home, should be paid at $120.00 per day subsistence pay plus base and fringe, regardless of county.

(2) Los Alamos county: $2.00 per hour incentive pay plus base and fringe.

(3) Workers living 60 or more miles from a San Juan county job site receive $3.00 per hour subsistence pay plus base and fringe.

Soft floor layer

(1) Zone 1: Base pay for an area within a 30 mile radius from the main post office in the city or town where the employee permanently resides. Albuquerque, Santa Fe, and Belen shall be considered Zone I.

(2) Zone 2: Work travel between 30 and 75 miles from the main post office in the town where an employee permanently resides shall be compensated at $1.00 per hour above base pay.

(3) Zone 3: Work travel 75 miles or more from the main post office in the town where an employee permanently resides shall be compensated at $3.13 per hour above base pay.

(4) Employer will furnish transportation or gasoline for all work performed beyond the 30-mile radius that encompasses the free cities of Albuquerque, Santa Fe, or Belen.

(5) When the employee is directed to report to a job site and the distance to the job site requires the employee to stay out of town overnight, the employer shall provide housing arrangements for the affected employees.

Sprinkler fitters

(1) Work travel between 60 and 80 miles from the employee's primary residence should be compensated at $23.00 per day.

(2) Work travel between 81 and 100 miles from the employee's primary residence should be compensated at $33.00 per day.

(3) Work travel of 101 miles or more from the employee's primary residence should be compensated at $125.00 per day.

(4) No zone or subsistence pay shall be paid when the employer provides daily transportation and the employee elects to travel back and forth from home.

New Mexico Department of WORKFORCE SOLUTIONS

SJ-24-2900-B

TYPE "B" – GENERAL BUILDING

Effective January 1, 2024

Trade Classification	Base Rate	Fringe Rate	Apprenticeship
Asbestos Workers/Heat and Frost insulators	35.86	12.46	0.60
Asbestos Workers/Heat and Frost insulators: Los Alamos County	38.29	12.46	0.60
Boilermaker/blacksmith	35.88	32.28	0.60
Boilermaker/blacksmith: San Juan County	36.83	31.88	0.60
Bricklayer/Block layer/Stonemason	27.03	10.99	0.60
Bricklayer/Block layer/Stonemason Curry, DeBaca, Quay and Roosevelt counties	23.10	8.98	0.60
Bricklayer/Block layer/Stonemason Dona Ana, Otero, Eddie and Lea counties	26.42	8.98	0.60
Carpenter/Lather	29.11	12.79	0.60
Carpenter: Los Alamos County	33.18	13.58	0.60
Millwright/pile driver	39.00	29.40	0.60
Cement Mason	24.31	11.16	0.60
Electricians-Outside Classifications: Zone 1			
Ground man	26.32	12.79	0.60
Equipment Operator	37.76	17.13	0.60
Lineman/technician	47.70	19.92	0.60
Cable Splicer	48.87	20.22	0.60

Electricians-Outside Classification: Zone 2			
Ground man	26.32	12.79	0.60
Equipment Operator	37.76	17.13	0.60
Lineman/technician	47.70	19.92	0.60
Cable Splicer	48.87	20.22	0.60
Electricians-Outside Classifications: Los Alamos County			
Ground man	27.07	12.81	0.60
Equipment Operator	38.85	17.17	0.60
Lineman/technician	48.95	20.24	0.60
Cable Splicer	53.75	21.44	0.60
Electricians-Inside Classifications: Zone 1			
Wireman/low voltage technician	38.30	12.60	0.60
Cable Splicer	42.13	12.71	0.60
Electricians-Inside Classification: Zone 2			
Wireman/low voltage technician	41.75	12.70	0.60
Cable Splicer	45.58	12.82	0.60
Electricians-Inside Classification: Zone 3			
Wireman/low voltage technician	44.05	12.72	0.60
Cable Splicer	47.88	12.89	0.60
Electricians-Inside Classification: Zone 4			
Wireman/low voltage technician	48.26	12.90	0.60
Cable Splicer	52.09	13.01	0.60
Electricians-Inside Classification: Dona Ana, Hidalgo, Luna and Otero Counties			
Wireman/low voltage technician	32.72	9.65	0.60
Cable splicer	32.72	9.65	0.60

Electricians-Inside Classification: Los Alamos County			
Wireman/low voltage technician	44.05	14.97	0.60
Cable Splicer	47.88	15.28	0.60
Elevator Constructor	49.77	39.19	0.60
Elevator Constructor Helper	34.84	39.19	0.60
Glazier/Fabricator	21.75	7.10	0.60
Glazier: Los Alamos county	21.75	7.10	0.60
Ironworker			
Ironworker Journeyman	28.49	18.71	0.60
Probationary Ironworker	22.79	18.71	0.60
Painter	21.00	5.75	0.60
Painter: Los Alamos county	31.18	11.50	0.60
Paper Hanger	21.00	5.75	0.60
Paper Hanger: Los Alamos county	32.06	11.50	0.60
Drywall Finisher/Taper - Light Commercial & Residential			
Ames tool operator	27.40	8.86	0.60
Hand finisher/machine texture	26.40	8.86	0.60
Drywall Finisher/Taper – Light Commercial & Residential: Los Alamos county	21.18	11.50	0.60
Plasterer	24.76	9.99	0.60
Plumber/Pipefitter	36.91	14.75	0.60
Roofer			
Roofer Journeyman	26.94	9.36	0.60
Roofer Helper	16.16	9.36	0.60
Sheet metal worker			
Zone 1	37.50	19.08	0.60
Zone 2 – Industrial	38.50	19.08	0.60
Zone 3 – Los Alamos County	39.50	19.08	0.60
Soft Floor Layer	21.00	9.20	0.60

Soft Floor Layer: Los Alamos county	31.20	11.62	0.60
Sprinkler Fitter	35.75	24.56	0.60
Tile Setter	24.46	8.81	0.60
Tile Setter Helper/Finisher	16.53	8.81	0.60
Laborers			
Group I- Unskilled	20.44	7.96	0.60
Group II – Semi-skilled	20.44	7.96	0.60
Group III- Skilled	21.44	7.96	0.60
Group IV - Specialty	23.69	7.96	0.60
Operators			
Group I	24.49	8.22	0.60
Group II	26.76	8.22	0.60
Group III	27.24	8.22	0.60
Group IV	27.70	8.22	0.60
Group V	27.90	8.22	0.60
Group VI	28.12	8.22	0.60
Group VII	28.23	8.22	0.60
Group VIII	31.43	8.22	0.60
Group IX	33.94	8.22	0.60
Group X	37.51	8.22	0.60
Truck Drivers			
Group I-VII	16.65	8.27	0.60
Group VIII	16.71	8.27	0.60
Group IX	18.65	8.27	0.60

NOTE: All contractors are required to pay SUBSISTENCE, ZONE AND INCENTIVE PAY according to the particular trade. Details are located in a PDF attachment at WWW.DWS.STATE.NM.US. Search Labor Relations/Labor Information/Public Works/Prevailing Wage Rates.

For more information about the Subsistence, Zone, and Incentive Pay rates, or to file a wage claim, contact the Labor Relations Division at (505) 841-4400 or visit us online at www.dws.state.nm.us.

CERTIFICATION OF BIDDER REGARDING EQUAL EMPLOYMENT OPPORTUNITY

Instructions: This certification is required pursuant to Executive Order 11246, entitled Equal Opportunity, as amended by Executive Order 11375, and as supplemented in DOL regulations (41 CPR Part 60). The implementing rules and regulations provide that any bidder or prospective contractor, or any of their proposed subcontractors, shall state as an initial part of the bid or negotiations of the contract whether it has participated in any previous contract or subcontract subject to the Equal Opportunity Clause; and if so, whether it has filed all compliance reports due under applicable instructions.

During the performance of this contract, the Contractor agrees as follows:

1. The Contractor will not discriminate against any employee or applicant for employment because of race, creed, color, sex, age, national origin or disability. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, creed, color, sex, age, national origin or disability. Such action shall include, but not limited to, the following: employment, upgrading demotion or transfer, recruitment advertising, layoff or termination, rates of pay or other forms of compensation; and selecting for training including apprenticeship.

2. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices as provided setting forth provisions of this nondiscrimination clause.

3. The Contractor agrees that, in all solicitation or advertisement for employment placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to their race, creed, color, sex, age, national origin or disability.

4. The Contractor agrees to send to each labor union or representative of workers with which the Contractor has had collective bargaining agreements or other contracts or understandings, a notice advising the labor union or worker's representative of the Contractors' commitments under Section 202 of Executive Order No. 11246 of September 24, 1965, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

5. The Contractor agrees to comply with all provisions of Executive Order No. 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor, and all subsequently issued rules, regulations or relevant orders, relating to equal employment opportunity.

6. The Contractor agrees to furnish all information and reports required by Executive Order No. 11246 of September 24, 1965, and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to Contractor's books, records, and account by the contracting agency and the Secretary of Labor for purpose of investigation to ascertain compliance with such rules, regulations, and orders.

7. In the event the Contractor's non-compliance with the nondiscrimination clauses of the contract or with any of such rules, regulations, or orders, this contract may be canceled, terminated or suspended in whole or in part, and the Contractor may be declared ineligible for further Government contract in accordance with procedures authorized in Executive Order No. 11246 of September 24, 1965, and such other sanctions as may be imposed and remedies invoked as provided in Executive Order No. 11246 of September 24, 1965, or by rules, regulations, or order of the Secretary of Labor, or as otherwise provided by law.

8. The Contractor agrees to include the provisions of paragraphs (1) through (8) in every subcontract or purchase related to the work of the contract unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order No. 11246 of September 24, 1965, or that such provisions will be binding upon each Contractor or vendor. The Contractor agrees to take such action with respect to any subcontract or purchase order as the contracting agency may direct as means of enforcing such provisions including sanctions for noncompliance: Provided, however, that in the event litigation with a Contractor or vendor as result of such direction by the contracting agency, the Contractor may request the United States to enter into such litigation to protect the interest of the United States.

COMPLIANCE WITH FEDERAL REGULATIONS

The Contractor agrees to comply with any Federal Statutes or Regulations which are applicable to this project including, but not limited to the following:

All labor standards including those relating to the payment of wages, working conditions, Copeland Anti-Kickback Act (18 USC 874), equal employment, and in particular:

[1] The provisions of Title 29 of the Office of the Secretary of Labor of the United States Government, Part 3, entitles "Contractors and Contractors on Public Work Financed in whole or in part by loans or grants from the United States" (29 CFR Part 3);

[2] The provision of 29 CFR Part 5 entitled "Labor Standard Provision Applicable to Contracts Governing Federally Financed and Assisted Construction" as well as the "National Labor Standard Provision Applicable to Non-construction Contracts subject to Contract Work Hours and Safety Standards Act".

[3] Those concerning relocations and related payments to all persons displaced as a result of the project as provided in the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, 42 USC 4601 et seq;

[4] The provisions of 29 CFR Part 1926 OSHA Standards for the Construction Industry and Part 1910 OSHA Standards for General Industry as applicable to the General Contractor and Subcontractors.

[5] The National Environmental Policy Act of 1969, as amended (42 USC 4321 et seq);

[6] The Clean Air Act, as amended (42 USC 11857-1858 a);

[7] The Federal Water Pollution Control Act, as amended (33 USC 1251-1376);

[8] The National Historic Preservation Act of 1966 (16 USC 470 et seq);

[9] The Wild and Scenic Rivers Act (16 USC 1271-1281);

[10] The Endangered Species Act of 1973 (16 USC 1531 et seq);

[11] The Historical and Archaeological Data Preservation Act as amended (16 USC 469 et seq);

[12] Regulations pertaining to the design, construction, and alteration of buildings to accommodate the physically handicapped;

[13] The National Flood Insurance Program;

[14] State Energy conservation Plan issued in compliance with the Energy Policy and conservation Act (P.L. 94-164).

SAFETY AND HEALTH REGULATIONS FOR CONSTRUCTION

In order to protect the lives and health of employees under the contractor and subcontractor, the contractor and subcontractor shall comply with Section 103 and 107 of the Contract Work Hours and Safety Standards Act (40 USCV 327-330) as supplemented by DOL regulations (29 CPR Part 5).

San Juan County Safety & Compliance Contractor Safety Verification Program

County Policy Statement

Contractors and subcontractors must comply with all applicable federal, state and county laws, ordinances, and guidelines for the health and safety of employees when performing construction work for San Juan County. The San Juan County Safety and Compliance Contractor Safety Verification Program will require contractors and subcontractors to demonstrate the initiation, maintenance, and supervision of all safety precautions and programs in connection with a construction project. The personal safety and health of contractors' and subcontractors' employees is of primary importance, and the prevention of occupationally induced injuries and illnesses is of such consequence that it will be given precedence over operating productivity whenever necessary.

Mike Stark
San Juan County Executive Officer

Stewart Logan
Safety and Compliance Manager

STANDARD PRACTICE INSTRUCTION

DATE: _____

SUBJECT: Contractor Safety Verification Program

REGULATORY STANDARD: All applicable Federal, State and Local Safety and Health regulatory requirements including but not limited to: OSHA - 29 CFR.

BASIS: It is the responsibility of the host General Contractor to ensure the safety of all workers conducting business on the site. When a General Contractor arranges to have employees of another employer (sub-contractors) perform work that involves activities that may put personnel at risk, the General Contractor must inform the sub-contractor that the workplace contains specific hazards and that the work to be done is permitted only if all workers have the proper training, equipment and work conditions to accomplish the task(s) in a safe manner.

GENERAL: The Contractor will ensure that safe work practices are used by Contractor personnel to provide for the control of hazards during operations such as lockout / tagout, confined space entry, welding, trenching, walking/working surfaces or piping, and general safety within our facilities. At the request of the County, the Contractor shall provide information regarding the Contractor's safety performance and programs to ensure that occupational safety and health policies have been established and are being followed.

RESPONSIBILITY: The Contractor shall be responsible for complying with this program, and the Safety and Compliance Manager will monitor the Contractor's compliance.

Contents of the Contractor Safety Verification Program

1. **Written Program.**
2. **Statement of Policy.**
3. **Routine Contractor Compliance Inspections.**
4. **Contractor Safety Meetings.**
5. **Specific Safety Standards Requiring Contractor Safety Compliance.**
6. **Contractor Training Compliance.**
7. **Contractor Safety Questionnaire.**

San Juan County Contractor Safety Verification Program

1. **Written Program.** San Juan County may review and evaluate this standard practice instruction:

- On an annual basis
- When changes occur to 29 CFR that prompt revision of this document
- When facility operational changes occur that require a revision of this document
- When there is an accident or close-call that relates to this area of safety
- When changes occur to related document that prompts a revision of this document; and/or
- Anytime the procedures fail

Effective implementation of this program requires support from all levels of Contractor management. This written program will be communicated to all personnel.

2. **Statement of Policy.** This policy is designed to establish a process to assist Contractors to accomplish desired job tasks without compromising the safety and health of employees at the designated site. The Contractor must assure that all employees and sub-contractors: 1) are trained to perform the job safely, 2) can recognize the hazards related to the job, and 3) are knowledgeable of other applicable provisions of Federal, State and Local safety and health regulatory requirements.

2.1 Initiation of work. Prior to the initiation of the Contractors' work at the site all contract employers will be informed of the applicable provisions of the facility emergency action plan and all other required information as required by relevant Federal, State and Local safety and health regulations.

3. **Contractor Disclosure.** As a means to assist contract employees to follow the safety rules of the facility, including safe work practices required by relevant regulations and policies, the following criteria and information relating to the Contractor may be reviewed by the Safety Compliance Manager.

3.1 Information relating to the Contractor's safety performance and programs;

3.2 Methods of informing the contractor, sub-contractors, architect / engineer and San Juan County personnel of known potential hazards related to the Contractor's work and applicable provisions of the facility emergency action plan;

3.3 Safe work practices to control the entrance, presence and exit of any persons in covered process areas, or other areas where known hazards exist;

3.4 Evaluation of Contractor performance in complying with specific safety standards;

3.5 Contract employee injury and illness logs related to safety standards (see section 8);

3.6 A list of unique hazards presented by Contractors' work or potential hazards generated by the Contractor in the workplace that are reported to San Juan County, such as: use of hazardous chemicals, excessive noise or dust generation, etc.

4. **Routine Contractor Compliance Inspections.** Routine Contractor compliance inspections will be conducted periodically when contractors are on site. The inspection will be made to insure working conditions conform to the best management practices regarding Contractor safety compliance.

4.1 Inspection team composition. The Contractor inspection team may be comprised of representatives of San Juan County and the Contractor.

4.2 Inspection Intervals. The Safety and Compliance Manager will coordinate inspection dates and times with all assigned inspection team members. The team may conduct inspections on a monthly basis or more frequently as needed while work is in progress.

4.3 Inspection report. The Safety and Compliance Manager will develop a Contractor safety report based on the inspection items noted during the inspection. **Imminent danger situations will be immediately addressed with the personnel responsible for correcting deficiencies and documented on the inspection report.** The following items will be accomplished:

4.3.1 The report will be distributed immediately to personnel responsible for correcting deficiencies noted during the inspection. A copy will also be given to the County Contract Administrator (the person designated by the County to administer the Contract for the project).

4.3.2 The report will be distributed to all supervisors and key management personnel affected by the Contractor's operation. Supervisors will brief the results to all employees under their control. A copy of the report will be posted in a conspicuous place for review.

4.3.3 The Safety and Compliance Manager will develop a report of deficiencies noted to determine jobs/areas that have high incidence Contractor non-compliance. These areas will be emphasized during future inspections and meetings.

4.3.4 Any deficiencies noted shall be immediately corrected by the Contractor. Corrective actions will be tracked to completion.

5. Contractor Safety Meetings.

5.1 Contractor meeting agendas. The General Contractor may develop agendas serving various topics of importance to the Contractor Safety Verification Program.

5.2 Contractor meeting schedules. Contractor safety meetings will be conducted at least once a month or on an "as needed" basis, and when operational changes to equipment, facilities, or the job occurs that impact the Contractor Safety Verification Program.

5.3 Administration update meetings. Contractor safety topics will be included in the agenda of selected staff meetings. The Safety and Compliance Manager will keep the County Contract Administrator informed of Contractor safety performance developments should issues arise.

6. Specific Safety Standards Requiring Contractor Safety Compliance. The following standards will be reviewed if the Contractor engages in activities that could fall under the jurisdiction of the specific standard:

APPLICABLE OHSA STANDARDS: Below are listed a sampling of OSHA Standards that require Contractor Safety Compliance in specific areas. The Contractor must determine any other standards that relate to specific safety conditions for the project. Please check the appropriate standards that will apply to the job:

_____ 29 CFR 1910.119	Process Safety
_____ 29 CFR 1910.120	HAZWOPER
_____ 29 CFR 1910.Subpart E	PPE
_____ 29 CFR 1910.146	Confined Space
_____ 29 CFR 1910.147	Lockout Tagout
_____ 29 CFR 1910.178	Powered Industrial Trucks
_____ 29 CFR 1910.252	Welding Safety
_____ 29 CFR 1910.1200	HAZCOM
_____ 29 CFR 1926 Subpart M	Fall Protection
_____ 29 CFR 1926 Subpart N	Cranes, Derricks and Hoist
_____ 29 CFR 1926 Subpart Q	Concrete and Masonry
_____ 29 CFR 1926 Subpart R	Steel Erection
_____ 29 CFR 1926 Subpart P	Excavations
_____ 29 CFR 1926 Subpart L	Scaffolding
_____ 29 CFR 1926 Subpart G	Signs, signals, barricades
_____ List additional standards	_____

7. Contractor Training Compliance. All Contractors will ensure that their employees are properly trained about known fire, explosion and / or toxic hazards, uncontrolled energy, confined spaces, and **any other hazard(s) related to their jobs**.

7.1 Contractors used by San Juan County are required to provide training to their employees in the work practices necessary for their specific job. Additionally, San Juan County, in coordination with the Contractor, may conduct job hazard analyses to identify, and evaluate and control processes involving highly hazardous chemicals.

7.2 Whenever there are outside contractors present, coordination with the General Contractor is mandatory. For example, the General Contractor will inform the subcontractor (and vice versa) when equipment cannot be touched, re-energized or restarted.

7.3 Safe working practices on site remain the responsibility of the General Contractor. Proper understanding and practice of working safely can be determined by observation, interviews with employees (contractors, sub-contractors, or contract employees), and OSHA reports. Any reports generated as a result of an incident shall be provided to the Safety and Compliance Manager.

7.4 Contractors used by San Juan County must:

7.4.1 Ensure that their employees are trained in safe work practices needed to perform the job.

7.4.2 Ensure their employees are instructed in the known potential fire, explosion, or toxic release hazards related to the job and the applicable provisions of the facility emergency action plan.

7.4.3 Document that their employees have received the required training.

7.4.4 Ensure that their employees follow the project safety rules and work practices.

7.4.5 Advise San Juan County of unique hazards presented by the Contractor's work.

8. Contractor Safety Questionnaire. The following questionnaire will be used to provide an initial assessment of the scope of a Contractors Safety Program (see next page).

PURPOSE: The purpose of this questionnaire is to provide San Juan County with necessary information about the Contractor's safety program. All items must be completed.

Company Name: _____

Address: _____

Safety Director: _____ Phone #: _____
(Person responsible for safety) FAX #: _____
Email: _____

1. Accident/Injury Experience

Using last year's OSHA 300 Log or Worker's Compensation Documentation, fill in the following:

A. Number of recordable injuries/illnesses _____

B. Number of restricted work days _____

C. Number of lost work days _____

D. Number of fatalities _____

E. Employee hours worked last year _____

F. Number of injuries/illnesses requiring hospitalization _____

2. Safety Program

A. Does your company have a written safety program?
Yes _____ No _____

Is the program revised/updated annually?
Yes _____ No _____

B. Does your written program contain a statement that your company abides by all federal (OSHA), state and local rules and regulations relating to safe work practices?
Yes _____ No _____

C. Do you have a new hire orientation program pertaining to safety training?
Yes _____ No _____

D. Does it include any training on the following? (If your company has a handbook, please submit a copy). Mark all that apply

Head Protection ____
Eye Protection ____
Hearing Protection ____
Respiratory Protection ____
Emergency Procedures ____
Hazardous Substances ____
Trench and Evacuation ____
Barricades ____

Safety Belts & Lifelines or Fall Protection____
Scaffolding ____
Housekeeping ____
Fire Protection ____
Hand Protection ____
Confined Space Entry ____
Electrical Safety ____
Rigging and Crane Safety ____
Hand and Power _____
Tool Safety ____
Others _____

E. Do you have a foreman safety training program?
Yes _____ No _____

F. Do you conduct regular safety meetings?
Yes _____ No _____
How often? _____

G. Are records of the training kept on site?
Yes _____ No _____

H. Do you generate accident investigation reports?
Yes _____ No _____

I. Do you perform project safety inspections?
Yes _____ No _____

Who conducts them? Name _____

Job Title _____

How often? _____

3. Lockout/Tagout

A. Does the work that you are contracting for involve any "Lockout/Tagout" situations?
Yes _____ No _____

If yes, please submit a copy of your written Lockout/Tagout procedures.

4. Hazard Communication

A. Does the work that you are contracting for, involve the use of any "Hazardous Substances"?
Yes_____ No _____

If yes, please submit a copy of your written hazard communication program and material safety data sheets for any hazardous substance that you will be using in your work.

5. Confined Spaces

   A. Does the job involve working in a "Confined Space"?
      Yes _____ No _____

   B. If yes, include your work plan, copies of training certification for the list of employees, entry permit and who will be in the permit-required confined space.

6. Elevated Work and Fall Protection

   A. Does the work that you are contracting for involve any "Elevated Work"?
      Yes _____ No _____

      If yes, please submit a copy of your fall protection and elevated work policy and procedures.

7. Powered Industrial Vehicles

   A. Does the work that you are contracting for, involve the use of any powered industrial vehicles? (i.e., fork trucks, highlifts, etc.)
      Yes _____ No _____

   B. Have designated people been trained and certified on such?
      Yes _____ No _____

   C. Are all certified drivers current on their recertification?
      Yes _____ No _____

9. Key Personnel

   List the key on-site people for this project.

Name: _____
Title: _____
Projects 1._____
2._____
3._____

Name: _____
Title: _____
Projects 1._____
2._____
3._____

Recommendations: _____

Comments: _____

_____

_____

_____

_____

For use by San Juan County

Approved *Yes ____ No____

I certify that I have conducted a review of the information contained in this questionnaire.

* Further detail on attachment: Yes __ No__

Name: _____ Signature: _____

Title: _____ Date: _____ Time: _____

ASSESSMENT QUESTIONNAIRE RETENTION INFORMATION

Permanent Retention File: _____ Location: _____

Date Filed: _____ Filed By: _____

DRAFT

AIA® Document A101® – 2017

Standard Form of Agreement Between Owner and Contractor

where the basis of payment is a Stipulated Sum

AGREEMENT made as of the « » day of « » in the year « »
(In words, indicate day, month and year.)

BETWEEN the Owner:
(Name, legal status, address and other information)

« »« »
« »
« »
« »

and the Contractor:
(Name, legal status, address and other information)

« »« »
« »
« »
« »

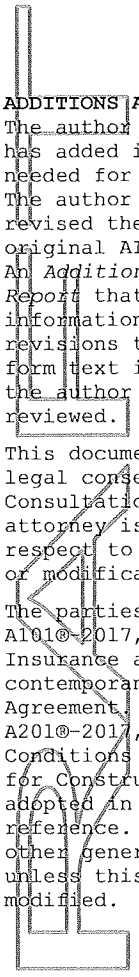
for the following Project:
(Name, location and detailed description)

«Bid 23-24-24 Re-BidCooperative Extension Office»
« »
« »

The Architect:
(Name, legal status, address and other information)

« »« »
« »
« »
« »

The Owner and Contractor agree as follows.



ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

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

The parties should complete A101®–2017, Exhibit A, Insurance and Bonds, contemporaneously with this Agreement. AIA Document A201®–2017, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

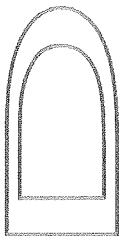


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TABLE OF ARTICLES

ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, 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, all of which 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 a Modification, appears in Article 9.

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as 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:
(Check one of the following boxes.)

[« »] The date of this Agreement.

[« »] A date set forth in a notice to proceed issued by the Owner.

[« »] Established as follows:
(Insert a date or a means to determine the date of commencement of the Work.)

« »

If a date of commencement of the Work is not selected, then the date of commencement shall be the date of this Agreement.

§ 3.2 The Contract Time shall be measured from the date of commencement of the Work.

§ 3.3 Substantial Completion

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work:
(Check one of the following boxes and complete the necessary information.)

[« »] Not later than « » (« ») calendar days from the date of commencement of the Work.

[« »] By the following date: « »

§ 3.3.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work are to be completed prior to Substantial Completion of the entire Work, the Contractor shall achieve Substantial Completion of such portions by the following dates:

Portion of Work	Substantial Completion Date

§ 3.3.3 If the Contractor fails to achieve Substantial Completion as provided in this Section 3.3, liquidated damages, if any, shall be assessed as set forth in Section 4.5.

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor 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 Alternates

§ 4.2.1 Alternates, if any, included in the Contract Sum:

Item	Price

§ 4.2.2 Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Agreement. Upon acceptance, the Owner shall issue a Modification to this Agreement.
(Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)

Item	Price	Conditions for Acceptance

§ 4.3 Allowances, if any, included in the Contract Sum:
(Identify each allowance.)

Item	Price

§ 4.4 Unit prices, if any:
(Identify the item and state the unit price and quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit ($0.00)

§ 4.5 Liquidated damages, if any:
(Insert terms and conditions for liquidated damages, if any.)

« »

§ 4.6 Other:
(Insert provisions for bonus or other incentives, if any, that might result in a change to the Contract Sum.)

« »

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 « » day of a month, the Owner shall make payment of the amount certified to the Contractor not later than the « » day of the « » month. If an Application for Payment is received by the Architect after the application date fixed above, payment of the amount certified shall be made by the Owner not later than « » (« ») days after the Architect receives the Application for Payment.
(Federal, state or local laws may require payment within a certain period of time.)

§ 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 of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.5 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.6 In accordance with AIA Document A201™–2017, General Conditions of the Contract for Construction, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

§ 5.1.6.1 The amount of each progress payment shall first include:

.1 That portion of the Contract Sum properly allocable to completed Work;

.2 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; and

.3 That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified.

§ 5.1.6.2 The amount of each progress payment shall then be reduced by:

.1 The aggregate of any amounts previously paid by the Owner;

.2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A201–2017;

.3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;

.4 For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A201–2017; and

.5 Retainage withheld pursuant to Section 5.1.7.

§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to Substantial Completion of the Work, the Owner may withhold the following amount, as retainage, from the payment otherwise due:
(Insert a percentage or amount to be withheld as retainage from each Application for Payment. The amount of retainage may be limited by governing law.)

« »

§ 5.1.7.1.1 The following items are not subject to retainage:
(Insert any items not subject to the withholding of retainage, such as general conditions, insurance, etc.)

« »

§ 5.1.7.2 Reduction or limitation of retainage, if any, shall be as follows:
(If the retainage established in Section 5.1.7.1 is to be modified prior to Substantial Completion of the entire Work, including modifications for Substantial Completion of portions of the Work as provided in Section 3.3.2, insert provisions for such modifications.)

« »

§ 5.1.7.3 Except as set forth in this Section 5.1.7.3, upon Substantial Completion of the Work, the Contractor may submit an Application for Payment that includes the retainage withheld from prior Applications for Payment pursuant to this Section 5.1.7. The Application for Payment submitted at Substantial Completion shall not include retainage as follows:
(Insert any other conditions for release of retainage upon Substantial Completion.)

« »

§ 5.1.8 If final completion of the Work is materially delayed through no fault of the Contractor, the Owner shall pay the Contractor any additional amounts in accordance with Article 9 of AIA Document A201–2017.

§ 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.

§ 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 Article 12 of AIA Document A201–2017, 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 30 days after the issuance of the Architect's final Certificate for Payment, or as follows:

« »

§ 5.3 Interest

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.
(Insert rate of interest agreed upon, if any.)

« » % « »

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as the Initial Decision Maker pursuant to Article 15 of AIA Document A201–2017, unless the parties appoint below another individual, not a party to this Agreement, to serve as the Initial Decision Maker.
(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)

« »
« »

« »
« »

§ 6.2 Binding Dispute Resolution

For any Claim subject to, but not resolved by, mediation pursuant to Article 15 of AIA Document A201–2017, the method of binding dispute resolution shall be as follows:
(Check the appropriate box.)

[« »] Arbitration pursuant to Section 15.4 of AIA Document A201–2017

[« »] Litigation in a court of competent jurisdiction

[« »] Other *(Specify)*

« »

If the Owner and Contractor do not select a method of binding dispute resolution, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2017.

§ 7.1.1 If the Contract is terminated for the Owner's convenience in accordance with Article 14 of AIA Document A201–2017, then the Owner shall pay the Contractor a termination fee as follows:
(Insert the amount of, or method for determining, the fee, if any, payable to the Contractor following a termination for the Owner's convenience.)

« »

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2017.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2017 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 The Owner's representative:
(Name, address, email address, and other information)

« »
« »
« »
« »
« »
« »

§ 8.3 The Contractor's representative:
(Name, address, email address, and other information)

« »
« »
« »
« »
« »
« »

§ 8.4 Neither the Owner's nor the Contractor's representative shall be changed without ten days' prior notice to the other party.

§ 8.5 Insurance and Bonds

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum, Exhibit A, Insurance and Bonds, and elsewhere in the Contract Documents.

§ 8.5.2 The Contractor shall provide bonds as set forth in AIA Document A101™–2017 Exhibit A, and elsewhere in the Contract Documents.

§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A201–2017, may be given in accordance with AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, if completed, or as otherwise set forth below:
(If other than in accordance with AIA Document E203–2013, insert requirements for delivering notice in electronic format such as name, title, and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)

« »

§ 8.7 Other provisions:

« »

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

.1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor

.2 AIA Document A101™–2017, Exhibit A, Insurance and Bonds

.3 AIA Document A201™–2017, General Conditions of the Contract for Construction

.4 AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, dated as indicated below:
(Insert the date of the E203-2013 incorporated into this Agreement.)

« »

.5 Drawings

Number	Title	Date

.6 Specifications

Section	Title	Date	Pages

.7 Addenda, if any:

Number	Date	Pages

Portions of Addenda relating to bidding or proposal requirements are not part of the Contract Documents unless the bidding or proposal requirements are also enumerated in this Article 9.

.8 Other Exhibits:
(Check all boxes that apply and include appropriate information identifying the exhibit where required.)

[« »] AIA Document E204™–2017, Sustainable Projects Exhibit, dated as indicated below:
(Insert the date of the E204-2017 incorporated into this Agreement.)

« »

[« »] The Sustainability Plan:

Title	Date	Pages

[« »] Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages

.9 Other documents, if any, listed below:
(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201™–2017 provides that the advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor's bid or proposal, portions of Addenda relating to bidding or proposal requirements, and other information furnished by the Owner in anticipation of receiving bids or proposals, are not part of the Contract Documents unless enumerated in this Agreement. Any such documents should be listed here only if intended to be part of the Contract Documents.)

« »

This Agreement entered into as of the day and year first written above.

OWNER *(Signature)*	CONTRACTOR *(Signature)*
« »« »	« »« »
(Printed name and title)	*(Printed name and title)*

DRAFT AIA® Document A101® – 2017

Exhibit A

Insurance and Bonds

This Insurance and Bonds Exhibit is part of the Agreement, between the Owner and the Contractor, dated the « » day of « » in the year « »
(In words, indicate day, month and year.)

for the following **PROJECT**:
(Name and location or address)

«Bid 23-24-24 Re-Bod Cooperative Extension Office»
« »

THE OWNER:
(Name, legal status and address)

« »« »
« »

THE CONTRACTOR:
(Name, legal status and address)

« »« »
« »

TABLE OF ARTICLES

ARTICLE A.1 GENERAL

The Owner and Contractor shall purchase and maintain insurance, and provide bonds, as set forth in this Exhibit. As used in this Exhibit, the term General Conditions refers to AIA Document A201™–2017, General Conditions of the Contract for Construction.

ARTICLE A.2 OWNER'S INSURANCE

§ A.2.1 General

Prior to commencement of the Work, the Owner shall secure the insurance, and provide evidence of the coverage, required under this Article A.2 and, upon the Contractor's request, provide a copy of the property insurance policy or policies required by Section A.2.3. The copy of the policy or policies provided shall contain all applicable conditions, definitions, exclusions, and endorsements.

§ A.2.2 Liability Insurance

The Owner shall be responsible for purchasing and maintaining the Owner's usual general liability insurance.

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

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

This document is intended to be used in conjunction with AIA Document A201®–2017, General Conditions of the Contract for Construction. Article 11 of A201®–2017 contains additional insurance provisions.

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§ A.2.3 Required Property Insurance

§ A.2.3.1 Unless this obligation is placed on the Contractor pursuant to Section A.3.3.2.1, the Owner shall purchase and maintain, from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located, property insurance written on a builder's risk "all-risks" completed value or equivalent policy form and sufficient to cover the total value of the entire Project on a replacement cost basis. The Owner's property insurance coverage shall be no less than the amount of the initial Contract Sum, plus the value of subsequent Modifications and labor performed and materials or equipment supplied by others. The property insurance shall be maintained until Substantial Completion and thereafter as provided in Section A.2.3.1.3, unless otherwise provided in the Contract Documents or otherwise agreed in writing by the parties to this Agreement. This insurance shall include the interests of the Owner, Contractor, Subcontractors, and Sub-subcontractors in the Project as insureds. This insurance shall include the interests of mortgagees as loss payees.

§ A.2.3.1.1 Causes of Loss. The insurance required by this Section A.2.3.1 shall provide coverage for direct physical loss or damage, and shall not exclude the risks of fire, explosion, theft, vandalism, malicious mischief, collapse, earthquake, flood, or windstorm. The insurance shall also provide coverage for ensuing loss or resulting damage from error, omission, or deficiency in construction methods, design, specifications, workmanship, or materials. Sub-limits, if any, are as follows:
(Indicate below the cause of loss and any applicable sub-limit.)

Causes of Loss	Sub-Limit

§ A.2.3.1.2 Specific Required Coverages. The insurance required by this Section A.2.3.1 shall provide coverage for loss or damage to falsework and other temporary structures, and to building systems from testing and startup. The insurance shall also cover debris removal, including demolition occasioned by enforcement of any applicable legal requirements, and reasonable compensation for the Architect's and Contractor's services and expenses required as a result of such insured loss, including claim preparation expenses. Sub-limits, if any, are as follows:
(Indicate below type of coverage and any applicable sub-limit for specific required coverages.)

Coverage	Sub-Limit

§ A.2.3.1.3 Unless the parties agree otherwise, upon Substantial Completion, the Owner shall continue the insurance required by Section A.2.3.1 or, if necessary, replace the insurance policy required under Section A.2.3.1 with property insurance written for the total value of the Project that shall remain in effect until expiration of the period for correction of the Work set forth in Section 12.2.2 of the General Conditions.

§ A.2.3.1.4 Deductibles and Self-Insured Retentions. If the insurance required by this Section A.2.3 is subject to deductibles or self-insured retentions, the Owner shall be responsible for all loss not covered because of such deductibles or retentions.

§ A.2.3.2 Occupancy or Use Prior to Substantial Completion. The Owner's occupancy or use of any completed or partially completed portion of the Work prior to Substantial Completion shall not commence until the insurance company or companies providing the insurance under Section A.2.3.1 have consented in writing to the continuance of coverage. The Owner and the Contractor shall take no action with respect to partial occupancy or use that would cause cancellation, lapse, or reduction of insurance, unless they agree otherwise in writing.

§ A.2.3.3 Insurance for Existing Structures

If the Work involves remodeling an existing structure or constructing an addition to an existing structure, the Owner shall purchase and maintain, until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, "all-risks" property insurance, on a replacement cost basis, protecting the existing structure against direct physical loss or damage from the causes of loss identified in Section A.2.3.1, notwithstanding the undertaking of the Work. The Owner shall be responsible for all co-insurance penalties.

§ A.2.4 Optional Extended Property Insurance.

The Owner shall purchase and maintain the insurance selected and described below.

(Select the types of insurance the Owner is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance. For each type of insurance selected, indicate applicable limits of coverage or other conditions in the fill point below the selected item.)

[« »] § A.2.4.1 **Loss of Use, Business Interruption, and Delay in Completion Insurance**, to reimburse the Owner for loss of use of the Owner's property, or the inability to conduct normal operations due to a covered cause of loss.

« »

[« »] § A.2.4.2 **Ordinance or Law Insurance**, for the reasonable and necessary costs to satisfy the minimum requirements of the enforcement of any law or ordinance regulating the demolition, construction, repair, replacement or use of the Project.

« »

[« »] § A.2.4.3 **Expediting Cost Insurance**, for the reasonable and necessary costs for the temporary repair of damage to insured property, and to expedite the permanent repair or replacement of the damaged property.

« »

[« »] § A.2.4.4 **Extra Expense Insurance**, to provide reimbursement of the reasonable and necessary excess costs incurred during the period of restoration or repair of the damaged property that are over and above the total costs that would normally have been incurred during the same period of time had no loss or damage occurred.

« »

[« »] § A.2.4.5 **Civil Authority Insurance**, for losses or costs arising from an order of a civil authority prohibiting access to the Project, provided such order is the direct result of physical damage covered under the required property insurance.

« »

[« »] § A.2.4.6 **Ingress/Egress Insurance**, for loss due to the necessary interruption of the insured's business due to physical prevention of ingress to, or egress from, the Project as a direct result of physical damage.

« »

[« »] § A.2.4.7 **Soft Costs Insurance**, to reimburse the Owner for costs due to the delay of completion of the Work, arising out of physical loss or damage covered by the required property insurance: including construction loan fees; leasing and marketing expenses; additional fees, including those of architects, engineers, consultants, attorneys and accountants, needed for the completion of the construction, repairs, or reconstruction; and carrying costs such as property taxes, building permits, additional interest on loans, realty taxes, and insurance premiums over and above normal expenses.

« »

§ A.2.5 Other Optional Insurance.

The Owner shall purchase and maintain the insurance selected below.

(Select the types of insurance the Owner is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance.)

[« »] § A.2.5.1 Cyber Security Insurance for loss to the Owner due to data security and privacy breach, including costs of investigating a potential or actual breach of confidential or private information. *(Indicate applicable limits of coverage or other conditions in the fill point below.)*

« »

[« »] § A.2.5.2 Other Insurance
(List below any other insurance coverage to be provided by the Owner and any applicable limits.)

Coverage	Limits

ARTICLE A.3 CONTRACTOR'S INSURANCE AND BONDS

§ A.3.1 General

§ A.3.1.1 Certificates of Insurance. The Contractor shall provide certificates of insurance acceptable to the Owner evidencing compliance with the requirements in this Article A.3 at the following times: (1) prior to commencement of the Work; (2) upon renewal or replacement of each required policy of insurance; and (3) upon the Owner's written request. An additional certificate evidencing continuation of commercial liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment and thereafter upon renewal or replacement of such coverage until the expiration of the periods required by Section A.3.2.1 and Section A.3.3.1. The certificates will show the Owner as an additional insured on the Contractor's Commercial General Liability and excess or umbrella liability policy or policies.

§ A.3.1.2 Deductibles and Self-Insured Retentions. The Contractor shall disclose to the Owner any deductible or self-insured retentions applicable to any insurance required to be provided by the Contractor.

§ A.3.1.3 Additional Insured Obligations. To the fullest extent permitted by law, the Contractor shall cause the commercial general liability coverage to include (1) the Owner, the Architect, and the Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions for which loss occurs during completed operations. The additional insured coverage shall be primary and non-contributory to any of the Owner's general liability insurance policies and shall apply to both ongoing and completed operations. To the extent commercially available, the additional insured coverage shall be no less than that provided by Insurance Services Office, Inc. (ISO) forms CG 20 10 07 04, CG 20 37 07 04, and, with respect to the Architect and the Architect's consultants, CG 20 32 07 04.

§ A.3.2 Contractor's Required Insurance Coverage

§ A.3.2.1 The Contractor shall purchase and maintain the following types and limits of insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below:
(If the Contractor is required to maintain insurance for a duration other than the expiration of the period for correction of Work, state the duration.)

« »

§ A.3.2.2 Commercial General Liability

§ A.3.2.2.1 Commercial General Liability insurance for the Project written on an occurrence form with policy limits of not less than « » ($ « ») each occurrence, « » ($ « ») general aggregate, and « » ($ « ») aggregate for products-completed operations hazard, providing coverage for claims including

.1 damages because of bodily injury, sickness or disease, including occupational sickness or disease, and death of any person;

.2 personal injury and advertising injury;

.3 damages because of physical damage to or destruction of tangible property, including the loss of use of such property;

.4 bodily injury or property damage arising out of completed operations; and

.5 the Contractor's indemnity obligations under Section 3.18 of the General Conditions.

§ A.3.2.2.2 The Contractor's Commercial General Liability policy under this Section A.3.2.2 shall not contain an exclusion or restriction of coverage for the following:

.1 Claims by one insured against another insured, if the exclusion or restriction is based solely on the fact that the claimant is an insured, and there would otherwise be coverage for the claim.

.2 Claims for property damage to the Contractor's Work arising out of the products-completed operations hazard where the damaged Work or the Work out of which the damage arises was performed by a Subcontractor.

.3 Claims for bodily injury other than to employees of the insured.

.4 Claims for indemnity under Section 3.18 of the General Conditions arising out of injury to employees of the insured.

.5 Claims or loss excluded under a prior work endorsement or other similar exclusionary language.

.6 Claims or loss due to physical damage under a prior injury endorsement or similar exclusionary language.

.7 Claims related to residential, multi-family, or other habitational projects, if the Work is to be performed on such a project.

.8 Claims related to roofing, if the Work involves roofing.

.9 Claims related to exterior insulation finish systems (EIFS), synthetic stucco or similar exterior coatings or surfaces, if the Work involves such coatings or surfaces.

.10 Claims related to earth subsidence or movement, where the Work involves such hazards.

.11 Claims related to explosion, collapse and underground hazards, where the Work involves such hazards.

§ A.3.2.3 Automobile Liability covering vehicles owned, and non-owned vehicles used, by the Contractor, with policy limits of not less than « » ($ « ») per accident, for bodily injury, death of any person, and property damage arising out of the ownership, maintenance and use of those motor vehicles along with any other statutorily required automobile coverage.

§ A.3.2.4 The Contractor may achieve the required limits and coverage for Commercial General Liability and Automobile Liability through a combination of primary and excess or umbrella liability insurance, provided such primary and excess or umbrella insurance policies result in the same or greater coverage as the coverages required under Section A.3.2.2 and A.3.2.3, and in no event shall any excess or umbrella liability insurance provide narrower coverage than the primary policy. The excess policy shall not require the exhaustion of the underlying limits only through the actual payment by the underlying insurers.

§ A.3.2.5 Workers' Compensation at statutory limits.

§ A.3.2.6 Employers' Liability with policy limits not less than « » ($ « ») each accident, « » ($ « ») each employee, and « » ($ « ») policy limit.

§ A.3.2.7 Jones Act, and the Longshore & Harbor Workers' Compensation Act, as required, if the Work involves hazards arising from work on or near navigable waterways, including vessels and docks

§ A.3.2.8 If the Contractor is required to furnish professional services as part of the Work, the Contractor shall procure Professional Liability insurance covering performance of the professional services, with policy limits of not less than « » ($ « ») per claim and « » ($ « ») in the aggregate.

§ A.3.2.9 If the Work involves the transport, dissemination, use, or release of pollutants, the Contractor shall procure Pollution Liability insurance, with policy limits of not less than « » ($ « ») per claim and « » ($ « ») in the aggregate.

§ A.3.2.10 Coverage under Sections A.3.2.8 and A.3.2.9 may be procured through a Combined Professional Liability and Pollution Liability insurance policy, with combined policy limits of not less than « » ($ « ») per claim and « » ($ « ») in the aggregate.

§ A.3.2.11 Insurance for maritime liability risks associated with the operation of a vessel, if the Work requires such activities, with policy limits of not less than « » ($ « ») per claim and « » ($ « ») in the aggregate.

§ A.3.2.12 Insurance for the use or operation of manned or unmanned aircraft, if the Work requires such activities, with policy limits of not less than « » ($ « ») per claim and « » ($ « ») in the aggregate.

§ A.3.3 Contractor's Other Insurance Coverage

§ A.3.3.1 Insurance selected and described in this Section A.3.3 shall be purchased from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below:
(If the Contractor is required to maintain any of the types of insurance selected below for a duration other than the expiration of the period for correction of Work, state the duration.)

« »

§ A.3.3.2 The Contractor shall purchase and maintain the following types and limits of insurance in accordance with Section A.3.3.1.
(Select the types of insurance the Contractor is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance. Where policy limits are provided, include the policy limit in the appropriate fill point.)

[« »] § A.3.3.2.1 Property insurance of the same type and scope satisfying the requirements identified in Section A.2.3, which, if selected in this section A.3.3.2.1, relieves the Owner of the responsibility to purchase and maintain such insurance except insurance required by Section A.2.3.1.3 and Section A.2.3.3. The Contractor shall comply with all obligations of the Owner under Section A.2.3 except to the extent provided below. The Contractor shall disclose to the Owner the amount of any deductible, and the Owner shall be responsible for losses within the deductible. Upon request, the Contractor shall provide the Owner with a copy of the property insurance policy or policies required. The Owner shall adjust and settle the loss with the insurer and be the trustee of the proceeds of the property insurance in accordance with Article 11 of the General Conditions unless otherwise set forth below:
(Where the Contractor's obligation to provide property insurance differs from the Owner's obligations as described under Section A.2.3, indicate such differences in the space below. Additionally, if a party other than the Owner will be responsible for adjusting and settling a loss with the insurer and acting as the trustee of the proceeds of property insurance in accordance with Article 11 of the General Conditions, indicate the responsible party below.)

« »

[« »] § A.3.3.2.2 **Railroad Protective Liability Insurance**, with policy limits of not less than « » ($ « ») per claim and « » ($ « ») in the aggregate, for Work within fifty (50) feet of railroad property.

[« »] § A.3.3.2.3 **Asbestos Abatement Liability Insurance**, with policy limits of not less than « » ($ « ») per claim and « » ($ « ») in the aggregate, for liability arising from the encapsulation, removal, handling, storage, transportation, and disposal of asbestos-containing materials.

[« »] § A.3.3.2.4 Insurance for physical damage to property while it is in storage and in transit to the construction site on an "all-risks" completed value form.

[« »] § A.3.3.2.5 Property insurance on an "all-risks" completed value form, covering property owned by the Contractor and used on the Project, including scaffolding and other equipment.

[« »] § A.3.3.2.6 **Other Insurance**
(List below any other insurance coverage to be provided by the Contractor and any applicable limits.)

Coverage	Limits

§ A.3.4 Performance Bond and Payment Bond

The Contractor shall provide surety bonds, from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located, as follows:
(Specify type and penal sum of bonds.)

Type	Penal Sum ($0.00)
Payment Bond	
Performance Bond	

Payment and Performance Bonds shall be AIA Document A312™, Payment Bond and Performance Bond, or contain provisions identical to AIA Document A312™, current as of the date of this Agreement.

ARTICLE A.4 SPECIAL TERMS AND CONDITIONS

Special terms and conditions that modify this Insurance and Bonds Exhibit, if any, are as follows:

« »

DRAFT

AIA® Document A201® – 2017

General Conditions of the Contract for Construction

for the following PROJECT:
(Name and location or address)

«Bid 23-24-24 Re-Bid Cooperative Extension Office»
« »

THE OWNER:
(Name, legal status and address)

« »« »
« »

THE ARCHITECT:
(Name, legal status and address)

« »« »
« »

TABLE OF ARTICLES

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

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

For guidance in modifying this document to include supplementary conditions, see AIA Document A503™, Guide for Supplementary Conditions.

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INDEX
(Topics and numbers in bold are Section headings.)

ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of 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 the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding or proposal 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 Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants, or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

§ 1.1.3 The Work

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

§ 1.1.4 The Project

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and 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 Instruments of Service

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 Initial Decision Maker

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2. The Initial Decision Maker shall not show partiality to the Owner or Contractor and shall not be liable for results of interpretations or decisions rendered in good faith.

§ 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.

§ 1.2.1.1 The invalidity of any provision of the Contract Documents shall not invalidate the Contract or its remaining provisions. If it is determined that any provision of the Contract Documents violates any law, or is otherwise invalid or unenforceable, then that provision shall be revised to the extent necessary to make that provision legal and enforceable. In such case the Contract Documents shall be construed, to the fullest extent permitted by law, to give effect to the parties' intentions and purposes in executing the Contract.

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

§ 1.3 Capitalization

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles, or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 Interpretation

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 Ownership and Use of Drawings, Specifications, and Other Instruments of Service

§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and retain all common law, statutory, and other reserved rights in their Instruments of Service, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to any protocols established pursuant to Sections 1.7 and 1.8, solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and suppliers may not use the Instruments of Service on other projects or for additions to the Project outside the scope of the Work without the specific written consent of the Owner, Architect, and the Architect's consultants.

§ 1.6 Notice

§ 1.6.1 Except as otherwise provided in Section 1.6.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly served if delivered in person, by mail, by courier, or by electronic transmission if a method for electronic transmission is set forth in the Agreement.

§ 1.6.2 Notice of Claims as provided in Section 15.1.3 shall be provided in writing and shall be deemed to have been duly served only if delivered to the designated representative of the party to whom the notice is addressed by certified or registered mail, or by courier providing proof of delivery.

§ 1.7 Digital Data Use and Transmission

The parties shall agree upon protocols governing the transmission and use of Instruments of Service or any other information or documentation in digital form. The parties will use AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, to establish the protocols for the development, use, transmission, and exchange of digital data.

§ 1.8 Building Information Models Use and Reliance

Any use of, or reliance on, all or a portion of a building information model without agreement to protocols governing the use of, and reliance on, the information contained in the model and without having those protocols set

forth in AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, and the requisite AIA Document G202™–2013, Project Building Information Modeling Protocol Form, shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

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 Section 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 Evidence of the Owner's Financial Arrangements

§ 2.2.1 Prior to commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. The Contractor shall have no obligation to commence the Work until the Owner provides such evidence. If commencement of the Work is delayed under this Section 2.2.1, the Contract Time shall be extended appropriately.

§ 2.2.2 Following commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract only if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due; or (3) a change in the Work materially changes the Contract Sum. If the Owner fails to provide such evidence, as required, within fourteen days of the Contractor's request, the Contractor may immediately stop the Work and, in that event, shall notify the Owner that the Work has stopped. However, if the request is made because a change in the Work materially changes the Contract Sum under (3) above, the Contractor may immediately stop only that portion of the Work affected by the change until reasonable evidence is provided. If the Work is stopped under this Section 2.2.2, 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 in the Contract Documents.

§ 2.2.3 After the Owner furnishes evidence of financial arrangements under this Section 2.2, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.4 Where the Owner has designated information furnished under this Section 2.2 as "confidential," the Contractor shall keep the information confidential and shall not disclose it to any other person. However, the Contractor may disclose "confidential" information, after seven (7) days' notice to the Owner, where disclosure is required by law, including a subpoena or other form of compulsory legal process issued by a court or governmental entity, or by court or arbitrator(s) order. The Contractor may also disclose "confidential" information to its employees, consultants, sureties, Subcontractors and their employees, Sub-subcontractors, and others who need to know the content of such information solely and exclusively for the Project and who agree to maintain the confidentiality of such information.

§ 2.3 Information and Services Required of the Owner

§ 2.3.1 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, 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.

§ 2.3.2 The Owner shall retain an architect lawfully licensed to practice architecture, or an entity lawfully practicing architecture, in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 2.3.3 If the employment of the Architect terminates, the Owner shall employ a successor to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

§ 2.3.4 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.

§ 2.3.5 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.3.6 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.4 Owner's Right to Stop the Work

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly 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 Section 6.1.3.

§ 2.5 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect and the Architect may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect, or failure. If current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.

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 Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. 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 its 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 or entities other than the Contractor.

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

§ 3.2.1 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.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.4, 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 coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. 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.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall submit Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner, subject to Section 15.1.7, as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 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. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and shall be 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 notice to the Owner and Architect, and shall propose alternative means, methods, techniques, sequences, or procedures. The Architect shall evaluate the proposed alternative solely for conformance with the design intent for the completed construction. Unless the Architect objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative means, methods, techniques, sequences, or procedures.

§ 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 Except in the case of minor changes in the Work approved by the Architect in accordance with Section 3.12.8 or ordered by the Architect in accordance with Section 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly 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 the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work 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 All material, equipment, or other special warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 9.8.4.

§ 3.6 Taxes

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

§ 3.7 Permits, Fees, Notices and Compliance with Laws

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

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

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions

If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that 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, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 14 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that 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 that an equitable adjustment be made 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 promptly notify the Owner and Contractor, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may submit a Claim as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately

suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 Allowances

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

§ 3.8.2 Unless otherwise provided in the Contract Documents,

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

.2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit, and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and

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

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 Superintendent

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the name and qualifications of a proposed superintendent. Within 14 days of receipt of the information, the Architect may notify the Contractor, stating whether the Owner or the Architect (1) has reasonable objection to the proposed superintendent or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 Contractor's Construction and Submittal Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project.

§ 3.10.2 The Contractor, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, shall submit a submittal schedule for the Architect's approval. The Architect's approval shall not be unreasonably delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, or fails to provide submittals in accordance with the approved submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

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

§ 3.11 Documents and Samples at the Site

The Contractor shall make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. These shall be in electronic form or paper copy, available to the Architect and Owner, and delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 Shop Drawings, Product Data and Samples

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules, and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier, or distributor to illustrate some portion of the Work.

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

§ 3.12.3 Samples are physical examples that 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. Their purpose is to demonstrate how the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 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 that 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, in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, 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.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

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

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from the requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the Architect 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 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 that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures. The Contractor shall not be required to provide professional services in violation of applicable law.

§ 3.12.10.1 If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall be entitled to rely upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Shop Drawings, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

§ 3.12.10.2 If the Contract Documents require the Contractor's design professional to certify that the Work has been performed in accordance with the design criteria, the Contractor shall furnish such certifications to the Architect at the time and in the form specified by the Architect.

§ 3.13 Use of Site

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, lawful orders of public authorities, 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. All areas requiring cutting, fitting, or patching shall be restored to the condition existing prior to the cutting, fitting, or patching, unless otherwise required by the Contract Documents.

§ 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 construction by the Owner or a Separate Contractor except with written consent of the Owner and of the Separate Contractor. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Owner or a Separate Contractor, its 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 and rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery, and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 Access to Work

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

§ 3.17 Royalties, Patents and Copyrights

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 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 an infringement of a copyright or patent is discovered by, or made known to, the Contractor, the Contractor shall be responsible for the loss unless the information is promptly furnished to the Architect.

§ 3.18 Indemnification

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

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

ARTICLE 4 ARCHITECT

§ 4.1 General

§ 4.1.1 The Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement.

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

§ 4.2 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 during construction until the date the Architect issues the final Certificate for Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed 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 not have control over, charge of, or responsibility 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.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner (1) known deviations from the Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) defects and deficiencies observed in the Work. 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

The Owner and Contractor shall include the Architect in all communications that relate to or affect the Architect's services or professional responsibilities. The Owner shall promptly notify the Architect of the substance of any direct communications between the Owner and the Contractor otherwise relating to the Project. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and suppliers shall be through the Contractor. Communications by and with Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.

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

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, whether or not the Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, 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 in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness 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 Sections 3.3, 3.5, and 3.12. The Architect's review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences, or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may order minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; 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 pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more Project representatives to assist in carrying out the Architect's responsibilities at the site. The Owner shall notify the Contractor of any change in the duties, responsibilities and limitations of authority of the Project representatives.

§ 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.

§ 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 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 rendered in good faith.

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

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

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 the 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, the Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the persons or entities proposed for each principal portion of the Work, including those who are to furnish materials or equipment fabricated to a special design. Within 14 days of receipt of the information, the Architect may notify the Contractor whether the Owner or the Architect (1) has reasonable objection to any such proposed person or entity or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.

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

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

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

§ 5.3 Subcontractual Relations

By appropriate written agreement, 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 that the Contractor, by these Contract 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 that may be at variance with the Contract Documents. Subcontractors will

similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 Contingent Assignment of Subcontracts

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

.1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor; and

.2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

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

§ 5.4.3 Upon assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

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 term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation.

§ 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 any Separate Contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to its 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 or with Separate Contractors, the Owner or its Separate Contractors shall have the same obligations and rights that the Contractor has under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11, and 12.

§ 6.2 Mutual Responsibility

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

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a Separate Contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Architect of apparent discrepancies or defects prior to proceeding with the

Work 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. The Contractor shall not be responsible for discrepancies or defects in the construction or operations by the Owner or Separate Contractor that are not apparent.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a Separate Contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a Separate Contractor's delays, improperly timed activities, damage to the Work or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage that the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or Separate Contractor as provided in Section 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 Section 3.14.

§ 6.3 Owner's Right to Clean Up

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. The Contractor shall proceed promptly with changes in the Work, unless otherwise provided in the Change Order, Construction Change Directive, or order for a minor change in the Work.

§ 7.2 Change Orders

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

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

§ 7.3 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 Section 7.3.4.

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the adjustment 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, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 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 Section 7.3.4 shall be limited to the following:

.1 Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Architect;

.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, directly related to the change; and

.5 Costs of supervision and field office personnel directly attributable to the change.

§ 7.3.5 If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

§ 7.3.6 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.

§ 7.3.7 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement 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.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that 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.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim 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 15.

§ 7.3.10 When the Owner and Contractor agree with a 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 the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 Minor Changes in the Work

The Architect may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Architect and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor

change without prior notice to the Architect that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

ARTICLE 8 TIME

§ 8.1 Definitions

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

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

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 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, commence the Work prior to the effective date of insurance required to be furnished by the Contractor and Owner.

§ 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 (1) an act or neglect of the Owner or Architect, of an employee of either, or of a Separate Contractor; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner pending mediation and binding dispute resolution; or (5) by other causes that the Contractor asserts, and the Architect determines, justify delay, then the Contract Time shall be extended 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 Article 15.

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

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

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

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 9.2 Schedule of Values

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit a schedule of values to the Architect before the first Application for Payment, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Architect. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. Any changes to the schedule of values shall be submitted to the Architect and supported by such data to substantiate its accuracy as the Architect may require, and unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's subsequent 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 prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. The application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment that the Owner or Architect require, such as copies of requisitions, and releases and waivers of liens from Subcontractors and suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that 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 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or supplier, unless such Work has been performed by others whom the Contractor intends to pay.

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

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

§ 9.4 Certificates for Payment

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either (1) issue to the Owner a Certificate for Payment in the full amount of the Application for Payment, with a copy to the Contractor; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Contractor and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Contractor and Owner of the Architect's reason for withholding certification in whole as provided in Section 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 in the Application for Payment, that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified. 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. 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 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 Section 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 Section 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 Section 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 suppliers 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 a Separate 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 repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When either party disputes the Architect's decision regarding a Certificate for Payment under Section 9.5.1, in whole or in part, that party may submit a Claim in accordance with Article 15.

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

§ 9.5.4 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or supplier to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Contractor shall reflect such payment on its next Application for Payment.

§ 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 pay each Subcontractor, no later than seven days after receipt of payment from the Owner, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the 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 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors and suppliers to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay, or to see to the payment of money to, a Subcontractor or supplier, except as may otherwise be required by law.

§ 9.6.5 The Contractor's payments to suppliers shall be treated in a manner similar to that provided in Sections 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 or provided by 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, create any fiduciary liability or tort liability on the part of the Contractor for breach of trust, or entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.6.8 Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. If approved by the applicable court, when required, the Contractor may substitute a surety bond for the property against which the lien or other claim for payment has been asserted.

§ 9.7 Failure of Payment

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents, the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' 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 that shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and 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 the Certificate. Upon such acceptance, and consent of surety if any, the Owner shall make payment of retainage applying to the 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 and authorized by public authorities having jurisdiction over the Project. 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 Section 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 the Contractor's 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. 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 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 Section 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, (3) a written statement that the Contractor knows of no 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, (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6) if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts and 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, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance 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 the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees.

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

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

.1 liens, Claims, security interests, or encumbrances arising out of the Contract and unsettled;
.2 failure of the Work to comply with the requirements of the Contract Documents;
.3 terms of special warranties required by the Contract Documents; or
.4 audits performed by the Owner, if permitted by the Contract Documents, after final payment.

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

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

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, a Subcontractor, or a Sub-subcontractor; 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 comply with, and give notices required by applicable laws, statutes, ordinances, codes, rules and 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 implement, 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 the owners and users of adjacent sites and utilities of the safeguards.

§ 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 Sections 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 Sections 10.2.1.2 and 10.2.1.3. The Contractor may make a Claim for the cost to remedy the damage or loss to the extent such damage or loss is 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 Section 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 permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 Injury or Damage to Person or Property

If either party 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, notice of the 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.

§ 10.3 Hazardous Materials and Substances

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials or substances. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and 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 notify the Owner and Architect of the condition.

§ 10.3.2 Upon receipt of the Contractor's notice, 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 cause it to be 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 the material or substance or who are to perform the task of removal or safe containment of the 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. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up.

§ 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 Section 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), except to the extent that such damage, loss, or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for hazardous materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for hazardous materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall reimburse the Owner for the cost and expense the Owner incurs (1) for remediation of hazardous materials or substances the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency 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 reimburse the Contractor for all cost and expense thereby incurred.

§ 10.4 Emergencies

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 Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Insurance and Bonds

§ 11.1.1 The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Owner, Architect, and Architect's consultants shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents.

§ 11.1.2 The Contractor shall provide surety bonds of the types, for such penal sums, and subject to such terms and conditions as required by the Contract Documents. The Contractor shall purchase and maintain the required bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 11.1.3 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

§ 11.1.4 Notice of Cancellation or Expiration of Contractor's Required Insurance. Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice to the Owner of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

§ 11.2 Owner's Insurance

§ 11.2.1 The Owner shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Owner shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located.

§ 11.2.2 Failure to Purchase Required Property Insurance. If the Owner fails to purchase and maintain the required property insurance, with all of the coverages and in the amounts described in the Agreement or elsewhere in the Contract Documents, the Owner shall inform the Contractor in writing prior to commencement of the Work. Upon receipt of notice from the Owner, the Contractor may delay commencement of the Work and may obtain insurance that will protect the interests of the Contractor, Subcontractors, and Sub-Subcontractors in the Work. When the failure to provide coverage has been cured or resolved, the Contract Sum and Contract Time shall be equitably adjusted. In the event the Owner fails to procure coverage, the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent the loss to the Owner would have been covered by the insurance to have been procured by the Owner. The cost of the insurance shall be charged to the Owner by a Change Order. If the Owner does not provide written notice, and the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain the required insurance, the Owner shall reimburse the Contractor for all reasonable costs and damages attributable thereto.

§ 11.2.3 Notice of Cancellation or Expiration of Owner's Required Property Insurance. Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property insurance required by the Contract Documents, the Owner shall provide notice to the Contractor of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.

§ 11.3 Waivers of Subrogation

§ 11.3.1 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; (2) the Architect and Architect's consultants; and (3) Separate Contractors, 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 those losses are covered by property insurance required by the Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Architect, Architect's consultants, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

§ 11.3.2 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, to the extent permissible by such policies, the Owner waives all rights in accordance with the terms of Section 11.3.1 for damages caused by fire or other causes of loss covered by this separate property insurance.

§ 11.4 Loss of Use, Business Interruption, and Delay in Completion Insurance

The Owner, at the Owner's option, may purchase and maintain insurance that will protect the Owner against loss of use of the Owner's property, or the inability to conduct normal operations, due to fire or other causes of loss. The Owner waives all rights of action against the Contractor and Architect for loss of use of the Owner's property, due to fire or other hazards however caused.

§11.5 Adjustment and Settlement of Insured Loss

§ 11.5.1 A loss insured under the property insurance required by the Agreement shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.5.2. The Owner shall pay the Architect and Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements the Architect and Contractor shall make payments to their consultants and Subcontractors in similar manner.

§ 11.5.2 Prior to settlement of an insured loss, the Owner shall notify the Contractor of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Contractor shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Contractor does not object, the Owner shall settle the loss and the Contractor shall be bound by the settlement and allocation. Upon receipt, the Owner shall deposit the insurance proceeds in a separate account and make the appropriate distributions. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the Contractor timely objects to either the terms of the proposed settlement or the allocation of the proceeds, the Owner may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.

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 requested 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 that 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, the Contractor shall be entitled to an equitable adjustment to

the Contract Sum and Contract Time as may be appropriate. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense.

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, discovered before Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, 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 Section 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 Section 9.9.1, or by terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of 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 Section 2.5.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that 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 of the Owner or Separate Contractors, whether completed or partially completed, caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

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

§ 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that 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

The Contract shall be governed by the law of the place where the Project is located, excluding that jurisdiction's choice of law rules. If the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.2 Successors and Assigns

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to covenants, agreements, and obligations contained in the Contract Documents. Except as provided in Section 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 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 a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate the assignment.

§ 13.3 Rights and Remedies

§ 13.3.1 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.

§ 13.3.2 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 upon in writing.

§ 13.4 Tests and Inspections

§ 13.4.1 Tests, inspections, and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules, and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections, and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

§ 13.4.2 If the Architect, Owner, or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection, or approval not included under Section 13.4.1, 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 Section 13.4.3, shall be at the Owner's expense.

§ 13.4.3 If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 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.

§ 13.4.4 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.

§ 13.4.5 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.

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

§ 13.5 Interest

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at the rate the parties 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.

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, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, for any of the following reasons:

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

.2 An act of government, such as a declaration of national emergency, that 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 Section 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 reasonable evidence as required by Section 2.2.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, repeated suspensions, delays, or interruptions of the entire Work by the Owner as described in Section 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 Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, as well as reasonable overhead and profit on Work not executed, and costs incurred by reason of such termination.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees or any other persons or entities performing portions of the Work because the Owner has repeatedly 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' notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

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

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

.3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or

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

§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, and upon certification by the Architect that sufficient cause exists to justify such action, the Owner 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' notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

.1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;

.2 Accept assignment of subcontracts pursuant to Section 5.4; and

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

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance,

the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Initial Decision Maker, 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 under Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

.1 that performance is, was, or would have been, so suspended, delayed, or interrupted, by another cause for which the Contractor is responsible; or

.2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 Termination by the Owner for Convenience

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

§ 14.4.2 Upon receipt of 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 Owner shall pay the Contractor for Work properly executed; costs incurred by reason of the termination, including costs attributable to termination of Subcontracts; and the termination fee, if any, set forth in the Agreement.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, a change in the Contract 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. The responsibility to substantiate Claims shall rest with the party making the Claim. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents.

§ 15.1.2 Time Limits on Claims

The Owner and Contractor shall commence all Claims and causes of action against the other and arising out of or related to the Contract, whether in contract, tort, breach of warranty or otherwise, in accordance with the requirements of the binding dispute resolution method selected in the Agreement and within the period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all Claims and causes of action not commenced in accordance with this Section 15.1.2.

§ 15.1.3 Notice of Claims

§ 15.1.3.1 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party under this Section 15.1.3.1 shall be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3.2 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party. In such event, no decision by the Initial Decision Maker is required.

§ 15.1.4 Continuing Contract Performance

§ 15.1.4.1 Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 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.

§ 15.1.4.2 The Contract Sum and Contract Time shall be adjusted in accordance with the Initial Decision Maker's decision, subject to the right of either party to proceed in accordance with this Article 15. The Architect will issue Certificates for Payment in accordance with the decision of the Initial Decision Maker.

§ 15.1.5 Claims for Additional Cost

If the Contractor wishes to make a Claim for an increase in the Contract Sum, notice as provided in Section 15.1.3 shall be given before proceeding to execute the portion of the Work that is the subject of the Claim. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.6 Claims for Additional Time

§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in Section 15.1.3 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.

§ 15.1.6.2 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.

§ 15.1.7 Waiver of Claims for Consequential Damages

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

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

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

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.7 shall be deemed to preclude assessment of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 Initial Decision

§ 15.2.1 Claims, excluding those where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2 or arising under Sections 10.3, 10.4, and 11.5, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim. If an initial decision has not been rendered within 30 days after the Claim has been referred to the Initial Decision Maker, the party asserting the Claim may demand mediation and binding dispute resolution without a decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a 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 Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the

Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker 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 Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker 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 the request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished, or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of receipt of an initial decision, demand in writing that the other party file for mediation. If such a demand is made and the party receiving the demand fails to file for mediation within 30 days after receipt thereof, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

§ 15.2.7 In the event of a Claim against the Contractor, 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 Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.8 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.

§ 15.3 Mediation

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract, except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.7, shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution 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. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 15.3.3 Either party may, within 30 days from the date that mediation has been concluded without resolution of the dispute or 60 days after mediation has been demanded without resolution of the dispute, demand in writing that the other party file for binding dispute resolution. If such a demand is made and the party receiving the demand fails to file for binding dispute resolution within 60 days after receipt thereof, then both parties waive their rights to binding dispute resolution proceedings with respect to the initial decision.

§ 15.3.4 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.

§ 15.4 Arbitration

§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. The Arbitration shall be conducted in the place where the Project is located, unless another location is mutually agreed upon. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. 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.

§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

§ 15.4.2 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.

§ 15.4.3 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.

§ 15.4.4 Consolidation or Joinder

§ 15.4.4.1 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

§ 15.4.4.2 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as those of the Owner and Contractor under this Agreement.

SUPPLEMENTARY CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

The following supplementary conditions modify, change, delete from, or add to the "General Condition of the Contract for Construction," AIA A201-2017 and AIA A101-2017, Exhibit A – Insurance and Bonds. Where any Article of the General Conditions is modified or any Section, Subsection or Clause thereof is modified or deleted by these Supplementary Conditions, the unaltered provisions of that Article, Section, Subsection, or Clause shall remain in effect.

In all Contract Documents and Bid Documents including AIA A101 (2007) and AIA A201 (2017), any reference to performance and payment bonds shall be disregarded for this project, if the bid amount does not exceed $25,000.

AIA DOCUMENT A201-2017, GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

1. ARCHITECT / ENGINEER

For the purposes of this Agreement, the term "Architect" shall include "Engineer" when an engineer provides the services anticipated by this Agreement.

2. CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

Add the following Subsection 1.2.4 to Section 1.2:

1.2.4 In the case of an inconsistency between Drawings and Specifications or between any contract document, the better quality or greater quantity of Work shall be provided in accordance with the Architect's interpretation.

3. SUPERVISION AND CONSTRUCTION PROCEDURES

Add the following Subsection 3.3.4 to Section 3.3 to read as follows:

3.3.4 The Contractor shall be licensed to execute the Work under applicable licensing statutes of the State of New Mexico and other applicable regulatory agencies. The Contractor, and its subcontractors shall comply with Federal, State and County regulations when applicable. All labor and materials shall meet all applicable codes. The Contractor shall comply with San Juan County policies and procedures in secure areas. Construction personnel shall be subject to search and security clearance.

4. LABOR AND MATERIALS

Add the following Subsection 3.4.3.1 to Section 3.4.3:

3.4.3.1 The Owner may, by notice in writing, require the Contractor to remove from the Work any employee the Owner deems incompetent, careless or otherwise objectionable.

Add the following Subsection 3.4.4 to Section 3.4:

3.4.4 By making a request for a substitution pursuant to Subsection 3.4.2, the Contractor:

.1 represents that the Contractor has personally investigated the proposed

substitute product and determined that it is equal or superior in all respects to that specified;

.2 represents that the Contractor will provide the same warranty for the substitute product as the Contractor would for the product actually specified;

.3 certifies that the cost data presented is complete and includes all related costs, and the Contractor waives all claims for additional costs related to the substitution which subsequently become apparent; and

.4 agrees to coordinate installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects.

Add the following Subsection 3.4.5 to Section 3.4:

3.4.5 Wage rates are required on this Project if the bid amount exceeds $60,000. Employees of any Contractor or Subcontractor participating in the work shall be paid not less than the minimum wage rates of the State of New Mexico as published by the State Labor and Industrial Commission.

.1 Pursuant to Section 13-4-11(A) NMSA 1978, the Contractor and subcontractors shall pay all mechanics and laborers employed on the site of the project unconditionally and not less often than once a week and without subsequent unlawful deduction or rebate on any account, the full amounts accrued at time of payment computed at wage rates not less than those stated in the minimum wage rates issued for the project.

.2 Contractor shall comply fully with the requirements set forth in the Public Works Minimum Wage Act Policy Manual, 11 NMAC 1.1 et seq., and the Wage Decision Packet issued by the State of New Mexico Department of Workforce Solutions.

.3 The General Contractor, Subcontractors and all tier Subcontractors must be registered with the Labor and Industrial Division in accordance with Public Works Minimum Wage Act, Section 13-4-~~10~~ 13.1 NMSA 1978.

.4 **Contractor and all Subcontractors shall comply with the requirements listed in the Project Manual.**

5. PERMITS, FEES AND NOTICES

Add the following Subsections 3.7.6 and 3.7.7 to Section 3.7:

3.7.6 The Contractor shall be licensed to execute the Work of this Contract in accordance with applicable licensing statutes of the State of New Mexico and other applicable regulatory agencies. The Contractor and his/her Subcontractors shall also comply with Federal, State, tribal and local regulations, as applicable. The Contractor shall comply with the Owner's policies and procedures regarding secure areas. The Contractor and his/her Subcontractors and their respective employees may be subject to search-and-security clearance.

3.7.7 Notice is given that the Procurement Code, Sections 13-1-21 through 13-1-1997 NMSA, imposes civil and criminal penalties for its violation. In addition, New Mexico criminal statutes impose felony penalties for illegal bribes, gratuities and kickbacks.

6. CONTRACTOR'S CONSTRUCTION SCHEDULES

Add the following Subsection 3.10.4 to Section 3.10:

3.10.4 The Contractor shall, at the end of every week, or at other mutually agreed intervals submit Daily Reports to the Owner (by facsimile or original), a report stating: labor forces on-site, areas worked, any potential schedule or coordination problems, material deliveries received, site visitors, and other relevant information required by the Owner.

7. INDEMNIFICATION

Subsection 3.18.1 is hereby amended by adding the following sentence to the end of the Subsection: "For the purposes of this Subsection, Owner's employees shall include elected officials of the Owner."

8. AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

Section 5.2 is hereby deleted in its entirety. These requirements are specified in the Bidding Documents.

9. SUBCONTRACTUAL RELATIONS

Section 5.3 is hereby amended with the addition of the following Subsection:

5.3.1 The Contractor shall, on a daily basis, coordinate and review each Subcontractor's work for compliance with Contract Documents. The Contractor shall be solely responsible for coordination of the Work between trades and Subcontractors.

10. CHANGES IN THE WORK - GENERAL

Section 7.1 is hereby amended with the addition of the following Subsection:

7.1.4 The Contractor shall notify the Owner within 10 days of a discovery of a changed condition or of a Contractor-initiated Change Order request. The Contractor shall respond to a proposed Construction Change Directive, Change Order, or other instruments used to effect changes in the Work within 10 days; otherwise, the Contractor shall waive his/her right of recovery.

11. PROGRESS AND COMPLETION

Section 8.2 is hereby amended with the addition of the following Subsection 8.2.4:

8.2.4 The Owner may require the Contractor to take such measures or adopt such methods as may be necessary in the Owner's opinion to obtain and maintain satisfactory progress when, in the Owner's judgment, the Work is not proceeding in accordance with the approved progress schedule or otherwise at a reasonable rate to achieve Substantial Completion within the time frame set by the Contract Documents. The Contractor shall not receive any additional compensation if the Owner imposes such a requirement. The failure of the Owner to require such measures pursuant to this Subsection shall not relieve the Contractor of his obligation to secure the rate of progress necessary to complete the Work within the time required of the Contract Documents.

Add the following Section 8.2.5 to Section 8.2:

8.2.5 In the event that the Contractor fails or, in the judgment of the Owner or Architect fails (except for causes as outlined in A201 Section 8.3.1), to complete a critical portion of Work on time or to complete a contractual milestone or completion date as evidenced by the latest update of the Project Construction Schedule Report, the Owner shall have the right to impose any or all of the following options:

.1 Require the Contractor to substantiate his capability to "get back on schedule within ten (10) working days".

.2 Require the Contractor to increase his work force, work overtime, and/or extra shifts, and do whatever else is required by the Owner until Contractor gets back on schedule as established by the Project Construction Schedule Report (including any updates thereto), such measures being at no extra cost to Owner.

.3 Withhold progress payment, or portions thereof, until such time as the Contractor returns to the approved schedule.

.4 Require the Contractor, Owner, or Architect to contact the factory, plant or distribution center whose production or delivery schedule may be critical to the scheduled completion of a portion of the contract work, and expedite same, at no expense to the Owner. If costs are incurred in executing the requirements of this Subsection, whether by the Owner, or Architect, the Contract Sum shall be decreased by the cost occasioned by such action and an appropriate Change Order shall be issued.

12. DELAYS AND EXTENSIONS OF TIME

Subsection 8.3.3 shall be deleted in its entirety and replaced with the following Subsection:

8.3.3 The Contractor agrees to make no claim for damages for delay in the performance of this Contract occasioned by any act or omission of the Owner or any of its representatives, and agrees that any such Claim shall be fully compensated for only through an extension of time to complete the performance of the Work as provided herein. This Section does not preclude recovery of damages for delay by Contractor under other provisions of the Contract Documents.

Add the following Subsections 8.3.4 and 8.3.5 to Section 8.3:

8.3.4 Any claims for extension of time shall be made in writing to the Owner, Construction Manager and Architect not more than twenty-one (21) days after commencement of the delay: otherwise it shall be waived. The Contractor shall provide the best estimate that can reasonably be developed at the time, of the probable effect of such delay on the progress of work at the time of notice.

8.3.5 Extensions of the contract completion time will be made for delays due to weather conditions only when such conditions are more severe and extended than those reflected by the ten-year average for the month as evidenced by the Climatological Data, U.S. Department of Commerce, for the project area, and only if a request for such an extension of time is received within twenty-one (21) days of the first date of each weather delay. The extension of contract completion time for weather conditions will occur only in the event that the weather in question affected critical activities on the most current Project Construction Schedule.

13. RESPONSIBILITY FOR PROGRESS AND COMPLETION

Add the following new Section 8.4:

8.4 RESPONSIBILITY FOR PROGRESS AND COMPLETION

8.4.1 The Contractor shall furnish such manpower, materials, facilities, and equipment and shall work such hours, including night shifts, overtime operations, and Sundays and/or Holidays, as may be necessary to ensure the progress and completion of both the Work and the Project as reflected by the currently updated Project Construction Schedule (as may be modified and approved from time to time). If either the Work or the Project actually in place falls behind, impacting the Substantial or Final Completion date of the project, as reflected by the currently updated Project Construction Schedule (except for causes as outlined in A201 Section 8.3.1), the Contractor agrees that s/he will, as necessary, take some or all of the following actions at no additional cost to the Owner or Architect, as required to substantially remedy, in the judgment of the Owner, the timely execution of Work on the Project:

.1 Increase manpower in quantities and crafts as necessary;

.2 Increase the number of working hours per shift, shifts per working day, working days per week, the amount of equipment, or any combination of the foregoing; and/or

.3 Reschedule activities to achieve maximum practical concurrence of accomplishment; and

.4 The Owner may require the Contractor to submit a new schedule. If the revised schedule proposed is not satisfactory, the Owner may require revisions until it is determined to be satisfactory, in order to make up the difference in actual versus scheduled progress.

.5 Do whatever else is reasonably required by the Owner.

.6 Failure of the Contractor to substantially comply with the requirements of Section 8.4 shall be considered grounds for a determination by the Owner that the Contractor is in breach of this Contract by failing to prosecute the Work so as to ensure its completion and that of the Project within both the Contract Time and the updated Project Construction Schedule.

14. CONTRACT SUM

Section 9.1 shall be amended with the addition of the following Subsection 9.1.3:

9.1.3 Liquidated Damages. If the Work is not substantially completed within the time required by the Contract, the Contractor shall pay to the Owner, or the Owner may offset from any amount then due and payable under the Contract Documents, liquidated damages in the amount of ($250.00) for each day that the Work is not Substantially Complete, as liquidated damages and not as a penalty.

15. SCHEDULE OF VALUES

Subsection 9.2.1 is added:

9.2.1 The Schedule of Values shall be prepared in such a manner that each major item of the Work and each subcontracted item of the Work is shown as a single line item on AIA G702 (current edition), and shall be the basis for the Contractor's Applications for Payment. The Continuation Sheet and the Schedule of Values shall be submitted in duplicate.

16. APPLICATIONS FOR PAYMENT

Subsection 9.3.1 shall be deleted in its entirety and replaced with the following Subsection:

9.3.1 Each application for Payment covering work, material and equipment completed, delivered or stored during a period ending on the twenty-fifth day of each month shall be recorded on AIA G702 (most current edition) and on the Continuation Sheet, and submitted in duplicate to the Architect no later than the thirtieth (30th) day of each month. Each Application for Payment shall be notarized and shall be supported by such data or documents such as copies of requisitions, and releases and waivers from liens from Subcontractors and suppliers as the Owner may require to substantiate the Contractor's right to payment.

17. PROGRESS PAYMENTS

Subsection 9.6.1 shall be deleted in its entirety and replaced with the following Subsection:

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. Payment for amounts due shall be paid within twenty-one days after the Owner receives an undisputed request for payment unless the Contract Documents provide for a payment later than twenty-one days.

18. FINAL COMPLETION AND FINAL PAYMENT

Subsection 9.10.1 shall be deleted in its entirety and replaced with the following Subsection:

9.10.1 Upon receipt of the Contractor's 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 the terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted on the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Subsection 9.10.2 as precedent to the Contractor being entitled to final payment have been fulfilled. However, a Certificate of Final Payment will not be issued until the Contractor has submitted to the Owner the fully executed "Consent of Surety Company to final Payment" written on AIA G707 (most current edition) and the "Contractor's Affidavit of Payment of Debts and Claims" written on AIA G706 (most current edition), in duplicate.

19. SAFETY PRECAUTIONS AND PROGRAMS

Section 10.1 is hereby amended with the addition of the following Subsection:

10.1.2 All Contractors and subcontractors shall comply with the San Juan County Safety and Compliance Contractor Safety Verification Program, a copy of which is available from the San Juan County Safety and Compliance Manager, or at the San Juan County Safety and Compliance Manager's option, the Contractor shall provide a Project-specific Safety Plan.

20. INJURY OR DAMAGE TO PERSONS AND PROPERTY

Subsection 10.2.8 is hereby deleted and replaced with the following Subsection 10.2.8:

10.2.8 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 to exceed 21 days after discovery. The notice shall provide sufficient details to enable the other party to investigate the matter. However, nothing in this Subsection or in the Contract Documents shall be construed as waiving defenses available to the Owner under the common law or statutory doctrines of sovereign immunity. The Owner shall be responsible for Claims arising from personal injury or property damage only to the extent specifically required by the New Mexico Tort Claims Act N.M.S.A. 1978, Section 41-4-1 et seq. (as amended).

21. CONTRACTOR'S INSURANCE

In addition to the Contractor's Insurance requirements contained in AIA Document A101 – 2017 Exhibit A, Contractor's Insurance shall:

1. Be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater.

2. Contain a provision that coverage afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. If any of the foregoing insurance coverage is required to remain in force after final payment, an additional certificate evidencing continuation of such coverage shall be submitted with the final Application for Payment. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness in accordance with the Contractor's information and belief. If the insurance is written on the Comprehensive General Liability policy form, the form ("Certificate of Insurance") shall be ACORD Form 25. **Copies of the policy and the certificate shall both be provided to Owner prior to the execution of the Agreement.**

22. PERFORMANCE BOND AND PAYMENT BOND

1. The Contractor shall furnish bonds concerning faithful performance of the Contract and payments of obligations arising thereunder. Bonds may be obtained through the Contractor's usual source and the cost thereof shall be included in the Contract Sum. The amount of each bond shall be equal to one hundred percent (100%) of the Contract Sum. The Contractor shall deliver the performance and payment bonds to the Owner not later than ten (10) days after the bid is awarded to the Contractor, or, if the Work is to be commenced prior thereto in response to a letter of intent, the Contractor shall, prior to the commencement of the Work, submit evidence satisfactory to the Owner that such bond will be furnished. The bonds shall be affixed with the certified and current copy of the Power of Attorney of the person executing the Bond on behalf of the Surety, and shall be written on AIA A312 (most current edition). Each Surety must be U.S. Treasury listed, licensed in New Mexico and have an A.M. Best rating of A minus VII or better.

2. Subcontractor shall provide to the General Contractor a Performance and Payment Bond on a New Mexico public works project if the Subcontractor's Contract for work to be performed on the project is one hundred twenty five thousand dollars ($125,000) or more pursuant to NMSA 1978, § 13-1-148.1 (2007). The bonds shall be affixed with the certified and current copy of the Power of Attorney of the person executing the Bond on behalf of the Surety, and shall be written on AIA A312 (most current edition). Each Surety must be U.S. Treasury listed, licensed in New Mexico and have an A.M. Best rating of A minus VII or better.

3 In the event that a change order is executed that increases the Contract Sum by 25% or more, the performance and payment bonds shall be revised to an amount to equal one hundred percent (100%) of the revised Contract Sum. The revised bonds shall be affixed with the certified and current copy of the Power of Attorney of the person executing the

Bond on behalf of the Surety, and shall be written on AIA A312 (most current edition). Copies of the revised bonds shall be provided to the Owner.

23. CORRECTION OF WORK -- AFTER SUBSTANTIAL COMPLETION

The following sentence shall be added to Subsection 12.2.2.1

Eleven (11) months after substantial completion, the Owner, Architect and Contractor shall attend a walkthrough to inspect the Work. Any concerns will be addressed in writing to the Contractor. The Contractor shall correct the deficiencies as provided in § 12.2.2.

24. GOVERNING LAW

Subsection 13.1 shall be deleted in its entirety and replaced with the following Subsection:

13.1 The Contract shall be governed by the laws of the State of New Mexico, and any action to enforce terms and conditions herein shall be brought only in the courts having jurisdiction in San Juan County, New Mexico.

25. TERMINATION BY THE OWNER FOR CAUSE

Add new Subsections 14.2.5 and 14.2.6 to read as follows:

14.2.5 In addition to the grounds for termination set forth elsewhere in the Bid Documents or in the Contract Documents, any Contract awarded may be terminated if sufficient appropriations or authorizations exist. San Juan County's decision concerning whether sufficient appropriations or authorizations exist will be final.

14.2.6 This contract may also be terminated pursuant to Section 13-4-13 NMSA 1978 in the event that the Director of the Labor and Industrial Division of the New Mexico Department of Labor finds that any laborer or mechanic employed on the site of the project has been, or is being paid as a result of a willful violation a rate of wages less than the rate of wages required by Section 13-4-11 NMSA 1978, provided written notice is given by Owner to the Contractor or subcontractor. A party receiving such notice shall have the right to appeal afforded by Section 13-4-13 NMSA 1978.

26. TERMINATION BY OWNER FOR CONVENIENCE

Amend Subsection 14.4.3 to delete "and the termination fee, if any, set forth in the Agreement."

27. CLAIMS

Subsection 15.1.7 is hereby deleted and replaced with the following Subsection:

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

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

.2 damages incurred by the Contractor for principal office expense including compensation of personnel stationed there, loss of financing, business and reputation, and for loss of profit. This mutual waiver is applicable, without limitation, to all consequential damages due to either party's

termination in accordance with Article 14. Nothing contained in this Subsection 15.1.7 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents. In addition, nothing in this section or in the Contract Documents shall be construed as waiving defenses available to the Owner under the common law or statutory doctrines of sovereign immunity. The Owner shall be responsible for Claims arising from personal injury or property damage only to the extent specifically required by the New Mexico Tort Claims Act N.M.S.A. 1978, Section 41-4-1 et seq. (as amended).

28. MEDIATION

Section 15.3 is deleted in its entirety, and replaced with the following Section 15.3:

Mediation. The parties may endeavor to settle any claim, dispute or other matter in question arising out of this Agreement through mediation. A request for mediation shall be filed in writing with the other party. A request for mediation shall be made within a reasonable time after the Claim has arisen, but in no event shall a request for mediation be made after the date when institution of or equitable proceedings based on a Claim would be barred by the applicable statute of limitations.

29. ARBITRATION

Section 15.4 is deleted in its entirety.

AIA DOCUMENT A101 – 2017 EXHIBIT A

1. Section A.2.3.3, Insurance for Existing Structures is deleted in its entirety and is replaced with the following provision:

§A.2.3.3 Insurance for Existing Structures.
If the Work involves remodeling an existing structure or constructing an addition to an existing structure, the Contractor shall purchase and maintain, until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, "all-risks" property insurance, on a replacement cost basis, protecting the existing structure against direct physical loss or damage from the causes of loss identified in Section A.2.3.1, notwithstanding the undertaking of the Work. The Contractor shall be responsible for all co-insurance penalties.

End of Section

DRAFT

AIA® Document A312® – 2010

Performance Bond

CONTRACTOR:
(Name, legal status and address)

« »« »
« »

SURETY:
(Name, legal status and principal place of business)

« »« »
« »

OWNER:
(Name, legal status and address)

« »« »
« »

CONSTRUCTION CONTRACT
Date: « »
Amount: $ «0.00»
Description:
(Name and location)
«Bid 23-24-24 Re-Bid Cooperative Extension Office»
« »

BOND
Date:
(Not earlier than Construction Contract Date)
« »
Amount: $ « »
Modifications to this Bond: « » None « » See Section 16

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:	« »« »	Name and Title:	« »« »

(Any additional signatures appear on the last page of this Performance Bond.)

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or **BROKER:**

« »
« »
« »

OWNER'S REPRESENTATIVE:
(Architect, Engineer or other party.)

« »
« »
« »
« »
« »
« »

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

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

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

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§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

§ 2 If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Section 3.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after

.1 the Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Section 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;

.2 the Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

.3 the Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

§ 4 Failure on the part of the Owner to comply with the notice requirement in Section 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

§ 5 When the Owner has satisfied the conditions of Section 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

§ 5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

§ 5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

§ 5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Section 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

§ 5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or

.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

§ 6 If the Surety does not proceed as provided in Section 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Section 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

§ 7 If the Surety elects to act under Section 5.1, 5.2 or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication, for

.1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

.2 additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Section 5; and

.3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

§ 8 If the Surety elects to act under Section 5.1, 5.3 or 5.4, the Surety's liability is limited to the amount of this Bond.

§ 9 The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors and assigns.

§ 10 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 11 Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 12 Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

§ 13 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 14 Definitions

§ 14.1 **Balance of the Contract Price.** The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

§ 14.2 **Construction Contract.** The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

§ 14.3 **Contractor Default.** Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

§ 14.4 **Owner Default.** Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 14.5 **Contract Documents.** All the documents that comprise the agreement between the Owner and Contractor.

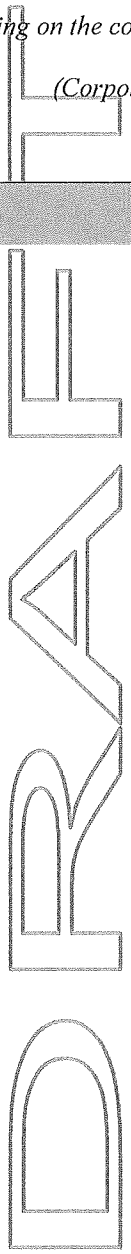
§ 15 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 16 Modifications to this bond are as follows:

« »

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL		SURETY	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:	« »« »	Name and Title:	« »« »
Address:	« »	Address:	« »



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AIA® Document A312® - 2010

Payment Bond

CONTRACTOR:
(Name, legal status and address)

« »« »
« »

SURETY:
(Name, legal status and principal place of business)

« »« »
« »

OWNER:
(Name, legal status and address)

« »« »
« »

CONSTRUCTION CONTRACT
Date: « »
Amount: $ «0.00»
Description:
(Name and location)
«Bid 23-24-24 Re-Bid Cooperative Extension Office»
« »

BOND
Date:
(Not earlier than Construction Contract Date)
« »
Amount: $ « »
Modifications to this Bond: « » None « » See Section 18

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:	« »« »	Name and Title:	« »« »

(Any additional signatures appear on the last page of this Payment Bond.)

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or **BROKER:**

« »
« »
« »

OWNER'S REPRESENTATIVE:
(Architect, Engineer or other party:)

« »
« »
« »
« »
« »
« »

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

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

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

ELECTRONIC COPYING of any portion of this AIA® Document to another electronic file is prohibited and constitutes a violation of copyright laws as set forth in the footer of this document.

§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner to pay for labor, materials and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

§ 2 If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies and holds harmless the Owner from claims, demands, liens or suits by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Section 13) of claims, demands, liens or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract and tendered defense of such claims, demands, liens or suits to the Contractor and the Surety.

§ 4 When the Owner has satisfied the conditions in Section 3, the Surety shall promptly and at the Surety's expense defend, indemnify and hold harmless the Owner against a duly tendered claim, demand, lien or suit.

§ 5 The Surety's obligations to a Claimant under this Bond shall arise after the following:

§ 5.1 Claimants, who do not have a direct contract with the Contractor,

.1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and

.2 have sent a Claim to the Surety (at the address described in Section 13).

§ 5.2 Claimants, who are employed by or have a direct contract with the Contractor, have sent a Claim to the Surety (at the address described in Section 13).

§ 6 If a notice of non-payment required by Section 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Section 5.1.1.

§ 7 When a Claimant has satisfied the conditions of Sections 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

§ 7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

§ 7.2 Pay or arrange for payment of any undisputed amounts.

§ 7.3 The Surety's failure to discharge its obligations under Section 7.1 or Section 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Section 7.1 or Section 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

§ 8 The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Section 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

§ 9 Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

§ 10 The Surety shall not be liable to the Owner, Claimants or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to, or give notice on behalf of, Claimants or otherwise have any obligations to Claimants under this Bond.

§ 11 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 12 No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Section 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 13 Notice and Claims to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

§ 14 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 15 Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

§ 16 Definitions

§ 16.1 Claim. A written statement by the Claimant including at a minimum:

.1 the name of the Claimant;
.2 the name of the person for whom the labor was done, or materials or equipment furnished;
.3 a copy of the agreement or purchase order pursuant to which labor, materials or equipment was furnished for use in the performance of the Construction Contract;
.4 a brief description of the labor, materials or equipment furnished;
.5 the date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
.6 the total amount earned by the Claimant for labor, materials or equipment furnished as of the date of the Claim;
.7 the total amount of previous payments received by the Claimant; and
.8 the total amount due and unpaid to the Claimant for labor, materials or equipment furnished as of the date of the Claim.

§ 16.2 Claimant. An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

§ 16.3 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

§ **16.4 Owner Default.** Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ **16.5 Contract Documents.** All the documents that comprise the agreement between the Owner and Contractor.

§ **17** If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ **18** Modifications to this bond are as follows:

« »

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:	« »« »	Name and Title:	« »« »
Address:	« »	Address:	« »

NOTICE OF AWARD

OWNER: COUNTY OF SAN JUAN
213 S. Oliver Drive
Aztec, NM 87410

DATE:

PROJECT NO: Bid 23-24-24 Re-Bid

CONTRACTOR:

PROJECT:
Cooperative Extension Office
400 Gossett Drive
Aztec, NM 87410

The Owner has considered the bid submitted by you for the above described work in response to its advertisement for bids dated TBD and instruction to bidders.

You are hereby notified that your bid has been accepted for the above described project in the amount shown:

Lump Sum Base Bid Amount: **$**
Gross Receipt Taxes:
Total Bid Amount: **$**

You are required by the contract documents to execute the agreement and furnish the required certificate of insurance, performance bond, and material & labor bond **within ten (10) calendar days** from date of this notice to you.

If you fail to execute said agreement **within ten (10) calendar days** from the date of this notice, said owner will be entitled to consider all your rights arising out of the owners acceptance of your bid as abandoned. The owner will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this Notice of Award to the owner.

CONTRACTOR:

BY: _____

TITLE: _____

DATE: _____

OWNER:

COUNTY OF SAN JUAN

BY: _____
DIANA CHAPMAN,
CHIEF PROCUREMENT OFFICER

RETURN SIGNED COPY TO SAN JUAN COUNTY
OFFICE OF CENTRAL PURCHASING

SAN JUAN COUNTY
NEW MEXICO
SINCE 1887

NOTICE TO PROCEED

OWNER: COUNTY OF SAN JUAN
213 S. Oliver Drive
Aztec, NM 87410

DATE:

PROJECT NO: Bid 23-24-24 Re-Bid

CONTRACTOR:

PROJECT:
Cooperative Extension Office
400 Gossett Drive
Aztec, NM 87410

The Contractor is hereby notified to commence work in accordance with the agreement dated **TBD,** and the Contractor is required to complete the above referenced project within **TBD calendar days** from the date of this notice to proceed.

An acknowledgement copy of this Notice to Proceed must be returned to the Owner.

CONTRACTOR:

BY: _____

TITLE: _____

DATE: _____

OWNER:
COUNTY OF SAN JUAN

BY: _____
DIANA CHAPMAN,
CHIEF PROCUREMENT OFFICER

RETURN SIGNED COPY TO SAN JUAN COUNTY
OFFICE OF CENTRAL PURCHASING

CHANGE ORDER PROCEDURES

PART 1 GENERAL

1.1 REQUIREMENTS INCLUDED

A. Promptly implement Change Order procedures.

1. Provide full written data required to evaluate changes.
2. Maintain detailed records of work done on a time-and-material/force account basis.
3. Provide full documentation to the designated San Juan County Representative upon request.

B. Designate in writing the member of Contractor's organization:

1. Who is authorized to accept changes in the work.
2. Who is responsible for informing others in the Contractor's employ of the authorization of changes in the Work.

C. Owner will designate in writing the person who is authorized to execute Change Orders on behalf of San Juan County.

1.2 RELATED REQUIREMENTS

A. Agreement: The amounts of established unit prices.

B. Conditions of the Contract:

1. Methods of determining cost or credit to Owner resulting from changes in Work made on a time and material basis.
2. Contractor's claims for additional costs.

D. Section 00810: Modifications to General Conditions.
E. Section 01152: Applications for Payment.
F. Section 01310: Construction Schedules.
G. Section 01630: Substitutions.
H. Section 01720: Project Record Documents.

1.3 DEFINITIONS

A. Modification Change Request: See General Conditions

B. Change Order: A written order to the Contractor, signed by Owner's designated representative, which amends the Contract Documents as described, and authorizes Contractor to proceed with a change which affects the Contract Sum or the Contract Time, for inclusion in a subsequent Change Order.

C. Architect's Supplemental Instructions, AIA Document G71O. A written order, instructions, or interpretations, signed by the San Juan County Representative making minor changes in the Work not involving a change in Contract Sum or Contract Time.

1.4 PRELIMINARY PROCEDURES

A. Owner or San Juan County Representative may initiate changes by submitting a Proposal Request to Contractor. Request will include:

1. Detailed description of the Change, Products, and location of the change in the Project.
2. Supplementary or revised Drawings and Specifications.
3. The projected time span for making the change, and a specific

statement if overtime work is authorized.
4. A specific period of time during which the requested price will be considered valid.
5. Such request is for information only, and is not an instruction to execute the changes, nor to stop Work in progress.

B. Contractor may initiate changes by submitting a written notice to San Juan County Representative, containing:

1. Description of the proposed changes.
2. Statement of the reason for making the changes.
3. Statement of the effect on the Contract Sum and the Contract Time.
4. Statement of the effect on the work of separate contractors.
5. Documentation supporting any change in Contract Sum or Contract Time, as appropriate.

1.5 CONSTRUCTION CHANGE AUTHORIZATION

A. In lieu of Proposal Request, San Juan County Representative may issue a construction change authorization for Contractor to proceed with a change for subsequent inclusion in Change Order.

B. Authorization will describe changes in the Work, both additions and deletions, with attachments of revised Contract Documents to define details of the change, and will designate the method of determining any change in the Contract Sum and any change in Contract Time.

C. Owner or San Juan County Representative will sign and date the Construction Change Authorization as authorization for the Contractor to proceed with the changes.

Contractor may sign and date the Construction Change Authorization to indicate agreement with the terms therein.

1.6 DOCUMENTATION OF PROPOSALS AND CLAIMS

A. Support each quotation for a lump-sum proposal, and for each unit price which has not previously been established, with sufficient substantiating data to allow San Juan County Representative to evaluate the quotation.

1. CONTRACTOR SHALL PROVIDE WRITTEN DOCUMENTATION AND COST PROPOSALS WITHIN 10 DAYS OF RECEIPT OF ANY PROPOSAL REQUEST, CONSTRUCTION CHANGE AUTHORIZATION. IF WRITTEN DOCUMENTATION IS NOT RECEIVED BY SAN JUAN COUNTY REPRESENTATIVE WITHIN 10 DAYS, NO EXTRA CHARGES OR INCREASES IN CONTRACT TIME WILL BE ALLOWED.
2. Contractor shall submit breakdown of costs on enclosed form.

B. Unless specified otherwise, provide data to support time and cost computations:
1. Labor required.
2. Equipment required.
3. Products required.
    a. Recommended source of purchase and unit cost.
    b. Quantities required.
4. Taxes, insurance and bonds.
5. Credit for work deleted from Contract, similarly documented.
6. Overhead and profit.
7. Justification for any change in Contract Time.
8. Use copies of form at end of this section.
9. Each Sub-Contractor and the General Contractor shall submit breakdown on form provided.

C. Support each claim for additional costs, and for work done on a time-and-material/force account basis, with documentation as required for a lump-sum proposal, plus additional information:

10. Name of the Owner's designated representative who ordered the work, and date of the order.

11. Dates and times work was performed, and by whom.

12. Time record, summary of hours worked, and hourly rates paid.

13. Receipts and invoices for:
    a. Equipment used, listing dates and times of use.
    b. Products used, listing of quantities.
    c. Subcontracts.

D. Document requests for substitutions for Products as specified in Section 01630.

1.7 PREPARATION OF CHANGE ORDERS

A. San Juan County Representative will prepare each Change Order.

B. Form: Change Order: AIA Document G701 (2001).

C. Change Order will describe changes in the Work, both additions and deletions, with attachments of revised Contract Documents to define details of the change.

D. Change Order will provide an accounting of the adjustment in the Contract Sum and in the Contract Time.

1.8 LUMP SUM/FIXED PRICE CHANGE ORDER

A. Content of Change Orders will be based on, either:

1. San Juan County Representative's Proposal Request and Contractor's responsive Proposal as mutually agreed between Owner and Contractor.
2. Contractor's Proposal for a change, as recommended by San Juan County Representative.

B. Owner or San Juan County Representative will sign and date the Change Order as authorized for the Contractor to proceed with the changes.

C. Contractor may sign and date the Change Order to indicate agreement with the terms therein.

1.9 UNIT PRICE CHANGE ORDER

A. Content of Change Orders will be based on, either:

1. San Juan County Representative's definition of the scope of the required changes.
2. Contractor's Proposal for a change, as recommended by San Juan County Representative.
3. Survey of completed work.

B. The amounts of the unit prices to be:

1. Those stated in the Agreement.
2. Those mutually agreed upon between Owner and contractor.

C. When quantities of each of the items affected by the Change Order can be

determined prior to start of the work:

1. Owner or San Juan County Representative will sign and date the Change Order as authorization for Contractor to proceed with the changes.
2. Contractor may sign and date the Change Order to indicate agreement with the terms therein.

D. When quantities of the items cannot be determined prior to start of the work:

1. San Juan County Representative or Owner will issue a construction change authorization directing Contractor to proceed with the change on the basis of unit prices, and will cite the applicable unit prices.
2. At completion of the change, San Juan County Representative will determine the cost of such work based on the unit prices and quantities used.
3. San Juan County Representative will sign and date the Change Order to establish the change in Contract Sum and in Contract Time.
4. Owner or San Juan County Representative and Contractor will sign and date the Change Order to indicate their agreement with the terms therein.

1.10 TIME AND MATERIAL/FORCE ACCOUNT CHANGE ORDER/CONSTRUCTION CHANGE AUTHORIZATION

A. San Juan County Representative and Owner will issue a Construction Change Authorization directing Contractor to proceed with the changes.

B. At completion of the change, Contractor shall submit itemized accounting and supporting data as provided in the Article "Documentation of Proposals and Claims" of this section.

1.11 ALLOWABLE MARKUPS

A. With each proposal for a change in the amount of the Contract, the Contractor shall submit separately a breakdown itemized to include material quantities and unit prices, labor and fringe benefit costs, equipment costs, Workmen's Compensation and Public Liability, overhead, profit, Social Security taxes, and other taxes.

The percentage for overhead and profit shall not exceed the following:

Subtotal Before Applying the Percentage shown	
Contractor for work performed by his own forces	15%
Subcontractor for work performed by his own forces	10%
Contractor for work performed by subcontractor	5%

B. Overhead: Individual Change Order proposals that include a time extension of five calendar days or less shall include the following: Bond premiums, insurance, small tools, incidentals and general office expense.

C. Overhead for those including a time extension more than five calendar days shall include the above with supervision and superintendent wages negotiated on an individual basis.

D. On proposals covering both increases and decreases in the amount of the contract, the COMBINED overhead and profit shall be allowed on the net increase only.

E. No overhead or profit will be allowed on Social Security Taxes.

DATE: _____

MODIFICATION / CHANGE REQUEST NO. _____

PROJECT NO. _____

DESCRIPTION OF PROPOSED WORK

NOTE: Fill out a separate worksheet for each subcontractor on this MCR. The GC shall use this same form to summarize the total of all subcontractor proposals while adding GC cost. Attach all worksheets and breakdowns to summary sheet for each MCR.

SUBCONTRACTOR COST (ATTACH SUBCONTRACTOR'S SHEET AND COST BREAKDOWNS):*

1	Total of subcontractor' material (attach itemized breakdown):			<---Enter Amount
2	Total of subcontractor's labor cost including fringe benefits and labor burden (attach itemized breakdown):			<---Enter Amount
3	Other direct attributable cost allowed (attach itemized breakdown):			<---Enter Amount
4	Subtotal:		$ -	
5	Subcontractor's O&P		<---Enter Percent	$ -
6	Subcontractor's Bond:		<---Enter Percent	$ -
7	Permits paid by subcontractor:			<---Enter Amount
8	Subcontractor's Gross Receipts Tax	0%		$ -
9	Subcontractor's Total Cost:			$ -

GENERAL CONTRACTOR'S COST (ATTACH WORKSHEETS)*

10	GC's material (attach itemized breakdown):		
11	General Contractor's labor cost including fringe benefits and labor burden @_____% (attach itemized breakdown):		
12	Construction equipment (rental).		
13	Direct attributable field supervision, insurance, etc. (attach itemized breakdown):	$ -	
14	Subtotal:		
15	General Contractor's Overhead & Profit of subcontractors (% of Item 9):		
16	General Contractor's Overhead & Profit on work by General Contractor's forces (16 % of Item 14):		
17	Subtotal (sum of Items 14, 15 and 16):		
18	Bond (% of Item 17 AND 9)		
19	Permits paid by General Contractor:		
20	Subtotal (sum of Items 9, 17, 18 and 19):		
21	Gross Receipts Tax _____% of Line 20:		$ -
22	General Contractor's total cost (sun of line 20 and 21):		$ -

DATE: _____

MODIFICATION / CHANGE REQUEST NO. _____

Breakdown Sheet

Bond Rate id this Subcontractor Bonded this Project

Material Description	# of Units	Cost Per. Unit	Total Cost Per Item
			$ -
			$ -
			$ -
			$ -
			$ -
			$ -
			$ -
			$ -
			$ -
			$ -
			$ -
			$ -
			$ -
			$ -
			$ -
			$ -
		Total Material Cost	$ -

Labor Description (Type of worker)	Number of Hours	Rate	Labor Burden	Total
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
			Total Labor Cost	$ -

Other Direct Cost	# of Units	Cost Each	Total Cost Per Item
			$ -
			$ -
			$ -
			$ -
			$ -
			$ -
			$ -
			$ -
		Total Other Cost	$ -
		Total Requested	$ -

DRAFT

AIA® Document G701® – 2017

Change Order

PROJECT: *(Name and address)* Cooperative Extension Office	**CONTRACT INFORMATION:** Contract For: General Construction Date:	**CHANGE ORDER INFORMATION:** Change Order Number: 001 Date:
OWNER: *(Name and address)*	**ARCHITECT:** *(Name and address)*	**CONTRACTOR:** *(Name and address)*

THE CONTRACT IS CHANGED AS FOLLOWS:
(Insert a detailed description of the change and, if applicable, attach or reference specific exhibits. Also include agreed upon adjustments attributable to executed Construction Change Directives.)

The original Contract Sum was	$ 0.00
The net change by previously authorized Change Orders	$ 0.00
The Contract Sum prior to this Change Order was	$ 0.00
The Contract Sum will be increased by this Change Order in the amount of	$ 0.00
The new Contract Sum including this Change Order will be	$ 0.00

The Contract Time will be increased by Zero (0) days.
The new date of Substantial Completion will be

NOTE: This Change Order does not include adjustments to the Contract Sum or Guaranteed Maximum Price, or the Contract Time, that have been authorized by Construction Change Directive until the cost and time have been agreed upon by both the Owner and Contractor, in which case a Change Order is executed to supersede the Construction Change Directive.

NOT VALID UNTIL SIGNED BY THE ARCHITECT, CONTRACTOR AND OWNER.

ARCHITECT *(Firm name)*	**CONTRACTOR** *(Firm name)*	**OWNER** *(Firm name)*
SIGNATURE	**SIGNATURE**	**SIGNATURE**
PRINTED NAME AND TITLE	**PRINTED NAME AND TITLE**	**PRINTED NAME AND TITLE**
DATE	**DATE**	**DATE**

DRAFT

AIA® Document G702® – 1992

Application and Certificate for Payment

TO OWNER:	**PROJECT:** Cooperative Extension Office	**APPLICATION NO:** 001	**Distribution to:**
		PERIOD TO:	OWNER: ☐
		CONTRACT FOR: General Construction	ARCHITECT: ☐
FROM CONTRACTOR:	**VIA ARCHITECT:**	**CONTRACT DATE:**	CONTRACTOR: ☐
		PROJECT NOS: / /	FIELD: ☐
			OTHER : ☐

CONTRACTOR'S APPLICATION FOR PAYMENT

Application is made for payment, as shown below, in connection with the Contract.
AIA Document G703®, Continuation Sheet, is attached.

1. ORIGINAL CONTRACT SUM		$0.00
2. NET CHANGE BY CHANGE ORDERS		$0.00
3. CONTRACT SUM TO DATE (Line 1 ± 2)		$0.00
4. TOTAL COMPLETED & STORED TO DATE (Column G on G703)		$0.00
5. RETAINAGE:		
a. 0 % of Completed Work (Column D + E on G703)	$0.00	
b. 0 % of Stored Material (Column F on G703)	$0.00	
Total Retainage (Lines 5a + 5b or Total in Column I of G703)		$0.00
6. TOTAL EARNED LESS RETAINAGE (Line 4 Less Line 5 Total)		$0.00
7. LESS PREVIOUS CERTIFICATES FOR PAYMENT (Line 6 from prior Certificate)		$0.00
8. CURRENT PAYMENT DUE		$0.00
9. BALANCE TO FINISH, INCLUDING RETAINAGE (Line 3 less Line 6)	$0.00	

CHANGE ORDER SUMMARY	ADDITIONS	DEDUCTIONS
Total changes approved in previous months by Owner	$0.00	$0.00
Total approved this Month	$0.00	$0.00
TOTALS	$0.00	$0.00
NET CHANGES by Change Order		$0.00

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

CONTRACTOR:

By: _____ Date: _____

State of:

County of:

Subscribed and sworn to before me this day of

Notary Public:

My Commission expires:

ARCHITECT'S CERTIFICATE FOR PAYMENT

In accordance with the Contract Documents, based on on-site observations and the data comprising this application, the Architect certifies to the Owner that to the best of the Architect's knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED $0.00

(Attach explanation if amount certified differs from the amount applied. Initial all figures on this Application and on the Continuation Sheet that are changed to conform with the amount certified.)

ARCHITECT:

By: _____ Date: _____

This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract.

User Notes:

DRAFT AIA® Document G703® – 1992

Continuation Sheet

AIA Document G702®, Application and Certification for Payment, or G732™, Application and Certificate for Payment, Construction Manager as Adviser Edition, containing Contractor's signed certification is attached.
Use Column I on Contracts where variable retainage for line items may apply.

APPLICATION NO: 001
APPLICATION DATE:
PERIOD TO:
ARCHITECT'S PROJECT NO:

A	B	C	D	E	F	G		H	I
			WORK COMPLETED						
ITEM NO.	DESCRIPTION OF WORK	SCHEDULED VALUE	FROM PREVIOUS APPLICATION (D + E)	THIS PERIOD	MATERIALS PRESENTLY STORED (NOT IN D OR E)	TOTAL COMPLETED AND STORED TO DATE (D + E + F)	% (G÷C)	BALANCE TO FINISH (C - G)	RETAINAGE (IF VARIABLE RATE)
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
	GRAND TOTAL	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**0.00%**	**$0.00**	**$0.00**

User Notes:

DRAFT

AIA® Document G704® – 2017

Certificate of Substantial Completion

PROJECT: *(name and address)*	CONTRACT INFORMATION:	CERTIFICATE INFORMATION:
Cooperative Extension Office	Contract For: General Construction Date:	Certificate Number: 001 Date:
OWNER: *(name and address)*	**ARCHITECT:** *(name and address)*	**CONTRACTOR:** *(name and address)*

The Work identified below has been reviewed and found, to the Architect's best knowledge, information, and belief, to be substantially complete. Substantial Completion is the stage in the progress of the Work when the Work or designated portion is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use. The date of Substantial Completion of the Project or portion designated below is the date established by this Certificate.
(Identify the Work, or portion thereof, that is substantially complete.)

ARCHITECT *(Firm Name)*	SIGNATURE	PRINTED NAME AND TITLE	DATE OF SUBSTANTIAL COMPLETION

WARRANTIES
The date of Substantial Completion of the Project or portion designated above is also the date of commencement of applicable warranties required by the Contract Documents, except as stated below:
(Identify warranties that do not commence on the date of Substantial Completion, if any, and indicate their date of commencement.)

WORK TO BE COMPLETED OR CORRECTED
A list of items to be completed or corrected is attached hereto, or transmitted as agreed upon by the parties, and identified as follows:
(Identify the list of Work to be completed or corrected.)

The failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. Unless otherwise agreed to in writing, the date of commencement of warranties for items on the attached list will be the date of issuance of the final Certificate of Payment or the date of final payment, whichever occurs first.
The Contractor will complete or correct the Work on the list of items attached hereto within ( ) days from the above date of Substantial Completion.

Cost estimate of Work to be completed or corrected: $

The responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work, insurance, and other items identified below shall be as follows:
(Note: Owner's and Contractor's legal and insurance counsel should review insurance requirements and coverage.)

The Owner and Contractor hereby accept the responsibilities assigned to them in this Certificate of Substantial Completion:

CONTRACTOR *(Firm Name)*	SIGNATURE	PRINTED NAME AND TITLE	DATE
OWNER *(Firm Name)*	SIGNATURE	PRINTED NAME AND TITLE	DATE

DRAFT

AIA® Document G706® – 1994

Contractor's Affidavit of Payment of Debts and Claims

PROJECT: *(Name and address)*
Cooperative Extension Office

TO OWNER: *(Name and address)*

ARCHITECT'S PROJECT NUMBER:

CONTRACT FOR: General Construction
CONTRACT DATED:

OWNER: ☐
ARCHITECT: ☐
CONTRACTOR: ☐
SURETY: ☐
OTHER: ☐

STATE OF:
COUNTY OF:

The undersigned hereby certifies that, except as listed below, payment has been made in full and all obligations have otherwise been satisfied for all materials and equipment furnished, for all work, labor, and services performed, and for all known indebtedness and claims against the Contractor for damages arising in any manner in connection with the performance of the Contract referenced above for which the Owner or Owner's property might in any way be held responsible or encumbered.

EXCEPTIONS:

SUPPORTING DOCUMENTS ATTACHED HERETO:

1. Consent of Surety to Final Payment. Whenever Surety is involved, Consent of Surety is required. AIA Document G707, Consent of Surety, may be used for this purpose

Indicate Attachment ☐ Yes ☒ No

The following supporting documents should be attached hereto if required by the Owner:

1. Contractor's Release or Waiver of Liens, conditional upon receipt of final payment.

2. Separate Releases or Waivers of Liens from Subcontractors and material and equipment suppliers, to the extent required by the Owner, accompanied by a list thereof.

3. Contractor's Affidavit of Release of Liens (AIA Document G706A).

CONTRACTOR: *(Name and address)*

BY: _____
(Signature of authorized representative)

_____
(Printed name and title)

Subscribed and sworn to before me on this date:

Notary Public:
My Commission Expires:

DRAFT

AIA® Document G706®A – 1994

Contractor's Affidavit of Release of Liens

PROJECT: *(Name and address)*
Cooperative Extension Office

ARCHITECT'S PROJECT NUMBER:

CONTRACT FOR: General Construction

CONTRACT DATED:

TO OWNER: *(Name and address)*

OWNER: ☐
ARCHITECT: ☐
CONTRACTOR: ☐
SURETY: ☐
OTHER: ☐

STATE OF:
COUNTY OF:

The undersigned hereby certifies that to the best of the undersigned's knowledge, information and belief, except as listed below, the Releases or Waivers of Lien attached hereto include the Contractor, all Subcontractors, all suppliers of materials and equipment, and all performers of Work, labor or services who have or may have liens or encumbrances or the right to assert liens or encumbrances against any property of the Owner arising in any manner out of the performance of the Contract referenced above.

EXCEPTIONS:

SUPPORTING DOCUMENTS ATTACHED HERETO:

1. Contractor's Release or Waiver of Liens, conditional upon receipt of final payment.

2. Separate Releases or Waivers of Liens from Subcontractors and material and equipment suppliers, to the extent required by the Owner, accompanied by a list thereof.

CONTRACTOR: *(Name and address)*

BY:

(Signature of authorized representative)

(Printed name and title)

Subscribed and sworn to before me on this date:

Notary Public:
My Commission Expires:

DRAFT

AIA® Document G707™ – 1994

Consent Of Surety to Final Payment

PROJECT: *(Name and address)*
Cooperative Extension Office

ARCHITECT'S PROJECT NUMBER:

CONTRACT FOR: General Construction

CONTRACT DATED:

TO OWNER: *(Name and address)*

OWNER: ☐
ARCHITECT: ☐
CONTRACTOR: ☐
SURETY: ☐
OTHER: ☐

In accordance with the provisions of the Contract between the Owner and the Contractor as indicated above, the
(*Insert name and address of Surety*)

, SURETY,

on bond of
(Insert name and address of Contractor)

, CONTRACTOR,

hereby approves of the final payment to the Contractor, and agrees that final payment to the Contractor shall not relieve the Surety of any of its obligations to
(Insert name and address of Owner)

, OWNER,

as set forth in said Surety's bond.

IN WITNESS WHEREOF, the Surety has hereunto set its hand on this date:
(Insert in writing the month followed by the numeric date and year.)

(Surety)

(Signature of authorized representative)

Attest:
(Seal):

(Printed name and title)

SECTION 00 0002

INDEX OF SECTIONS
SAN JUAN COUNTY
EXTENSION OFFICE
REBID

END OF SECTION

SECTION 01 0400

COORDINATION

PART 1 GENERAL

1.1 DESCRIPTION

A. The General Contractor shall coordinate the Work of all trades and all subcontractors on the job. It shall be his responsibility to see that all aspects of the Work and the interrelationship of all work be fully understood by all persons performing any part of the Work. No additional cost shall accrue to the Owner as a result of any lack of such coordination of understanding.

1.2 UTILITIES

A. The extent and type of existing underground utilities are shown on the drawings for reference only. Exact records of locations, size, type, depth, and destination of any utility on the property are not available. Contractor shall proceed with extreme caution in performance of all site work in anticipation of utilities not known or indicated.

1.3 DRAWINGS

A. Should on-site conditions necessitate changes in dimensions or materials or the rearrangement of piping, fixtures, and electrical equipment, such departures and the reasons therefore shall be submitted to the Architect for approval in the form of detail drawings on which all changes are marked which shall subsequently be indicated in the General Contractors preparation of "Record" drawings.

END OF SECTION

SECTION 01 1000

ADMINISTRATIVE PROVISIONS

PART 1 GENERAL

1.1 WORK UNDER THIS CONTRACT

A. Work under this contract includes all material, labor, tools, expendable equipment, utility and transportation services and all incidental items necessary to perform and complete in a workmanlike manner, the Work required for the:

1. Construction of a new free standing frame building utilizing post and beam structural system with steel bar joist roof structure. The building will be approximately 8,984 square feet enclosed. There are exterior areas covered by roof which increase the overall foot print. The building will include a large airlock entry, office area, community kitchen and two (2) classrooms. An outdoor covered patio area adjoins the classrooms and kitchen for joint events and demonstrations.
2. All utilities including water, sewer, natural gas, fire suppression water and phone/data will be brought to the building. All these utilities are in the general area and shown for extension on Sheet C3.
3. The geotechnical report is included in the Specification and identifies the soil types in the area as well as defining the procedures for building the pad for the structure and foundation. Over excavation as shown on A/S1 will be done by San Juan County crews.
4. Coordinate door access devices with San Juan County staff for installation locations. Final programming by San Juan County.

5. The Base Bid for the Extension Building will complete all sitework with the exception of the asphalt paving which will be done by the Owner. The building exterior shell will be completely finished. The interior construction will be complete with the exception of the classrooms and the kitchen areas. These are shown in the drawings as Alternate #1, for the classroom area and Alternate #2, for the kitchen areas. A brief description of each alternate is show below. This will not specifically identify every item/material required for the work. Fire sprinkler system will be install in unfinished areas.

Alternate #1 - Classrooms (Rooms 125, 126 and 127):

1. Under the Base Bid the walls of the rooms will be left unfinished. There will be drywall on the hallway side only. Exterior walls will be insulated. Complete drywall and painting following mechanical and electrical work.

2. Install the overhead door to the kitchen area, 126A.

3. Install the suspended acoustical tile ceiling system.

4. Install floor finish and base. In-floor outlets will be installs in the Base Bid.

5. Install equipment shown on AL1.2.

6. The RTU for this area will be set under the Base Bid and ductwork stubbed into this area. Complete the install of duct and diffusers.

7. Under Base Bid the conduit for power and lighting will be run from the panel into this area and ceiling space only. Extend per E1/E2.

8. Install the sprinkler system to ceiling.

9. Install doors and frames.

Alternate #2 - Kitchen Area (Rooms 128, 129 and 130):

1. Under the Base Bid the exterior walls will be finished except for the interior drywall and water/electrical. Finish these walls as scheduled.

2. Under the Base Bid all sewer piping will be in place with floor sinks, drains, clean outs and vents.

3. Install wall framing as shown for interior rooms and equipment walls.

4. Install suspended ceiling system.

5. Polish concrete floor and install base.

6. Install exhaust hood system including exhaust fan and make up air unit. Patch roofs as required for curbs.

7. Install walk-in cooler and equipment.

8. Install door and frames.

9. Under Base Bid the RTU will be set for this area and stubbed through the roof. Complete the duct and diffuser installation.

10. Under the Base Bid the gas piping will be stubbed into this area and capped. Extend as shown on P2.

11. Under the Base Bid water piping will be stubbed into this area and capped with valve. Extend piping to fixtures as shown on P2.

12. Under the Base Bid electrical conduit and wiring will be run to panel K, but not completed. Extend power and light as shown on E1, E2 and E3.

13. Install fire sprinkler system to ceiling.

14. Install built-in cabinets and countertops.

1.2 SCOPE

A. Each Division or Section of the Specification shall be deemed to have as its leading Paragraph the following, which shall become part of each Section or Division as if written out in full:

1. Scope of Work: Contractor performing this Work shall furnish all labor, equipment, tools, appurtenances, and materials, except those specified to be furnished by others, and pay for all special taxes or permits necessary to complete all work as hereinafter required or as shown or called for on the Drawings.
2. Manufacturer's Printed Directions: Where these Specifications require that a material, article, or apparatus shall be applied, installed, connected, erected, cleaned, and conditioned, "In accordance with the Manufacturer's printed specifications, directions, or recommendations", they shall have the same force and effect as though written in full in these Specifications.

1.3 CONTRACTS

A. The project shall be constructed under a single lump sum contract.

1.4 WORK BY OTHERS

A. Phone, data, security devices will be terminated by Owner. The contractor will be responsible for installation of ceiling from outlets to ceiling space.

B. Asbestos Containing Materials (ACM) removal.

C. All material testing shall be provided by the Owner regardless of any discrepancy elsewhere in these specifications. Costs for these specific services shall be paid directly to the Third Party Testing Lab by the Owner. The Contractor will be responsible for scheduling, coordination and ordering all such material testing services. Rejected work or materials requiring follow up testing shall be scheduled, coordinated, ordered and paid for by the Contractor.

1.5 PROJECT SCHEDULING

A. Construction shall commence as soon as the building permit is obtained.

1.6 CONTRACTOR'S USE OF PREMISES:

A. Contractor shall have complete use and access to site.

B. Do not unreasonably encumber site with materials or equipment.

C. Assume full responsibility for protection and safe-keeping of products stored on premises.

D. Move any stored products which interfere with operations of Owner or other Contractors.

E. Obtain and pay for use of additional storage or work areas needed for operations.

F. Limit use of site for work and storage.

1.7 COORDINATION

A. Coordinate work of the various Sections of Specifications to assure efficient and orderly sequence of installation of construction elements, with provisions for accommodating items installed later in the construction process.

B. Verify characteristics of elements of interrelated operating equipment are compatible; coordinate work of various Sections having interdependent responsibilities for installing, connecting and placing in service such equipment.

C. Coordinate space requirements and installation of mechanical and electrical work which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts and conduits, as closely as practicable; make runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repair.

D. In finished areas (except as otherwise shown), conceal pipes, ducts, and wiring in the construction. Coordinate locations of fixtures and outlets with finish elements.

1.8 FIELD ENGINEERING

A. Each trade shall lay out his work so as to interfere as little as possible with location of work of other trades. Obvious conflicts shall be brought to the attention of the Architect.

B. Shoring, Anchoring and Bracing: The Contractor shall provide temporary shoring, anchoring and bracing required by the nature of the Work in order to make all parts absolutely rigid and stable. The Contractor shall be responsible for any damage resulting from failure to provide if either through lack of proper judgment or from any other cause.

1.9 PROTECTION (ALL RESPONSIBILITY OF GENERAL CONTRACTOR).

A. Protect at all times the excavation trenches and/or the adjacent buildings from damage or rain water, spring water, ground water backing up from drains or sewers, and all other water. Provide all pumps and equipment and enclosures to insure this protection.

B. Provide all shoring, bracing, and sheeting as required for safety and prosecution of the Work, and have same removed when Work is completed.

C. Provide and maintain guard lights to all barricades, railings, obstructions in the streets, roads, or sidewalks, and at all trenches or pits adjacent to public ways, corridors, stairs, or hallways.

D. Provide at all times protection against weather (rain, wind, storms, frost, or heat) so as to maintain all work, materials, apparatus and fixtures free from injury or damage. At the end of a day's work all new Work likely to be damaged shall be covered.

1.10 REFERENCE STANDARDS

A. For products specified by association or trade standards, comply with requirements of the standard, except when more field requirements are specified or are required by applicable codes.

B. The date of the standard is that 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. Obtain copies of standards when required by Contract Documents. Maintain copy at jobsite during progress of the specific work.

1.11 WORK IN PUBLIC RIGHT OF WAY

A. General Contractor shall pay all fees and for all damages to sidewalks, streets, or other public utilities, which result from execution of this Contract.

1.12 GUARANTEE

A. The Contractor shall warrant and guarantee all workmanship performed by him and materials supplied by him for a period of one (1) year from date of completion, as evidenced by date of Beneficial Occupancy or Substantial Completion on this Contract. All guarantees for this period, or for a longer period of time required by Sections of these Specifications, shall be secured from separate subcontractors and delivered to the Architect and shall be warranted by General Contractor.

END OF SECTION

SECTION 01 1520

APPLICATION FOR PAYMENT

PART 1 GENERAL

1.1 REQUIREMENTS INCLUDED

A. Submit Applications for Payment to Architect/Engineer in accordance with the schedule established by Conditions of the Contract and Agreement Between Owner and Contractor.

1.2 RELATED REQUIREMENTS

A. Agreement between Owner and Contractor: Lump Sum and Unit Prices.

B. Conditions of the Contract: Progress Payments, Retainages and Final Payment.

C. Section 01 7010: Contract Closeout.

1.3 FORMAT AND DATA REQUIRED

A. Submit itemized applications typed on AIA Document G702, Application and Certificate for Payment, and continuation sheets G703.

1.4 PREPARATION OF APPLICATION FOR EACH PROGRESS PAYMENT

A. Application Form:

1. Fill in required information, including that for Change Orders executed prior to date of submittal of application.
2. Fill in summary of dollar values to agree with respective total indicated on continuation sheets.
3. Execute certification with signature of a responsible officer of Contract firm.

B. Continuation Sheets:

1. Fill in total list of all scheduled component items of Work, with item number and scheduled dollar value for each item.
2. Fill in dollar value in each column for each scheduled line item when work has been performed or products stored.

   ROUND OFF VALUES TO THE NEAREST DOLLAR.

3. List each Change Order executed prior to date of submission, at the end of the continuation sheets.

   a. List by Change Order number, and description, as for an original component item of Work.

C. Project Schedule

1. With each application for payment, Contractor shall include an updated project schedule. The Pay Request will NOT be forwarded to the Owner without the schedule.

D. Project Narrative:

1. With each application for payment, contractor shall include a project narrative describing the activity completed, any special problems, delays or other items that could influence the projects schedule and completion.

1.5 SUBSTANTIATING DATA FOR PROGRESS PAYMENTS

A. When the Owner or the Architect/Engineer requires substantiating data, contractor shall submit suitable information with a cover letter identifying:

1. Project.
2. Application number and date.
3. Detailed list of enclosures.
4. For stored products:

a. Item number and identification as shown on application.
b. Description of specific material.
c. Indicate location of stored materials; if not on project site, approval for payment of these stored items will be at the discretion of the Owner or the Architect/Engineer.

B. Submit one copy of data for each copy of application.

1.6 PREPARATION OF APPLICATION FOR FINAL PAYMENT

A. Fill in Application form as specified for progress payments.

B. Use continuation sheet for presenting the final statement of accounting as specified in Section 01 7010 - Contract Closeout.

1.7 SUBMITTAL PROCEDURE

A. Submit Applications for Payment to Architect/Engineer by the 25th of each month.

B. Number: Three copies of each Application.

C. When Architect/Engineer finds Application properly completed and correct, he will transmit certificate for payment to Owner, with copy to Contractor.

D. **ARCHITECT WILL NOT CERTIFY PAY REQUEST UNTIL HE VERIFIES THAT "AS-BUILT" DRAWINGS ARE CURRENT AND UP TO-DATE. IF AS BUILT'S ARE NOT CURRENT - PAY REQUEST WILL BE HELD UNTIL THEY ARE BROUGHT UP TO-DATE.**

END OF SECTION

SECTION 01 2000

ALTERNATE BIDS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements governing Additive Alternates.

1.3 DEFINITIONS

A. Definitions: Alternates are defined as alternate products, materials, equipment, installations, systems or portions of Work, which may, at the Owner's option, be selected and recorded in the Contract to either supplement or displace corresponding basic requirements of the Contract Documents.

1. The cost for each alternate is the net addition to the Contract Sum to incorporate the Alternate into the Work. No other adjustments are made to the Contract Sum.
2. Alternates may or may not substantially change the scope and general character of the Work; and must not be confused with "change orders", or other similar provisions.
3. The Alternates identified in the project Bid Proposal and the Project Manual are of the Additive Alternate type. No Deductive Alternates are identified.

1.4 PROCEDURES

A. Coordination: Modify or adjust affected adjacent Work as necessary to completely and fully integrate that Work into the Project.

1. Include as part of the alternate, miscellaneous devices, accessory objects and similar items incidental to or required for a complete installation whether or not stated as part of the Alternate.

B. Execute accepted alternates under the same conditions as other Work of this Contract.

C. Schedule: A "Schedule of Alternates" is included at the end of this Section. The Alternate is defined by abbreviated language, recognizing that drawings and specification sections further document the requirements.

D. The Contract shall guarantee the Alternate Bid amounts for a period of not less than 30 days from the date of Bid Opening.

E. The Contractor shall complete all of the related Work (including installation) as an integral part of the Additive Alternate.

PART 2 EXECUTION

2.1 SCHEDULE OF ADDITIVE ALTERNATES

If selected by San Juan County for inclusion in the Work, the Contractor will complete all of the Work (including installation) for the additive bid alternates described as follows:

A. ADDITIVE ALTERNATE NO. 1:

1. Build out of the Classroom Area which will include rooms 125, 126 and 127. Provide wall and ceiling finishes within these rooms. Finishes on exterior and corridor sides of wall will be furnished in the Base Bid. Finish electrical power and lighting, special systems and HVAC, plumbing in these rooms. All in slab devices are included in the Base Bid. Further information and Drawings are included in the Bid Set.

B. ADDITIVE ALTERNATE NO. 2:

1. Build out of Kitchen Areas which will include rooms 128, 129 and 130. Provide wall and ceiling finishes within these rooms as scheduled. Finishes on exterior and corridor walls will be done in the Base Bid. Finish electrical power and lighting, special systems and HVAC, plumbing in these rooms. All in slab piping for sewer, vent and clean outs will be included in the Base Bid. Install exhaust hood system, walk-in cooler and cabinets/tops. Further information and Drawings are included in the Bid Set.

END OF SECTION

SECTION 01 3100

CONSTRUCTION SCHEDULES

PART 1 GENERAL

1.1 REQUIREMENTS INCLUDED

A. Within ten days after award of the Contract, prepare and submit to Architect/Engineer estimated construction progress schedules for the Work, with sub-schedules of related activities which are essential to its progress.

B. Submit revised progress schedules with each Certificate of Payment Request.

C. At weekly project meetings, Contractor shall submit completed Projected Two- Week Schedule. This project should show in bar chart form all work scheduled for the next 14 days.

1.2 RELATED REQUIREMENTS

A. General Conditions of the Contract.

B. Section 01 1000: Administrative Provisions.

C. Section 01 3400: Shop Drawings, Product Data and Samples

1.3 FORM OF SCHEDULES

A. Provide separate horizontal bar for each trade of operation.

1. Horizontal time scale: Identify the first work day of each week.
2. Scale and spacing: To allow space for notations and future revisions.
3. Minimum sheet size: 11 inches by 17 inches.

B. Format of listings: The table of contents of this Project Manual.

C. Identifications of listings: By major specification section numbers.

1.4 CONTENT OF SCHEDULES

A. Construction Progress Schedule:

1. Show the complete sequence of construction by activity according to the Index of Specifications.

1.5 PROGRESS REVISIONS

A. Indicate progress of each activity to date of submission.

B. Show changes occurring since previous submission of schedule:

1. Major changes in scope.
2. Activities modified since previous submission.
3. Revised projections of progress and completion.
4. Other identifiable changes.

C. Provide a narrative report as needed to define:

1. Problem areas, anticipated delays, and the impact on the schedule.
2. Corrective action recommended, and its effect.
3. Effect of changes on schedules of other prime contractors.

1.6 SUBMISSIONS

A. Submit initial schedules within 10 days after award of contract.

1. Architect/Engineer will review schedules and return review copy within 5 days after receipt.
2. If required, resubmit within 7 days after return of review copy.

B. Submit the number of opaque reproductions which the Contractor requires, plus two copies which will be retained by the Architect/Engineer.

1.7 DISTRIBUTION

A. Distribute copies of the reviewed schedules to:

1. Job site file.
2. Subcontractors.
3. Other concerned parties.

B. Instruct recipients to report promptly to the Contractor, in writing, any problems anticipated by the projections shown in the schedules.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01 3200

PROJECT MEETINGS

PART 1 GENERAL

1.1 PRECONSTRUCTION CONFERENCE

A. THE GENERAL CONTRACTOR, THE MECHANICAL, ELECTRICAL SUBCONTRACTORS AND OTHER MAJOR SUBCONTRACTORS, shall attend a preconstruction conference to discuss and clarify contract administration procedures, and Construction Schedule and requirements under which the construction operation is to proceed. The Owner and the Architects-Engineers will also attend. The Architect will notify the General Contractor of the date, time, and location of the conference.

1.2 CONSTRUCTION SCHEDULE

A. THE GENERAL CONTRACTOR shall prepare a preliminary critical path method (CPM) construction schedule for explanation and discussion at this meeting.

1.3 CONSTRUCTION MEETINGS

A. WEEKLY JOBSITE MEETINGS will be held by the Contractor to insure that all activities are being coordinated properly on the project and to assist in meeting the schedule. The status of submittals, change orders, and other matters will be reviewed. The Architect shall attend such meetings as shall all Subcontractors currently involved with Work as well as those who will be involved in the Work within two weeks. The General Contractor shall be prepared to present a Two week "Look Ahead" schedule at these meetings to discuss any delivery, coordination or scheduling concerns that may arise.

B. CONTRACTORS shall attend personally, or be represented at such meetings. Should the contractor elect to be represented it shall be understood and agreed that the Owner and the Architect-Engineer, in dealing with the Contractor's representative, do so with full assurance that the representative's actions and commitments may be accepted the same as though the Contractor who signed, and is bound by the Contract were himself present and personally made such agreements or commitments. General Contractor will advise all concerned of the schedule of meetings. Contractor to provide copies of detailed Projected Two-Week Schedule for each trade for the upcoming two weeks.

END OF SECTION

SECTION 01 3400

SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

PART 1 GENERAL

1.1 REQUIREMENTS INCLUDED

A. Submit to the architect/engineer shop drawings, product data and sample required by specification sections.

B. CONTRACTOR NOTICE: ALL SUBMITTALS ARE REQUIRED TO BE IN HAND OF THE ARCHITECT OR ENGINEER WITHIN FORTY-FIVE DAYS (45) OF AWARD OF CONTRACT.

1.2 RELATED REQUIREMENTS

A. Conditions of the Contract: Definitions, and Additional Responsibilities of Parties.

B. Section 01 3100: Construction Schedules

C. Section 01 7200: Record Documents

D. Designate in the construction schedule, or in a separate coordinated schedule, the dates for submission and the dates that reviewed Shop Drawings, Product Data and Samples will be needed.

1.3 SHOP DRAWINGS: Original drawings, prepared by contractor, subcontractor, supplier or distributor, which illustrate some portion of the work, showing fabrication, layout, setting, or erection details.

A. Prepared by a qualified detailer.

B. Identify details by reference to sheet and detail numbers shown on contract drawings.

C. Minimum sheet size: 8-1/2" x 11".

D. Maximum sheet size: 24" x 36".

E. Submit two (2) paper copies of each product as well as an electronic version to Rodahl and Hummell Architecture email.

1.4 PRODUCT DATA:

A. Manufacturer's standard schematic drawings:

1. Modify drawings to delete information which is not applicable to project.
2. Supplement standard information to provide additional information applicable to project.

B. Manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts, illustrations and other standard descriptive data.

1. Clearly mark each copy to identify pertinent materials, products or models.

2. Show dimensions and clearance required.
3. Show performance characteristics and capacities.
4. Show wiring diagrams and controls.

1.5 SUBMISSION REQUIREMENTS:

A. CONTRACTOR SHALL REVIEW ALL SUBMITTALS, SHOP DRAWINGS, AND PRODUCT DATA PRIOR TO SUBMITTING THEM TO ARCHITECT/ENGINEER AND ALL SUBMITTALS, ETC. SHALL BEAR A STAMP SO INDICATING CONTRACTOR REVIEW. ARCHITECT/ENGINEER SHALL RETURN TO CONTRACTOR ANY SUBMITTAL THAT HAS NOT BEEN REVIEWED AND APPROVED BY CONTRACTOR. NO EXCEPTIONS WILL BE PERMITTED TO THE ABOVE REQUIREMENT.

B. CONTRACTOR SHALL SUBMIT MECHANICAL AND ELECTRICAL DIRECTLY TO THE RESPECTIVE CONSULTANTS (SEE TITLE SHEET OF DRAWINGS) WITH TRANSMITTAL LETTER TO ARCHITECT SHOWING WHEN SUBMITTALS WERE SENT.

C. Submit number of copies or prints of shop drawings and number of copies of product data (including materials for color selection) which contractor requires for distribution plus two (2) copies which will be retained by architect/engineer.

D. Submit samples specified in each of the specification sections.

E. Accompany submittals with transmittal letter, containing:

1. Date
2. Project title and number
3. Contractor's name and address
4. The number of each shop drawing, project data and sample submitted
5. Notification of deviations from contract documents
6. Other pertinent data.

F. Submittals shall be complete for trade involved and shall be submitted at one time, and shall include:

1. Date and revision dates
2. Project title and number
3. The names of:

    a. Architect/Engineer
    b. Contractor
    c. Subcontractor
    d. Supplier
    e. Manufacturer
    f. Separate detailer when pertinent

4. Identification of product or material
5. Relation to adjacent structure or materials
6. Field dimensions, clearly identified as such where required. Further review by the Architect will not happen, if these field dimensions are not indicated.
7. Specification section number
8. Applicable standard, such as ASTM number or federal specifications

9. A blank space, 4" x 4", located in lower right hand corner for the architect/engineer's stamp
10. Identification of deviations from contract documents
11. Contractor's stamp, initialed or signed, certifying to review of submittal, verification of field measurements and compliance with contract documents.

G. All finish material which require color selection and are not previously selected in these specifications shall be submitted as soon as possible. Color selections will not be until all items are submitted and colors can be coordinated. A Color Schedule will be prepared following this selection and distributed to the General Contractor.

1.6 RESUBMISSION REQUIREMENTS

A. Shop drawings:

1. Revise initial drawings as required and resubmit as specified for initial submittal.

2. Indicate on drawings any changes which have been made other than those requested by architect/engineer.

B. Product data and samples: Submit new data and samples as required for initial submittal.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01 5000

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Temporary Utilities: Electricity, lighting, heat, ventilation, telephone service, water, and sanitary facilities.

B. Temporary Controls: Barriers, enclosures and fencing, protection of the Work, and water control.

1.2 TEMPORARY ELECTRICITY

A. Provide temporary electric feeder from electrical service at location as directed.

B. Provide power outlets for construction operations, with branch wiring and distribution boxes located as required in each area. Provide flexible grounded power cords as required.

C. Permanent convenience receptacles may not be utilized during construction.

1.3 TEMPORARY LIGHTING

A. Temporary lighting shall be provided during the construction period by the General Contractor for use by all trades, Contractors, and Subcontractors for safe and adequate working conditions throughout the building and stairways, and shall provide minimum illumination measured in foot candles (FC) at the floor line, as follows:

General area and walkway lighting	5 FC
Boiler, mechanical, and electrical rooms	20 FC
General, electrical, and mechanical rough work areas	10 FC
Concrete, masonry, and finish work areas	20 FC

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 not be utilized during construction.

1.4 TEMPORARY HEAT

A. Provide and pay for heat devices and heat as required to maintain specified conditions for construction operations.

B. 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.

C. Maintain minimum ambient temperature of 50 degrees F (in areas where construction is in progress, unless indicated otherwise in specifications.)

1.5 TEMPORARY VENTILATION

A. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

1.6 TEMPORARY WATER SERVICE

A. On-site water supplies may be utilized for construction.

B. Extend branch piping with outlets located so water is available by hoses with threaded connections.

1.7 TEMPORARY SANITARY FACILITIES

A. Provide and maintain required facilities and enclosures adequate for the work force on the project at a ratio of one portable restroom per ten workers.

1.8 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas to allow for Owner's use of site, and to protect existing facilities and adjacent properties from damage from construction operations and demolition.

B. Protect non-owned vehicular traffic, stored materials, site and structures from damage.

1.9 EXTERIOR ENCLOSURES

A. Provide temporary weather-tight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification Sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

1.10 PROTECTION OF INSTALLED WORK

A. Protect installed Work and provide special protection where specified in individual specification Sections.

B. Provide temporary and removable protection for installed Products. Control activity in immediate work area to minimize damage.

C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

E. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

1.11 PROGRESS CLEANING

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition on a daily basis. Should the site become unsafe and hazardous due to debris and rubbish the job will be shut down until it is cleaned up.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

D. Remove waste materials, debris, and rubbish from site weekly and dispose off-site.

END OF SECTION

SECTION 01 6300

PRODUCTS AND SUBSTITUTIONS

PART 1 GENERAL

1.1 DESCRIPTION

A. Product quality, substitutions, transportation, storage, protection and installations shall conform to the following general requirements unless otherwise described under a specific section of these specifications.

1.2 QUALITY:

A. Specifications:

1. The intent of these specifications is to allow ample opportunity for the contractor to use his ingenuity and abilities to prosecute the work to his and the Owner's best advantage, and to permit maximum competition in bidding on standards of material and equipment required.
2. In general, these specifications identify the required materials and equipment by naming one or more manufacturer's brand, model, catalog number and/or other identification; the first named manufacturer's product used as the basis for design; other named brands considered equivalent. Equivalent brands or manufacturer's named, must furnish products consistent with the specifications for the first named product, as determined by the architect/engineer. Base bid shall include only those brands named.
3. NO SUBSTITUTIONS: THERE ARE SEVERAL PRODUCTS SPECIFIED, FOR WHICH NO SUBSTITUTION IS ALLOWED. SEE RESPECTIVE SECTIONS WHERE THIS RESTRICTION IS IN EFFECT.

B. Prior Approvals

1. SHOULD THE CONTRACTOR DESIRE TO BID SUBSTITUTE EQUIPMENT OTHER THAN THAT SPECIFIED, HE MUST PROVIDE SUBMITTAL DATA TO THE ARCHITECT/ENGINEER AT LEAST SEVEN DAYS PRIOR TO THE BID DATE. IF AFTER EXAMINING THE DATA, THE ARCHITECT/ENGINEER DETERMINES THIS ALTERNATE EQUIPMENT IS ACCEPTABLE, AN ADDENDA WILL BE ISSUED TO ALL BIDDERS PERMITTING THEM TO BID THIS EQUIPMENT.
2. **NOTE: PRIOR APPROVAL WILL NOT BE ACCEPTED VIA FAX.**
3. CONTRACTOR, SUBCONTRACTORS, AND SUPPLIERS: DON'T EVEN THINK ABOUT REQUESTING SUBSTITUTIONS AFTER THE CONTRACT IS AWARDED EXCEPT IN ACCORDANCE WITH PARAGRAPH 1.3 OF THIS SECTION.
4. Where materials or equipment are described but not named, provide required first-quality items, adequate in every respect for the intended use; such items subject to architect/engineer's approval or prior to procurement, unless otherwise agreed in writing.
5. In specifying an item by manufacturer's name and/or catalog number, unless specifically stated otherwise, such item shall be provided with all standard devices and accessories indicated in the latest edition of the manufacturer's catalog or brochure; such item further complete with component parts necessary for the obviously intended used and installation, whether or not the description or catalog number contains all supplemental information and/or numbers of such components.

C. Engineer's selection and approval of products:

1. Where approval of architect/engineer for products is required, secure such approval before procurement.
2. Where colors and/or patterns are to be selected by architect/engineer, request such selection in ample time for procurement. Provide color charts, samples, etc., with request.
3. The aesthetic values of every material and installation, such as shape, proportion, texture, finish, and color, will be an important consideration to the architect/engineer and his decisions cover same shall be final.

D. Performance:

1. Where drawings and/or specifications designate a standard of performance e.g. fire ratings, sound transmission class, insulation value, heating output, air velocity, etc. the completed installation shall perform at least to the designated standard.

E. Appropriate materials and installations:

1. The contractor, his subcontractors and material suppliers observe drawings and specifications, and should any material and/or its installation be indicated or specified in a manner not approved by material manufacturer, notify the architect/engineer and receive his instructions. Failing to do so, contractor shall provide other equivalent materials, suitable for the installation, as approved by the architect/engineer, at no added cost to the Owner.

1.3 SUBSTITUTIONS AFTER BID OPENING: (NOTE: THIS SECTION APPLIES ONLY IF SPECIFIED PRODUCTS ARE NOT AVAILABLE ON A TIMELY BASIS)

A. Request for substitutions:

1. Architect/engineer will consider formal request from contractor for substitutions of products in place of those specified.
2. Submit written request for substitution. Include in the request:

   a. Complete data substantiating compliance of proposed substitution with contract documents.
   b. Accurate cost data on proposed substitutions specified.

3. In making his request for substitution, bidder/contractor shall comply with requirements of 1.2,B,2.

   a. HE HAS PERSONALLY INVESTIGATED PROPOSED PRODUCT OR METHOD, AND DETERMINED THAT IT IS EQUAL OR SUPERIOR IN ALL RESPECTS TO THAT SPECIFIED.
   b. He will provide the same guarantee for substitution as for product of method specified.
   c. He will coordinate installation of accepted substitution into work, making such changes as may be required for work to be complete in all respects.
   d. He waives all claims for additional costs related to substitution which consequently becomes apparent.
   e. Cost data is complete and includes all related costs under this contract, but excludes:

1) Costs under separate contracts
2) Engineer's redesign

4. Substitutions will not be considered if:

a. They are indicated or implied on shop drawings or project data submittals without formal request submitted in accordance with paragraph 1.3 A.2 above.
b. Acceptance will require substantial revision of contract documents.

a. The contractor or sub-contractor have failed to place the order for the material in a timely manner and now want to substitute a material more readily available.

1.4 PRODUCT HANDLING AND STORAGE

A. Packaging and identification:

1. Deliver materials in manufacturer's original, unbroken containers with labels intact and legible, clearly identifying manufacturer, contents, brand name, color, pattern, and applicable standards.
2. Provide pallets, crates, cardboard packing or other containers, separators, sanding, spreaders, and paper wrappings as required by manufacturer to adequately protect items.
3. Properly tag or identify all fabricated items as scheduled on approved shop drawings or erection drawings on schedules.
4. Packages showing indications of damage that affect condition of contents are not acceptable.

B. Delivery and handling:

1. Exercise care to prevent damage to materials.
2. Operate material handling equipment so as not to damage existing construction or materials being handled.
3. On receipt of materials, check for in-transit and/or concealed damage in ample time to replace any damaged materials prior to scheduled installation time.
4. Comply with special handling requirements of manufacturer.
5. Immediately upon discovery, remove damaged or contaminated materials from site.

C. Storage

1. Material or equipment too large to store inside shall be stored above round on pallets, platforms, skids, or other supports, and adequately protected from weather, condensation, and moisture.
2. Unless otherwise noted, all other materials shall be stored above ground in a weather-tight, well ventilated, dry enclosure, until ready for use in the work.
3. Adequately protect stored items subject to damage by freezing and frost.
4. Store packaged materials in original, unbroken packages or containers with labels intact and legible.

1.5 PRODUCT INSTALLATIONS:

A. Preparation:

1. Properly prepare all work to receive subsequent work or finish. Notify architect/engineer if any work is unsatisfactory to receive such subsequent work or finish and receive his instructions before proceeding.
2. Installation or application of subsequent work implies acceptance of prior work by the subsequent installer or applicator and acknowledges his responsibility to correct prior work at his expense.

B. Installations:

1. Furnish, apply, install, connect, erect, clean, and condition manufactured articles, materials, and equipment per manufacturer's latest printed instructions and recommendations. Manufacturer's printed directions shall be on job prior to and during installation of materials and equipment.
2. Provide all attachment devices and materials necessary to secure materials together or to other materials and to secure work of other trades.
3. Make allowance for ample expansion and contraction for all building components subject to same.
4. Each trade shall build in sleeves, anchors, recesses, and openings in their work as required to receive work of other trades. Trades requiring same shall furnish sleeves, anchors, etc., of proper size and verify locations. Failure to provide proper items and instructions for installation by trade requiring their installation will acknowledge that trade's responsibility for cutting and patching.
5. Make field check of actual building dimension before fabricating products.
6. Where proper fit of work depends upon close tolerances of manufactured products, furnish necessary templates to insure proper fit of all components.
7. Install materials only when conditions of temperature, moisture, humidity, and conditions of adjacent building components are conducive to achieving best installation results.
8. In job-assembling, each trade properly cut and fit to make its assemblies fit accurately and as necessary for other trades having work occurring therein. Correct errors in cutting, shop fabrication and installation. Where necessary to cut into other building components, do so only in a manner not to damage building structurally nor aesthetically, then repair adjoining parts thoroughly and neatly. Scribe and/or otherwise neatly fit materials to adjoining materials.
9. Erect, install and secure building components in a structurally sound and appropriate manner, plumb, level, square and true-in-line. Where necessary, temporarily brace, shore, or otherwise support members until final connection or installation. Leave temporary bracing, shoring, or other structural supports in place as long as necessary for safety and until structure is strong enough to withstand all loads involved.
10. Where obviously of best practice, furnish materials in longest practical lengths and largest practical sizes to avoid unnecessary jointing. Short, make-up pieces shall not occur at end of run.
11. Miter trim corners and joints, making tight and secure.
12. Provide quality of workmanship not less than the commercially accepted standards of that trade.
13. Consult architect/engineer for mounting weight or position of any unit not specifically located.

C. Closing-in Work:

1. Contractor shall notify subcontractors, Owner and all contractors under the Owner when he is ready for them to install their portions of work and see that they comply within any reasonable period of time. Neither enclosure nor cover any piping, wiring, ducts, equipment or other items until proper tests and inspection have been made by architect/engineer and/or proper authorities.

Notify architect/engineer to inspect any work when placing of subsequent work would prevent observation of previous work.

D. Finishing:

1. Adjust windows, doors, drawers, hardware, appliances, motors, valves, controls, and other equipment for proper operation.
2. Seal exterior joints between materials to form a waterproofed enclosure.
3. Touch up imperfections in surfaces, paint and other finishes after all contractors and tradesmen have completed their work.
4. Clean surfaces using appropriate materials and methods that will thoroughly clean but no damage materials and their finishes, nor adversely affect other finishes.

E. Unless architect/engineer grants permission to repair any defective work, remove defective work from project and replace with new work in accordance with contract documents. Permission to repair any such work shall not constitute a waiver of architect/engineer's right to require complete replacement of defective work if repair operation does not restore quality and appearance of member or surface to architect/engineer's satisfaction. If permission is granted, repair according to architect/engineer's directions.

F. Submit requests on the following form.

SUBSTITUTION REQUEST FORM

TO: Rodahl & Hummell Architecture, P.C.
609 N. Dustin
Farmington, NM 87401

PROJECT: SAN JUAN COUNTY COOPERATIVE EXTENSION OFFICE

We hereby submit for your consideration the following product instead of the specified item for the above referenced Project:

Section	Page	Paragraph/Line	Specified Item
_____	_____	_____	_____

Proposed Substitution: _____

_____

Attach complete product description, drawings, photographs, performance and test data, and other information necessary for evaluation. Identify specific model numbers, finishes, options, etc.

A. Will changes be required to building design in order to properly install proposed substitution?
Yes_____ No_____. If Yes, explain.

_____

_____

B. Will the undersigned pay for changes to the building design, including engineering and drawing costs, caused by requested substitutions?
Yes_____ No_____.

C. List differences between proposed substitution and specified item.

Specified Item	Proposed Substitution
_____	_____
_____	_____
_____	_____
_____	_____

D. Does the substitution affect Drawing dimensions?
Yes_____ No_____

E. What affect does substitution have on other trades?

_____

_____

F. Does manufacturer's warranty of proposed substitution differ from that specified?

Yes_____ No_____. If Yes, explain.

_____

_____

G. Will substitution affect progress schedule?
Yes_____ No_____
If Yes, explain.

_____

_____

H. Will substitution require more license fees or royalties than specified product?
Yes_____ No_____.

_____

I. Will maintenance and service parts be locally available for substitution?
Yes_____ No_____

_____

Submitted by:

_____
Signature

_____
Firm

_____
Address

_____

_____
Date

_____
Telephone Number

For Architect's Use Only

_____ Accepted _____ Accepted as noted

_____ Not Accepted _____ Received too late

By:_____

Date:_____

Remarks:_____

_____

_____

_____

_____

END OF SECTION

SECTION 01 7010

CONTRACT CLOSEOUT PROCEDURES

PART 1 GENERAL

1.1 REQUIREMENTS INCLUDED

A. Substantial Completion.

B. Final Completion.

C. Reinspection Fees.

D. Closeout Submittals.

E. Adjustment of Accounts.

F. Application for Final Payment.

1.2 RELATED REQUIREMENTS

A. Condition of the Contract: Fiscal provisions, legal submittals and additional administrative requirements.

B. Section 01 1000: Administrative Provisions.

C. Respective Sections of Specifications: Closeout submittals for work of the section.

1.3 SUBSTANTIAL COMPLETION

A. **WHEN CONTRACTOR CONSIDERS THE WORK, OR DESIGNATED PORTION THEREOF, IS SUBSTANTIALLY COMPLETE, SUBMIT WRITTEN NOTICE, WITH A PUNCH LIST OF ITEMS TO BE COMPLETED OR CORRECTED AND WHEN THEY ARE EXPECTED TO BE COMPLETED. ARCHITECT/ENGINEER PUNCH LIST WILL NOT BE SCHEDULED UNTIL THIS IS SUBMITTED.**

B. Within a reasonable time, Architect/Engineer will inspect to determine status of completion.

C. Should Architect/Engineer determine that Work is not substantially complete, he will promptly notify Contractor in writing, giving the reasons therefor.

D. Contractor shall remedy deficiencies, and send a second written notice of substantial completion, and Architect/Engineer will reinspect the Work.

E. When Architect/Engineer determines that Work is substantially complete, he will prepare a Certificate of Substantial Completion in accordance with General Conditions.

1.4 FINAL COMPLETION

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

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 in presence of Owner's representative and are operational.
5. Work is complete and ready for final inspection.

B. Architect/Engineer will inspect to verify status of completion with reasonable promptness.

C. Should Architect/Engineer consider that Work is incomplete or defective, he will promptly notify Contractor in writing, listing incomplete or defective work.

D. Contractor shall take immediate steps to remedy deficiencies and send a second written certification that Work is complete, and Architect/Engineer will reinspect the Work.

E. CONTRACTOR IS ALERTED THAT ANY ADDITIONAL INSPECTIONS OTHER THAN THAT OF PARAGRAPH 1.4 C AND 1.4 D WILL BE SUBJECT TO REINSPECTION FEES. SEE PARAGRAPH 1.5 A.

F. When Architect/Engineer finds Work is acceptable, he will consider closeout submittals.

G. Contractor shall have fifteen (15) days to complete all punch list items documented at the time of Substantial Completion. If these are item which cannot be completed in this time the General Contractor shall submit a written notice to the Architect stating the reasons why.

1.5 REINSPECTION FEES

A. Should Architect/Engineer perform reinspections due to failure of work to comply with claims made by the Contractor, Owner will compensate Architect/Engineer for such compensation from final payment of the Contract.

1.6 CLOSEOUT SUBMITTALS

A. **All closeout documents must be received within thirty days (30) of Substantial Completion. If not received within thirty days (30), there will be a one hundred dollar ($100.00) per day penalty.**

B. Evidence of compliance with requirements of governing authorities:

1. Certificate of Occupancy.
2. Certificates of Inspection from regulatory agencies as required by Paragraph 13.5 of the General Conditions.
3. Contractor's Affidavit of Payment of Debts and Claims
   Consent of Surety Company to Final Payment
   Contractor's and Subcontractor's Affidavit of Release of Lien

C. Warranties and Bonds

1. Standard Product Warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.
2. Special Warranties are written warranties required by or incorporated in Contract Documents, to extend time limits provided by standard warranties or to provide greater rights for the Owner.

a. Refer to the General Conditions for terms of the Contractor's special warranty of workmanship and materials.
b. Requirements for warranties for products and installations that are specified to be warranted are included in the individual Sections of Divisions 2 through 16.

D. Operation and Maintenance Data

1. Provide data for:

a. Mechanical equipment and controls - Division 15.
b. Electrical equipment and controls - Division 16.

2. Submit two sets prior to final inspection, with a separate volume for each system, bound in 8-1/2 x 11 inch three-ring side binders with durable plastic covers. Provide a table of contents and index tabs for each volume.
3. Subdivide each into two sections as follows:

Part 1: Directory, listing names, addresses, and telephone numbers of Architect and Contractor.

Part 2: Operation and maintenance instructions, arranged by Specification Division. For each Specification Division, give names, addresses, and telephone numbers or subcontractors and suppliers.

List the following:

- Appropriate design criteria
- List of equipment
- Parts List
- Operating Instructions
- Maintenance instructions, equipment
- Maintenance instructions, finishes
- Shop drawings and product data
- Warranties

E. Deliver Project Records Drawings and Specifications to the Architect-Engineer before final payment in accord with Paragraph 3.11 of the General Conditions. All underground utilities outside of building shall be dimensioned with elevations shown. All modifications to the Drawings shall be indicated, including Architect's Supplemental Instructions and Change Orders. All information shall be transferred to a clean set of Drawings.

F. Submit Affidavit to the Architect-Engineer certifying that no asbestos was used in the manufacture and fabrication of products and materials used in the construction of this project.

G. Certificates of Insurance for Products and Completed Operations: In accordance with Supplementary Conditions.

1.7 SUBMITTAL REQUIREMENTS

A. Assemble warranties, bonds and service and maintenance contracts, executed by each of the respective manufacturers, suppliers, and subcontractors.

B. Number of original signed copies required: Two (2) each.

C. Table of Contents: Neatly typed, in orderly sequence. Provide complete information for each item.

1. Product of work item.
2. Firm, with name of principal, address and telephone number.
3. Scope.
4. Date of beginning of warranty, bond or service maintenance contract.
5. Duration of warranty, bond or service maintenance.
6. Provide information for Owner's personnel:

    a. Proper procedure in case of failure.
    b. Instances which might affect the validity of warranty or bond.

7. Contractor, name and responsible principal, address and telephone number.

1.8 FORM OF SUBMITTALS

A. Prepare in duplicate packets

B. Format:

1. Size 8-1/2 in. x 11 in. punch sheets for standard 3-ring binder.

    a. Fold larger sheets to fit into binders.

2. Cover: Identify each packet with typed or printed title "WARRANTIES AND BONDS". List:

    a. Title of Project
    b. Name of Contractor.

C. Binders: Commercial quality, three-ring with durable and cleanable plastic covers.

1.9 ADJUSTMENT OF ACCOUNTS

A. Submit a final statement of accounting, reflecting adjustments to Contract Sum.

1. Original Contract Sum.
2. Additions and deductions resulting from:

    a. Previous change orders.
    b. Allowances.
    c. Unit prices.
    d. Deductions for uncorrected work.
    e. Penalties and bonuses.
    f. Deductions for liquidated damages.
    g. Deductions for re-inspection payments.
    h. Other adjustments.

3. Total Contract Sum, as adjusted.
4. Previous payments.
5. Sum remaining due.

B. Architect will issue a final Change Order, reflecting approved adjustments to the Contract Sum not previously made by Change Orders.

1.10 APPLICATION FOR FINAL PAYMENT

A. Submit Application for Final Payment in accordance with procedures and requirements in Conditions of the Contract.

B. Final payment will not be processed by Architect until all closeout submittals (See Paragraph 1.6) are received by Architect and all items are satisfactorily completed on the punch list compiled for Substantial Completion and Final Inspection.

END OF SECTION

SECTION 01 7200

PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.1 DESCRIPTION

A. WORK INCLUDED

1. Throughout progress of the Work of this Contract, the Contractor shall maintain an accurate record or all changes in the Contract Documents, as described in Paragraph 3.1, below.
2. Upon completion of the Work of this Contract, the Contractor shall transfer the record changes to the Architect for the preparation of Record Documents.

B. RELATED WORK described elsewhere

Shop Drawings, Project Data, and Samples	Section 01 3400
Project Closeout	Section 01 7010

1.2 QUALITY ASSURANCE

A. GENERAL. Maintenance of Record Documents shall be the responsibility of one person on the Contractor's staff as approved in advance by the Architect.

B. ACCURACY OF RECORDS. Thoroughly coordinate all changes within the Record Documents, making adequate and proper entries on each page of Specifications and each sheet of Drawings and other Documents where such entry is required to properly show the change. Accuracy of records shall be such that future searcher for items shown in the Contract Documents may reasonably rely on information obtained from the approved Record Documents.

C. TIMING OF ENTRIES. Make all entries within 24 hours after receipt of information.

D. THE ARCHITECT AND THE OWNER shall examine the Contract Documents at selected intervals to assure Contract Compliance for updating entries. Should the Contractor fail to satisfy the requirements of this Section, the Owner shall withhold the Contractor's monthly request until said requirements are satisfied.

1.3 SUBMITTALS

A. GENERAL. The Architect's approval of the current status of Record Documents will be a prerequisite to the Architect's approval of requests for progress payment and request for final payment under the Contract.

B. FINAL SUBMITTAL. Prior to submitting final Application for Payment, submit the final Record Documents required by Contract to the Architect and secure his approval.

1.4 PRODUCT HANDLING

A. USE ALL MEANS necessary to maintain the job set of Record Documents completely protected from deterioration and from loss and damage until completion of the Work and transfer of the recorded data to the final Record Documents. In the event of loss of recorded data, use all means necessary to secure the data to the Architect's approval, such means shall include, if necessary in the opinion of the Architect, removal and

replacement of concealing materials and, in such case, all replacements shall be to the standards originally specified in the Contract Documents.

PART 2 PRODUCTS

2.1 RECORD DOCUMENTS

A. JOB SET. Promptly following award of Contract, secure from the Architect, at no charge to the Contractor, one complete set of all Documents comprising the Contract Documents and signed by the Contractor.

B. At initiation of project, Contractor shall request from the Architect/Engineer one set of reproducible sepias. The cost of these reproducibles shall be paid by the Contractor.

C. Transfer all information from the "Record Documents--Job Set" maintained during construction to the reproducible set, as changes or modifications are made.

D. Submit reproducible sepias with all "Record Documents" information to Architect/Engineer for review. Also submit set of "Record Documents" to Architect/Engineer.

PART 3 EXECUTION

3.1 MAINTENANCE OF JOB SET

A. IMMEDIATELY UPON RECEIPT of job set described in 2.1.A above, identify each of the Documents with the title "RECORD DOCUMENTS - JOB SET."

B. PRESERVATION.

1. Considering the Contract completion time, the probable number of occasions upon which the job set must be taken out for new entries and for examination, and the conditions under which these activities will be performed, devise a suitable method for protecting the job set to the approval of the Architect.
2. Do not use the job set for any purpose except entry of new data and review by the Architect, until start of transfer of data to final Record Documents.
3. Maintain the job set at the site of Work as designated by the Architect.

C. MAKING ENTRIES ON DRAWINGS. Using an erasable colored pencil (not ink or indelible pencil), clearly describe the change by note and by graphic lines, as required. Date all entries and incorporate entry from Subcontractor within 48 hours following completion of change. Call attention to the entry by a "cloud" around the area or areas affected. In the event of overlapping changes, different colors may be used for each of the changes.

D. MAKING ENTRIES ON OTHER DOCUMENTS.

1. Where changes are caused by directive issued by the Architect, clearly indicate the change by note in ink, colored pencil, or rubber stamp.
2. Where changes are caused by Contractor originated proposals approved by the Architect, including inadvertent errors by the Contractor which have been accepted by the Architect, clearly indicate the change by note in erasable colored pencil.
3. Make entries in the pertinent Documents as approved by the Architect.

E. CONVERSION OF SCHEMATIC LAYOUTS

1. In most cases on the Drawings, arrangement of conduits and circuits, piping, ducts, and other similar items, is shown schematically and is not intended to portray precise physical layout. Final physical arrangement is as determined by the Contractor, subject to the Architect's approval. However, design of future modifications of the facility may require accurate information as to the final physical arrangement of items which are shown only schematically on the Drawings.
2. Shown on the job set of Record Drawings, by dimensions accurate to within 25 mm (1-inch) the centerline of each run of items such as are described in Paragraph 3.1.E.1, above. Clearly identify the item by accurate note such as "cast iron drain", galv. water", etc. Show by symbol or note, the vertical location of the item ("under slab", "in ceiling plenum", "exposed", etc.). Make all identification sufficiently descriptive that it may be related reliably to the Specifications including elevations of underground items.
3. The Architect may waive the requirements for conversion of schematic data where, in the Architect's judgement, such conversion serves no beneficial purpose. However, do not rely upon waivers being issued except as specifically issued in writing by the Architect.
4. Timing of entries. Be alert to changes in the Work from how it is shown in the Contract Documents. Promptly, and in no case later than 24 hours after the change has occurred and has been made known to the contractor, make the entry or entries required.

F. ACCURACY OF ENTRIES. Use all means necessary, including the proper tools and necessary labor for measurement, to determine actual locations of the installed items.

3.2 FINAL RECORD DOCUMENTS

A. THE PURPOSE of the final Record Documents is to provide factual information regarding all aspects of the Work, both concealed and visible, to enable future modification to proceed without lengthy and expensive site measurement, investigation, and examination.

B. THE OWNER shall not authorize final payment to the Contractor until all Final Record Documents have been submitted and approved by the Owner and Architect.

END OF SECTION

GEOTECHNICAL ENGINEERING REPORT
SAN JUAN COUNTY
NMSU EXTENSION BUILDING
FARMINGTON, NEW MEXICO

Submitted To:

Mike Stark
San Juan County
100 South Oliver
Aztec, New Mexico 87410

Submitted By:

GEOMAT Inc.
915 Malta Avenue
Farmington, New Mexico 87401

February 5, 2024
GEOMAT Project 232-4633

GEOMAT INC.
915 Malta Avenue ◆ Farmington, NM 87401 ◆ Tel (505) 327-7928 ◆ Fax (505) 326-5721

February 5, 2024

Mike Stark
San Juan County
100 South Oliver
Aztec, New Mexico 87410

RE: Geotechnical Engineering Report
San Juan County NMSU Extension Building
Aztec, New Mexico
GEOMAT Project No. 232-4633

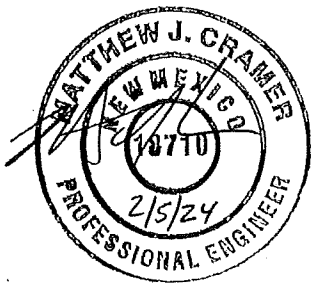
GEOMAT Inc. (GEOMAT) has completed the geotechnical engineering exploration for the NMSU Extension Building project to be located in Aztec, New Mexico. This study was performed in general accordance with our Proposal No. 232-04-30, dated April 19, 2023.

The results of our engineering study, including the geotechnical recommendations, site plan, boring records, and laboratory test results are attached. Based on geotechnical engineering analyses, subsurface exploration and laboratory test results, the site is considered suitable for the proposed building and parking lot. The building could be supported on shallow spread footings bearing on engineered fill. Other design and construction details, based upon geotechnical conditions, are presented in the report.

We have appreciated being of service to you in the geotechnical engineering phase of this project. If you have any questions concerning this report, please contact us.

Sincerely yours,

GEOMAT Inc.



Chase J Beckstead P.E BJH
Chase J. Beckstead, P.E.
Staff Engineer

Matthew J. Cramer, P.E.
President, Principal

Copies to: Addressee (1)

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GEOTECHNICAL ENGINEERING REPORT
SAN JUAN COUNTY
NMSU EXTENSION BUILDING
AZTEC, NEW MEXICO
GEOMAT PROJECT NO. 232-4633

INTRODUCTION

This report contains the results of our geotechnical engineering exploration for the NMSU Extension Building project to be located in Aztec, New Mexico, as shown on the Site Plan in Appendix A of this report.

The purpose of these services is to provide information and geotechnical engineering recommendations about:

- subsurface soil conditions
- groundwater conditions
- lateral soil pressures
- earthwork
- foundation design and construction
- slab design and construction
- drainage

The opinions and recommendations contained in this report are based upon the results of field and laboratory testing, engineering analyses, and experience with similar soil conditions, structures, and our understanding of the proposed project as stated below.

PROPOSED CONSTRUCTION

We understand that the project will consist of the construction of a building with a footprint of 11,250 square feet. The structure will be one-story in height, consist of conventional shallow foundations, a concrete slab-on-grade floor slab, and be constructed out of either CMU or steel frame. Structural loads were not provided; however, we anticipate maximum loads not to exceed 75 kips for isolated/column footings, and 3 kip/lf for linear/continuous footings. We anticipate that minor cuts or fills will be required to achieve final site grades, and that no basements or other below grade structures are planned.

SITE EXPLORATION

Our scope of services performed for this project included a site reconnaissance, a subsurface exploration program, laboratory testing and engineering analyses.

Field Exploration:

Subsurface conditions at the site were explored on October 27th, 2023, by drilling a total of six (6) exploratory borings at the approximate locations shown on the Site Plan in Appendix A. Borings B-1 through B-4 were drilled within the proposed building area to approximate depths ranging from 16 to 16 ½ feet below existing ground surface (bgs). Borings B-5 and B-6 were drilled within the proposed parking area to depths of approximately 5 feet bgs.

The borings were advanced using a CME-55 truck-mounted drill rig with continuous-flight, 7.25-inch O.D. hollow-stem auger. The borings were continuously monitored by a staff engineer from our office who examined and classified the subsurface materials encountered, obtained representative samples, observed groundwater conditions, and maintained a continuous log of each boring.

Soil samples were obtained from the borings using a combination of standard 2-inch O.D. split spoon and 3-inch O.D. modified Dames & Moore ring barrel samplers. The samplers were driven using a 140-pound hammer falling 30 inches. The standard penetration resistance was determined by recording the number of hammer blows required to advance the sampler in six-inch increments. Representative bulk samples of the subsurface materials were also obtained.

Groundwater evaluations were made in each boring at the time of site exploration. Soils were classified in accordance with the Unified Soil Classification System described in Appendix A. Boring logs were prepared and are presented in Appendix A.

Laboratory Testing:

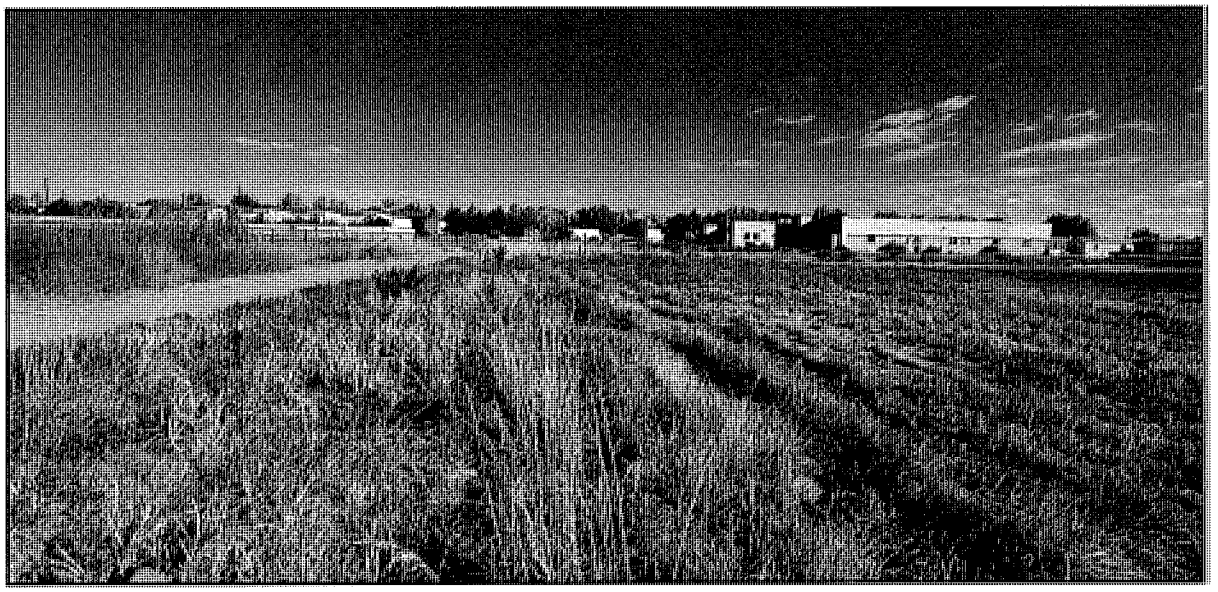
Samples retrieved during the field exploration were transported to our laboratory for further evaluation. At that time, the field descriptions were confirmed or modified as necessary, and laboratory tests were performed to evaluate the engineering properties of the subsurface materials.

SITE CONDITIONS

The proposed project site is located in Aztec, New Mexico approximately 760 feet southeast of the San Juan County Legal Department. The project site is generally flat, cultivated farmland and surrounded by a crushed rock walk path. A gravel road near the entrance of Growing Forward Farm provides access to the site. The site is bordered by the Law Offices of the Public Defender to the north, Animas Trailor Court to the east, residential housing to the south, and farmland to the west. The western side of the site has soft, moist soil covered in thick grasses, whereas the eastern side is relatively dry, with some grasses and weed vegetation and small cracks throughout the surface.

The following photographs depict the site at the time of our exploration.

Drill Rig at Boring B-6
View Towards the West



Overview of the Western Side of the Site
View Towards the North

Small Fissures and Cracks
Example of Cracking Throughout the Site

SUBSURFACE CONDITIONS

Soil Conditions:

As presented on the Boring Logs in Appendix A, in borings B-1 through B-4, we generally encountered clayey soils ranging in depths of approximately 4 ½ to 8 feet bgs, overlying various classifications of sandy soils to the depths explored. In borings B-5, we encountered clayey soil to the depth explored. In boring B-6, we encountered clayey soil to approximately 4 feet bgs, underlain by sandy soil to the depth explored.

The clayey soils were generally tan to brown, medium stiff to stiff, and slightly damp to damp. The sandy soils were generally tan to brown, fine to coarse-grained, loose to medium dense and slightly damp.

Groundwater Conditions:

Groundwater was not encountered in the borings at the time of our exploration. Groundwater elevations can fluctuate over time depending upon precipitation, irrigation, runoff, and infiltration of surface water. We do not have any information regarding the historical fluctuation of the groundwater level in this vicinity.

Laboratory Test Results:

Laboratory analyses of samples tested indicate that the clayey soil have fines contents (silt- and/or clay-sized particles passing the U.S. No. 200 sieve) ranging from approximately 90 to 95 percent and have plastic indices ranging from 34 to 52. The in-place dry density of a clayey soil samples ranged from approximately 94 to 108 pounds per cubic foot (pcf), with natural moisture contents ranging from approximately 7 to 26 percent.

Laboratory analyses of samples tested indicate that the sandy soil have fines contents (silt- and/or clay-sized particles passing the U.S. No. 200 sieve) ranging from approximately 30 to 40 percent and have plastic indices ranging from NP to 22. The in-place dry density of sandy soil samples ranged from approximately 99 to 102 pounds per cubic foot (pcf), with natural moisture contents ranging from approximately 1 to 6 percent.

Laboratory consolidation/expansion testing was performed on undisturbed ring samples of the clayey soils below and/or adjacent to the proposed building. Results of these tests indicate that the soils undergo slight compression when subjected to anticipated foundation stresses at the existing moisture contents. When subjected to increased moisture conditions at these stresses, the soil undergoes moderate to significant expansion followed by slight to moderate compression under increased loading.

Laboratory consolidation/expansion testing was performed on an undisturbed ring sample of the clayey sand soil below and/or adjacent to the proposed building. Results of these tests indicate that the sandy soil undergoes slight compression when subjected to anticipated foundation stresses at the existing moisture contents. When subjected to increased moisture conditions at these stresses, the soil undergoes slight expansion followed by moderate compression under increased loading.

Results of all laboratory tests are presented in Appendix B.

OPINIONS AND RECOMMENDATIONS

Geotechnical Considerations:

The site is considered suitable for the proposed building based on the geotechnical conditions encountered and tested for this report. To reduce the potential for settlement and provide more uniform and higher allowable bearing pressures, the footings should bear on engineered fill.

Expansive and potentially dispersive clays were encountered in our borings. It is of paramount importance to provide good positive drainage away from the structure to ensure that surface water is transmitted away from the structure. Consideration should be given to paving adjacent to the structure on all sides or otherwise surfacing with a low-permeability material to prevent surface water infiltration next to the structure. Raising the site grade may also help improve drainage and reduce the potential for the underlying soils to become wet.

Other foundation types were considered including deep foundations. However, based upon our understanding of the type of structure to be built we anticipate that spread footings on engineered fill are likely the most economical. Recommendations for other foundation types can be considered upon request.

The recommendations contained herein are based upon the conditions encountered in our borings, but variation in subsurface conditions may become evident during excavation and construction activities. GEOMAT should be contacted to review the recommendations contained herein should differing subsurface conditions be encountered.

If there are any significant deviations from the assumed floor elevations, structure locations and/or loads noted at the beginning of this report, the opinions and recommendations of this report should be reviewed and confirmed/modified as necessary to reflect the final planned design conditions.

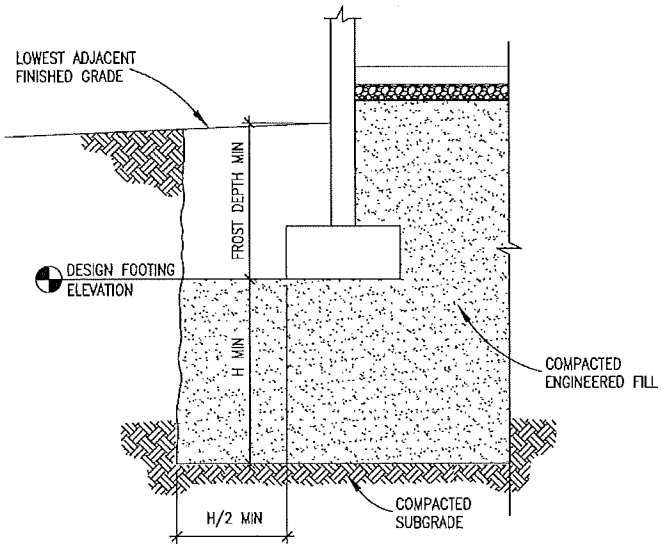
Foundations:

Shallow Spread Footings Bearing on Engineered Fill:

Based on our understanding of the type of structure to be built and the results of our field subsurface exploration and laboratory testing, the building could be founded on conventional shallow spread footings bearing on engineered fill as described herein.

The engineered fill should be provided for a depth below the footings, H, as required to completely remove the fat clay soils but not less than three (3.0) feet under the entire building footprint, whichever is deeper. The engineered fill should extend beyond the edges of the footings for a distance of one-half the depth of engineered fill below the footings, H/2, but not less than one and a half (1.5) feet. If the entire building areas are excavated for the engineered fill placement, the engineered fill should extend at least five (5.0) feet beyond the perimeter of the building.

A generalized depiction of a shallow spread footing supported on engineered fill and a floor slab supported on compacted soil is shown in the diagram below.



Two (2.0) feet and sixteen (16.0) inches are the minimum recommended widths of square and continuous footings, respectively.

Footings on engineered fill should bear a minimum of 30 inches below finished grade to provide protection against frost heaving. The recommended design bearing capacity and footing depth are presented in the following table.

Footing Depth [1] (ft)	Allowable Bearing Pressure (psf)	Bearing Material
2.5[2]	2,500	Engineered Fill

[1] Footing depth referenced below lowest adjacent finished grade. Finished grade is the lowest adjacent grade for perimeter footings and floor level for interior footings.

[2] Minimum footing depth for frost protection.

Recommendations for earthwork beneath the floor slab can be found in the **Floor Slab Design and Construction** section of this report.

Materials and compaction criteria for the engineered fill should be as recommended in the **Earthwork** section of this report. Adequate drainage should be provided to prevent the supporting soil/rock from undergoing significant moisture changes.

Total and differential settlements resulting from the assumed structural loads are estimated to be on the order of 3/4 inch or less. Proper drainage should be provided in the final design and

during construction and areas adjacent to the structure should be designed to prevent water from ponding or accumulating next to the structure.

Total and differential settlements should not exceed predicted values, provided that:

- Foundations are constructed as recommended, and
- Essentially no changes occur in water content of foundation soils.

For foundations adjacent to descending slopes, a minimum horizontal setback of five (5) feet should be maintained between the foundation base and slope face. In addition, the setback should be such that an imaginary line extending downward at 45 degrees from the nearest foundation edge does not intersect the slope.

Footings and foundations should be reinforced as necessary to reduce the potential for distress caused by differential foundation movement. Foundation excavations should be observed by GEOMAT. If the subsurface conditions encountered differ significantly from those presented in this report, supplemental recommendations will be required.

Floor Slab Design and Construction:

In reference to the diagram found in the **Foundations** section of this report, the ground floor slabs should be placed on engineered fill as required to completely remove the fat clay from beneath the building or a minimum depth, H, of three (3.0) feet below the footings, whichever is deeper.

On-site or imported soils with low expansive potential meeting the criteria given in the criteria given in the *Fill Materials* section of this report should be used in fills that will support the floor slabs. Some differential movement of a slab-on-grade floor system is possible if the subgrade soils become elevated in moisture content. Such movements are considered within general tolerance for normal slab-on-grade construction. To reduce potential slab movements, the subgrade soils should be prepared as outlined in the **Earthwork** section of this report.

For structural design of concrete slabs-on-grade, a modulus of subgrade reaction of 200 pounds per cubic inch (pci) may be used for floors supported on compacted engineered fill.

Additional floor slab design and construction recommendations are as follows:

- Control joints should be provided in slabs to control the location and extent of cracking. Joint spacing should be designed by the structural engineer.

- Interior trench backfill placed beneath slabs should be compacted in accordance with recommended specifications outlined below.

- In areas subjected to normal loading, a minimum 4-inch layer of clean-graded gravel, aggregate base course should be placed beneath interior slabs. For heavy loading, re-evaluation of slab and/or base course thickness may be required.

- Other design and construction considerations, as outlined in the ACI Design Manual, Section 302.1R are recommended.

- If moisture sensitive floor coverings are used on interior slabs, consideration should be given to the use of membranes to help reduce the potential for vapor rise through the slab.

Subgrade preparation and moisture control recommendations provided in this report help to reduce soil related problems that may result in distress of concrete floor slabs on grade. However, concrete drying shrinkage, temperature induced volume change and curling can create cracking and distress in the concrete slab on grade. To reduce distress from these causes, properly proportioned concrete mixes with adequate curing and proper joint spacing must be provided. These options should be discussed with the project Architect/Engineer.

Corrosion and Cement Type:

A representative sample of the soil from boring B-2 was tested to evaluate the potential for the on-site soils to corrode buried metal and/or concrete. The samples were tested for pH, electrical resistivity, and soluble sulfates. Results of these tests are summarized in the following table.

Corrosivity Test Results					
Sample No.	**Boring No.**	**Sample Depth (ft)**	**pH**	**Resistivity (ohm-cm)**	**Sulfates (% by weight)**
16303	B-2	2 - 3	7.52	620	0.04

Corrosion of Concrete:

The soluble sulfate contents of the samples tested were less than 0.10 percent by mass as determined by ASTM C1580.

American Concrete Institute (ACI) 318-14 Table 19.3.1.1, (as referenced in the 2018 International Building Code) presents the following exposure categories and classes for the water-soluble sulfate (SO_4^{2-}) content in soil. Exposure category S applies to concrete in contact with soil or water containing deleterious amounts of water-soluble sulfate ions.

Category	Class	Condition	
		Water-Soluble Sulfate (SO_4^{2-}) in soil, percent by mass [1]	Dissolved sulfate (SO_4^{2-}) in water, ppm [2]
Sulfate (S)	S0	$SO_4^{2-} < 0.10$	$SO_4^{2-} < 150$
	S1	$0.10 \leq SO_4^{2-} < 0.20$	$150 \leq SO_4^{2-} < 1,500$ or seawater
	S2	$0.20 \leq SO_4^{2-} \leq 2.00$	$1,500 \leq SO_4^{2-} \leq 10,000$
	S3	$SO_4^{2-} > 2.00$	$SO_4^{2-} > 10,000$

[1] Percent sulfate by mass in soil shall be determined by ASTM C1580.
[2] Concentration of dissolved sulfates in water, in ppm, shall be determined by ASTM D516 or ASTM D4130.

American Concrete Institute (ACI) 318-14 Table 19.3.2.1 presents the requirements shown in the table below for concrete by water-soluble sulfate (SO_4^{2-}) exposure class. The project engineers or architects should review the applicable building codes to confirm the accuracy of the information presented below and any possible project specific considerations. All concrete should be designed, mixed, placed, finished, and cured in accordance with the guidelines presented by the ACI.

Exposure Class	Maximum *w/cm* [1]	Minimum f_c', psi	Cementitious Materials [3] – Types			Calcium Chloride Admixture
			ASTM C150	ASTM C595	ASTM C1157	
S0	N/A	2,500	No type restriction	No type restriction	No type restriction	No restriction
S1	0.50	4,000	II [4][5]	Types IP, IS, or IT with (MS) designation	MS	No restriction
S2	0.45	4,500	V [5]	Types IP, IS, or IT with (HS) designation	HS	Not permitted
S3	0.45	4,500	V plus pozzolan or slag cement [6]	Types IP, IS, or IT with (HS) designation plus pozzolan or slag cement [6]	HS plus pozzolan or slag cement [6]	Not permitted

[1] The maximum *w/cm* limits in Table 19.3.2.1 do not apply to lightweight concrete.
[3] Alternative combinations of cementitious materials to those listed in Table 19.3.2.1 are permitted when tested for sulfate resistance and meeting criteria in 26.4.2.2(c) of the ACI 318-14.
[4] For seawater exposure, other types of portland cements with tricalcium aluminate (C_3A) contents up to 10 percent are permitted if the *w/cm* does not exceed 0.40.
[5] Other available types of cement such as Type I or Type III are permitted in Exposure Classes S1 or S2 if the C_3A contents are less than 8 percent for Exposure Class S1 or less than 5 percent for Exposure Class S2.
[6] The amount of the specific source of the pozzolan or slag cement to be used shall be at least the amount that has been determined by service record to improve sulfate resistance when used in concrete containing Type V cement. Alternatively, the amount of the specific source of the pozzolan or slag cement to be used shall be at least the amount tested in accordance with ASTM C1012 and meeting the criteria in 26.4.2.2(c) of the ACI 318-14.

Corrosion of Metals:

Corrosion of buried ferrous metals can occur when electrical current flows from the metal into the soil. As the resistivity of the soil decreases, the flow of electrical current increases, increasing the potential for corrosion. A commonly accepted correlation between soil resistivity and corrosion of ferrous metals is shown in the following table.

Resistivity (ohm-cm)	Corrosivity
0 to 1,000	Severely Corrosive
1,000 to 2,000	Corrosive
2,000 to 10,000	Moderately Corrosive
>10,000	Mildly Corrosive

The sample tested had a resistivity value of approximately 620 ohm-cm. Based on this laboratory result and the table above, the on-site soils would be characterized as severely corrosive towards ferrous metals. The potential for corrosion should be accounted for during the design process.

Site Classification:

Based on the subsurface conditions encountered in the borings, we estimate that Site Class D is appropriate in accordance with the International Building Code. This parameter was estimated based on extrapolation of data beyond the deepest depth explored, using methods allowed by the code. Actual shear wave velocity testing/analysis and/or exploration to a depth of 100 feet were not performed as part of our scope of services for this project.

Seismic design parameters for the project site were determined in accordance with the procedure in the International Building Code. These values are based on a Risk Category of II and Site Class of D. The seismic design parameters are presented in the table below.

Seismic Design Parameters	
S_S	0.174g
S_1	0.058g
S_{MS}	0.278g
S_{M1}	0.140g
S_{DS}	0.185g
S_{D1}	0.093g

S_S = mapped spectral response acceleration at short periods
S_1 = mapped spectral response acceleration at 1-second period
S_{MS} = maximum considered earthquake spectral response acceleration for short periods
S_{M1} = maximum considered earthquake spectral response acceleration for 1-second period
S_{DS} = five-percent damped design spectral response acceleration at short periods
S_{D1} = five-percent damped design spectral response acceleration at 1-second period
g = gravitational acceleration, approximately 9.8 m/sec^2 or 32.2 ft/sec^2

Lateral Earth Pressures:

For soils above any free water surface, recommended equivalent fluid pressures for unrestrained foundation elements are presented in the following table:

- **Active:**
  Granular soil backfill ..... 35 psf/ft
  Undisturbed subsoil ..... 30 psf/ft

- **Passive:**
  Shallow foundation walls ..... 250 psf/ft
  Shallow column footings..... 350 psf/ft
- **Coefficient of base friction**: ..... 0.40 *

  * The coefficient of base friction should be reduced to 0.30 when used in conjunction with passive pressure.

Where the design includes restrained elements, the following equivalent fluid pressures are recommended:

- **At rest:**
  Granular soil backfill .....50 psf/ft
  Undisturbed subsoil.....60 psf/ft

Fill against grade beams and retaining walls should be compacted to densities specified in **Earthwork**. Medium to high plasticity clay soils should not be used as backfill against retaining walls. Compaction of each lift adjacent to walls should be accomplished with hand-operated tampers or other lightweight compactors. Over compaction may cause excessive lateral earth pressures that could result in wall movement.

Pavement Design and Construction:

Design of pavements for the project has been based on the procedures outlined in the Guideline for Design of Pavement Structures by the American Association of State Highway and Transportation Officials (AASHTO), and on the Guide for the Design and Construction of Concrete Parking Lots by the American Concrete Institute (ACI 330). Based upon the results of our subsurface exploration and laboratory testing an estimated subgrade R-value of 5 was used for the design. Any fill material, native or imported, that may be required to achieve final site grades should have a minimum R-value of 5.

The recommended pavement sections are presented in the tables below.

Recommended Pavement Sections for Light Vehicle Parking Areas				
Option	**Hot Mix Asphalt** (inches)	**Aggregate Base Course** (inches)	**Geogrid**	**Portland Cement Concrete** (inches)
Asphalt	3.5	7.0	--	--
Concrete	--	--	--	5.0

Recommended Heavy Duty Pavement Section	
Portland Cement Concrete (inches)	**Aggregate Base Course** (inches)
7.0	--

Construction Recommendations for Asphalt and Concrete Pavements:

In areas to be paved, the exposed ground surface should be scarified to a minimum depth of 12 inches and moisture conditioned as necessary to bring the upper 1.0 foot to within optimum to plus 3 percent of optimum moisture content and compacted to a minimum of 95 percent of

ASTM D1557 maximum dry density prior to placement of fill or construction of pavement sections.

After preparation of the pavement subgrade, the areas to be paved should be proof-rolled under the observation of a representative of GEOMAT. The proof-rolling should be conducted utilizing a fully loaded, single axle water truck with a minimum 2,000-gallon capacity or other vehicle that will provide an equivalent weight on the subgrade. The proof-rolling should consist of driving the truck across all the areas to be paved with asphalt at a slow speed (less than 5 mph) and observing any deflections or distress caused to the subgrade. Areas that show distress should be repaired by removing and replacing the soft material with suitable fill.

Soft, wet clay soils were encountered in our borings and should be anticipated during construction. Stabilization with geogrid or other methods may be required if these soils are encountered during construction of the paving areas. If encountered, GEOMAT should be contacted for further recommendations or clarification.

Asphalt Pavements:

Aggregate base course should conform to Section 303 of the NMDOT specifications for Type I or II Base Course. The aggregate base course should be placed in lifts not exceeding 6 inches and should be compacted to a minimum of 95% Modified Proctor density (ASTM D1557), within a moisture content range of 4 percent below, to 2 percent above optimum. In any areas where base course thickness exceeds 6 inches, the material should be placed and compacted in two or more lifts of equal thickness.

If the hot-mix asphalt (HMA) is placed in more than one mat, the surface of each underlying mat should be treated with a tack coat immediately prior to placement of the subsequent mat of hot – mix asphalt.

Asphalt concrete should be obtained from an engineer-approved mix design prepared in accordance with NMDOT specifications. The hot-mix paving should be placed and compacted in accordance with NMDOT specifications. HMA should either SP-III or SP-IV mix complying with the requirements of section 416, Minor Paving of the 2014 NMDOT Specifications. HMA lift thickness should comply with the following:

HMA Lift Thicknesses		
HMA Type	**Minimum Thickness** (inches)	**Maximum Thickness** (inches)
SP-III	2.5	3.5
SP-IV	1.5	3.0

Concrete Pavements:

Concrete should be placed directly on the prepared subgrade. Reinforcing steel and dowels are not required or recommended for rigid pavement sections. Concrete used for pavement sections should have a nominal aggregate size of ¾-inch or greater, be air-entrained to have an air content of 6 +/- 1.5 percent and have a minimum 28-day compressive strength of 4,000 pounds per square inch (psi). Concrete materials and placement including jointing should be in accordance with recommendations in the latest edition of ACI-330R of the American Concrete Institute "*Guide for the Design and Construction of Concrete Parking Lots*".

General Pavement Considerations:

The performance of the recommended pavement sections can be enhanced by minimizing excess moisture that can reach the subgrade soils.

The following recommendations should be considered at minimum:

- Site grading at a minimum 2% grade away from the pavements;
- Compaction of any utility trenches to the same criteria as the pavement subgrade

The recommended pavement sections are considered minimal sections based on the anticipated traffic volumes and the subgrade conditions encountered during our exploration. They are expected to perform adequately when used in conjunction with preventive maintenance and good drainage. Preventive maintenance activities are intended to slow the rate of pavement deterioration and to preserve the pavement investment.

Slopes:

Assuming fill specifications, compaction requirements, and recommended setbacks provided in this report are followed, cut and fill slopes as steep as to 2.5:1 (horizontal:vertical) should be stable. Depending upon specific project conditions, adequate factors of safety against slope failure may be available for steeper configurations. However, such a determination would require additional analysis.

Earthwork:

General Considerations:

The opinions contained in this report for the proposed construction are contingent upon compliance with recommendations presented in this section. Although underground facilities such as foundations, septic tanks, cesspools, basements, and irrigation systems were not encountered during site reconnaissance, such features could exist and might be encountered during construction.

Site Clearing:

1. Strip and remove all existing pavement, fill, debris, and other deleterious materials from the proposed building areas. Any existing structures should be completely removed from below any building, including foundation elements and any associated development such as underground utilities, septic tanks, etc. All exposed surfaces below footings and slabs should be free of mounds and depressions which could prevent uniform compaction.

2. If unexpected fills or underground facilities are encountered during site clearing, we should be contacted for further recommendations. All excavations should be observed by GEOMAT prior to backfill placement.

3. Stripped materials consisting of vegetation and organic materials should be removed from the site or used to re-vegetate exposed slopes after completion of grading operations. If it is necessary to dispose of organic materials on-site, they should be placed in non-structural areas, and in fill sections not exceeding 5 feet in height.

4. Sloping areas steeper than 5:1 (horizontal:vertical) should be benched to reduce the potential for slippage between existing slopes and fills. Benches should be level and wide enough to accommodate compaction and earth moving equipment.

5. All exposed areas which will receive fill, once properly cleared and benched where necessary, should be scarified to a minimum depth of eight inches, conditioned to optimum to plus 3 percent of optimum moisture content, and compacted to at least 95% of modified proctor (ASTM D1557). If gravels and cobbles are present at the bottom of the over excavation, they should be proof compacted under observation by GEOMAT.

Excavation:

1. We present the following general comments regarding our opinion of the excavation conditions for the designers' information with the understanding that they are opinions based on our boring data. More accurate information regarding the excavation conditions should be evaluated by contractors or other interested parties from test excavations using the equipment that will be used during construction. Based on our subsurface evaluation it appears that excavations in soils at the site will be possible using standard excavation equipment.

2. On-site soils may pump or become unstable or unworkable at high water contents, especially for excavations near the water table. Dewatering may be necessary to achieve a stable excavation. Workability may be improved by scarifying and drying. Over-excavation of wet zones and replacement with granular materials may be necessary. Lightweight excavation equipment may be required to reduce subgrade pumping.

Slab Subgrade Preparation:

1. After site clearing is complete, the existing soil below the building area should be prepared as recommended in the **Floor Slab Design and Construction** and *Site Clearing* sections of this report.

2. A minimum 4-inch layer of aggregate base course should be placed beneath floor slabs on grade.

Foundation Preparation:

Footings should bear on engineered fill as recommended in the **Foundations** section of this report. All loose and/or disturbed soils should either be compacted or removed from the bottoms of footing excavations prior to placement of reinforcing steel and/or concrete.

Fill Materials:

1. Based upon the conditions encountered and tested, the clayey native soils will not be suitable for reuse as structural (engineered) fill. It is the responsibility of the contractor to determine the appropriate methods for providing suitable structural (engineered) fill material prior to bidding the work. Periodic quality control testing during construction will be required to determine the suitability of native soils to be re-used as engineered fill.

2. Soils with low expansive potentials could be used as fill material for the following, provided they meet the criteria given in this section below:

   - general site grading
   - foundation areas
   - interior floor slab areas
   - foundation backfill
   - pavement areas

3. Select granular materials should be used as backfill behind walls that retain earth.

4. Soils to be used in structural (engineered) fills should conform to the following:

Gradation	Percent Finer by Weight (ASTM C136)
3"	100
No. 4 Sieve	50 – 100
No. 200 Sieve	20 – 50
Plasticity Index	12 Max
Maximum Expansive Potential (%) *	+ 1.5

* Measured on a sample compacted to approximately 95 percent of the ASTM D1557 maximum dry density at about 3 percent below optimum water content. The sample is confined under a 144-psf surcharge and submerged.

5. The contractor should be responsible for determining the most appropriate method for providing the required structural (engineered) fill (i.e. removal/replacement vs. blending vs. import) to meet the recommended requirements prior to bidding the work.

6. Aggregate base should conform to Type I Base Course as specified in Section 303 of the 2019 New Mexico Department of Transportation (NMDOT) *"Standard Specifications for Highway and Bridge Construction."*

Placement and Compaction:

1. Place and compact fill in horizontal lifts, using equipment and procedures that will produce recommended moisture contents and densities throughout the lift.

2. Un-compacted fill lifts should not exceed 10 inches loose thickness.

3. Materials should be compacted to the following:

Material	Minimum Percent (ASTM D1557)
Subgrade soils beneath fill areas	95
On site or imported soil fills:	
Beneath footings, slabs on grade and pavements	95
Aggregate base beneath slabs and pavements	95
Miscellaneous backfill	90

4. On-site and imported soils should be compacted at moisture contents near optimum.

Compliance:

Recommendations for slabs-on-grade and foundation elements supported on compacted fills depend upon compliance with **Earthwork** recommendations. To assess compliance, observation and testing should be performed by GEOMAT.

Drainage:

Surface Drainage:

1. Positive drainage should be provided during construction and maintained throughout the life of the proposed project. Infiltration of water into utility or foundation excavations must be prevented during construction. Planters and other surface features that could retain water in areas adjacent to the building or pavements should be sealed or eliminated.

2. In areas where sidewalks or paving do not immediately adjoin the structure, we recommend that protective slopes be provided with a minimum grade of approximately 5 percent for at least 10 feet from perimeter walls. Backfill against footings, exterior walls, and in utility and sprinkler line trenches should be well compacted and free of all construction debris to reduce the possibility of moisture infiltration.

3. Downspouts, roof drains or scuppers should discharge into splash blocks or extensions when the ground surface beneath such features is not protected by exterior slabs or paving.

4. Sprinkler systems should not be within 5 feet of foundation walls. Irrigated landscaping adjacent to the foundation system should be minimized or eliminated.

Subsurface Drainage:

Free-draining, granular soils containing less than five percent fines (by weight) passing a No. 200 sieve should be placed adjacent to walls which retain earth. A drainage system consisting of either weep holes or perforated drain lines (placed near the base of the wall) should be used to intercept and discharge water which would tend to saturate the backfill. Where used, drain lines should be embedded in a uniformly graded filter material and provided with adequate clean-outs for periodic maintenance. An impervious soil should be used in the upper layer of backfill to reduce the potential for water infiltration.

GENERAL COMMENTS

It is recommended that GEOMAT be retained to provide a general review of final design plans and specifications in order to confirm that grading and foundation recommendations in this report have been interpreted and implemented. In the event that any changes of the proposed project are planned, the opinions and recommendations contained in this report should be reviewed and the report modified or supplemented as necessary.

GEOMAT should also be retained to provide services during excavation, grading, foundation, and construction phases of the work. Observation of footing excavations should be performed prior to placement of reinforcing and concrete to confirm that satisfactory bearing materials are present and is considered a necessary part of continuing geotechnical engineering services for the project. Construction testing, including field and laboratory evaluation of fill, backfill, pavement materials, concrete and steel should be performed to determine whether applicable project requirements have been met.

The analyses and recommendations in this report are based in part upon data obtained from the field exploration. The nature and extent of variations beyond the location of test borings may not become evident until construction. If variations then appear evident, it may be necessary to re-evaluate the recommendations of this report.

Our professional services were performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical engineers practicing in this or similar localities at the same time. No warranty, express or implied, is intended or made. We prepared the report as an aid in the design of the proposed project. This report is not a bidding document. Any contractor reviewing this report must draw his own conclusions regarding site conditions and specific construction equipment and techniques to be used on this project.

This report is for the exclusive purpose of providing geotechnical engineering and/or testing information and recommendations. The scope of services for this project does not include, either specifically or by implication, any environmental assessment of the site or identification of contaminated or hazardous materials or conditions. If the owner is concerned about the potential for such contamination, other studies should be undertaken. This report has also not addressed any geologic hazards that may exist on or near the site.

This report may be used only by the Client and only for the purposes stated, within a reasonable time from its issuance. Land use, site conditions (both on and off site), or other factors may change over time and additional work may be required with the passage of time. Any party, other than the Client, who wishes to use this report, shall notify GEOMAT in writing of such intended use. Based on the intended use of the report, GEOMAT may require that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements, by the Client or anyone else, will release GEOMAT from any liability resulting from the use of this report by an unauthorized party.

Appendix A

Approximate Not to Scale	VICINITY PLAN Boring Locations (approximate) GEOMAT Project No. 232-4633 Date of Exploration: October 27, 2023	PROJECT NMSU Extension Building Aztec, New Mexico

GEOMAT INC.

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Boring B-1

Project Name: NMSU Extension Building
Project Number: 232-4633
Client: San Juan County
Site Location: Aztec, New Mexico
Rig Type: CME-55
Drilling Method: 7.25" O.D. Hollow Stem Auger
Sampling Method: Ring and Split spoon samples
Hammer Weight: 140 lbs
Hammer Fall: 30 inches

Date Drilled: 10/27/2023
Latitude: Not Determined
Longitude: Not Determined
Elevation: Not Determined
Boring Location: See Site Plan
Groundwater Depth: Not Encountered
Logged By: CB
Remarks: None

Laboratory Results				Blows per 6"	Sample Type & Length (in)	Symbol	Material Type	Soil Symbol	Depth (ft)	Soil Description
Dry Density (pcf)	% Passing #200 Sieve	Plasticity Index	Moisture Content (%)							
94.3	-	-	7.0	6-8	R		CH		1 2 3 4	Fat CLAY, tan to brown, medium stiff, slightly damp tan to light brown
-	40	22	6.9	7-8-9	SS		SC		5 6 7 8 9	Clayey SAND, light brown, fine- to coarse-grained, medium dense, slightly damp
99.9	-	-	4.9	9-8	R					
				3-2-2	SS		SW-SM		10 11 12 13	Well Graded SAND with silt, tan to light brown, fine- to coarse-grained, very loose, slightly damp clay lens
				6-12	R		SM		14 15 16	Silty SAND, brown, fine- to coarse-grained, medium dense, slightly damp
									17 18 19 20	Total Depth 16 feet

A = Auger Cuttings R = Ring-Lined Barrel Sampler SS = Split Spoon GRAB = Manual Grab Sample D = Disturbed Bulk Sample SH = Shelby Tube Sampler

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Boring B-2

Project Name: NMSU Extension Building
Project Number: 232-4633
Client: San Juan County
Site Location: Aztec, New Mexico
Rig Type: CME-55
Drilling Method: 7.25" O.D. Hollow Stem Auger
Sampling Method: Bulk, Ring and Split spoon samples
Hammer Weight: 140 lbs
Hammer Fall: 30 inches

Date Drilled: 10/27/2023
Latitude: Not Determined
Longitude: Not Determined
Elevation: Not Determined
Boring Location: See Site Plan
Groundwater Depth: Not Encountered
Logged By: CB
Remarks: None

Laboratory Results				Blows per 6"	Sample Type & Length (in)	Symbol	Material Type	Soil Symbol	Depth (ft)	Soil Description
Dry Density (pcf)	% Passing #200 Sieve	Plasticity Index	Moisture Content (%)							
-	95	52	15.4	7-7-8	SS GRAB	X	CH		1	Fat CLAY, brown, stiff, slightly damp
									2	
									3	light brown
									4	
				8-11	R	X			5	
							SC		6	Clayey SAND, light brown to brown, fine- to medium-grained, medium dense, slightly damp
									7	
				5-4-3	SS	X	SM		8	Silty SAND, light brown to brown, fine- to coarse-grained, loose, slightly damp
									9	
				4-8	R	X	SW-SM		10	Well Graded SAND with silt, tan to light brown, fine- to coarse-grained, loose, slightly damp
									11	gray/tan
									12	
									13	
							SM		14	Silty SAND, brown, fine- to coarse-grained, slightly damp
									15	
				3-6-6	SS	X			16	
							SW-SM			Well Graded SAND with silt, tan to light brown, fine- to coarse-grained, medium dense, slightly damp
									17	Total Depth 16 ½ feet
									18	
									19	
									20	

A = Auger Cuttings R = Ring-Lined Barrel Sampler SS = Split Spoon GRAB = Manual Grab Sample D = Disturbed Bulk Sample SH = Shelby Tube Sampler

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Boring B-3

Project Name: NMSU Extension Building
Project Number: 232-4633
Client: San Juan County
Site Location: Aztec, New Mexico
Rig Type: CME-55
Drilling Method: 7.25" O.D. Hollow Stem Auger
Sampling Method: Ring and Split spoon samples
Hammer Weight: 140 lbs
Hammer Fall: 30 inches

Date Drilled: 10/27/2023
Latitude: Not Determined
Longitude: Not Determined
Elevation: Not Determined
Boring Location: See Site Plan
Groundwater Depth: Not Encountered
Logged By: CB
Remarks: None

Laboratory Results				Blows per 6"	Sample Type & Length (in)	Symbol	Material Type	Soil Symbol	Depth (ft)	Soil Description
Dry Density (pcf)	% Passing #200 Sieve	Plasticity Index	Moisture Content (%)							
									1	Fat CLAY, brown, stiff, slightly damp
									2	
102.9	-	-	12.0	14-18	R		CH		3	
									4	light brown to brown
	30	NP	4.4	7-10-8	SS		SM		5	Silty SAND, brown, fine- to coarse-grained, medium dense, slightly damp
									6	
									7	
102.4	-	-	1.7	9-9	R		SW-SM		8	Well Graded SAND with silt, tan to light brown, fine- to coarse-grained, loose, slightly damp
									9	brown
				2-4-4	SS				10	clay lenses
									11	
							SC		12	Clayey SAND, brown, fine- to medium-grained, slightly damp
									13	
							SW-SM		14	Well Graded SAND with silt, tan to light brown, fine- to coarse-grained, medium dense, slightly damp
				6-11	R				15	
									16	
									17	Total Depth 16 feet
									18	
									19	
									20	

A = Auger Cuttings R = Ring-Lined Barrel Sampler SS = Split Spoon GRAB = Manual Grab Sample D = Disturbed Bulk Sample SH = Shelby Tube Sampler

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Boring B-4

Project Name: NMSU Extension Building
Project Number: 232-4633
Client: San Juan County
Site Location: Aztec, New Mexico
Rig Type: CME-55
Drilling Method: 7.25" O.D. Hollow Stem Auger
Sampling Method: Bulk, Ring and Split spoon samples
Hammer Weight: 140 lbs
Hammer Fall: 30 inches

Date Drilled: 10/27/2023
Latitude: Not Determined
Longitude: Not Determined
Elevation: Not Determined
Boring Location: See Site Plan
Groundwater Depth: Not Encountered
Logged By: CB
Remarks: None

Laboratory Results				Blows per 6"	Sample Type & Length (in)	Symbol	Material Type	Soil Symbol	Depth (ft)	Soil Description
Dry Density (pcf)	% Passing #200 Sieve	Plasticity Index	Moisture Content (%)							
									1	Fat CLAY, brown, stiff, dry to slightly damp
									2	
	92	38	11.3	4-5-4	SS GRAB		CH		3	
									4	light brown
108.8	-	-	13.4	9-15	R				5	
									6	brown/white, salt precipitants
									7	
				4-3-3	SS				8	sand lenses
									9	Well Graded SAND with silt, tan to light brown, fine- to coarse-grained, loose, slightly damp
100.4	-	-	3.4	7-9	R		SW-SM		10	clay lens
									11	
									12	Silty SAND, brown, fine- to coarse-grained, slightly damp
							SM		13	
									14	Well Graded SAND with silt, tan to light brown, fine- to coarse-grained, loose, slightly damp
				5-4-5	SS		SW-SM		15	
									16	gray clay lens
									17	Total Depth 16 ½ feet
									18	
									19	
									20	

A = Auger Cuttings R = Ring-Lined Barrel Sampler SS = Split Spoon GRAB = Manual Grab Sample D = Disturbed Bulk Sample SH = Shelby Tube Sampler

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Boring B-5

Project Name: NMSU Extension Building
Project Number: 232-4633
Client: San Juan County
Site Location: Aztec, New Mexico
Rig Type: CME-55
Drilling Method: 7.25" O.D. Hollow Stem Auger
Sampling Method: Bulk sample from auger cuttings
Hammer Weight: N/A
Hammer Fall: N/A

Date Drilled: 10/27/2023
Latitude: Not Determined
Longitude: Not Determined
Elevation: Not Determined
Boring Location: See Site Plan
Groundwater Depth: Not Encountered
Logged By: CB
Remarks: None

Laboratory Results				Blows per 6"	Sample Type & Length (in)	Symbol	Material Type	Soil Symbol	Depth (ft)	Soil Description
Dry Density (pcf)	% Passing #200 Sieve	Plasticity Index	Moisture Content (%)							
-	90	34	26.1		GRAB		CH		1 2 3 4 5	Fat CLAY, tan to brown, slightly damp to damp
									6 7 8 9 10	Total Depth 5 feet

A = Auger Cuttings R = Ring-Lined Barrel Sampler SS = Split Spoon GRAB = Manual Grab Sample D = Disturbed Bulk Sample SH = Shelby Tube Sampler

GEOMAT 232-4633.GPJ GEOMAT.GDT 11/9/23

GEOMAT INC.
915 Malta Ave
Farmington, NM 87401
Tel (505) 327-7928
Fax (505) 326-5721

Boring B-6

Project Name: NMSU Extension Building
Project Number: 232-4633
Client: San Juan County
Site Location: Aztec, New Mexico
Rig Type: CME-55
Drilling Method: 7.25" O.D. Hollow Stem Auger
Sampling Method: Bulk sample from auger cuttings
Hammer Weight: N/A
Hammer Fall: N/A

Date Drilled: 10/27/2023
Latitude: Not Determined
Longitude: Not Determined
Elevation: Not Determined
Boring Location: See Site Plan
Groundwater Depth: Not Encountered
Logged By: CB
Remarks: None

Laboratory Results				Blows per 6"	Sample Type & Length (in)	Symbol	Material Type	Soil Symbol	Depth (ft)	Soil Description
Dry Density (pcf)	% Passing #200 Sieve	Plasticity Index	Moisture Content (%)							
					GRAB		CH		1 2 3 4	Fat CLAY, tan to brown, slightly damp
							SC		5	Clayey SAND, light brown, fine- to medium-grained, slightly damp
									6 7 8 9 10	Total Depth 5 feet

A = Auger Cuttings R = Ring-Lined Barrel Sampler SS = Split Spoon GRAB = Manual Grab Sample D = Disturbed Bulk Sample SH = Shelby Tube Sampler

GEOMAT 232-4633.GPJ GEOMAT.GDT 11/9/23

UNIFIED SOIL CLASSIFICATION SYSTEM					CONSISTENCY OR RELATIVE DENSITY CRITERIA		
Major Divisions			Group Symbols	Typical Names			
Coarse-Grained Soils More than 50% retained on No. 200 sieve	**Gravels** 50% or more of coarse fraction retained on No. 4 sieve	Clean Gravels	GW	Well-graded gravels and gravel-sand mixtures, little or no fines	Standard Penetration Test Density of Granular Soils		
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines	Penetration Resistance, N (blows/ft.)	Relative Density	
		Gravels with Fines	GM	Silty gravels, gravel-sand-silt mixtures	0-4	Very Loose	
			GC	Clayey gravels, gravel-sand-clay mixtures	5-10	Loose	
	Sands More than 50% of coarse fraction passes No. 4 sieve	Clean Sands	SW	Well-graded sands and gravelly sands, little or no fines	11-30	Medium Dense	
			SP	Poorly graded sands and gravelly sands, little or no fines	31-50	Dense	
		Sands with Fines	SM	Silty sands, sand-silt mixtures	>50	Very Dense	
			SC	Clayey sands, sand-clay mixtures	Standard Penetration Test Density of Fine-Grained Soils		
Fine-Grained Soils 50% or more passes No. 200 sieve	**Silts and Clays** Liquid Limit 50 or less		ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands	Penetration Resistance, N (blows/ft.)	Consistency	Unconfined Compressive Strength (Tons/ft2)
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	<2	Very Soft	<0.25
			OL	Organic silts and organic silty clays of low plasticity	2-4	Soft	0.25-0.50
	Silts and Clays Liquid Limit greater than 50		MH	Inorganic silts, micaceous or diatomaceous free sands or silts, elastic silts	4-8	Firm	0.50-1.00
			CH	Inorganic clays of high plasticity, fat clays	8-15	Stiff	1.00-2.00
			OH	Organic clays of medium to high plasticity	15-30	Very Stiff	2.00-4.00
Highly Organic Soils			PT	Peat, mucic & other highly organic soils	>30	Hard	>4.0

U.S. Standard Sieve Sizes

>12"	12"	3"	3/4"	#4	#10	#40	#200
Boulders	Cobbles	Gravel			Sand		Silt or Clay
		coarse	fine	coarse	medium	fine	

MOISTURE CONDITIONS		MATERIAL QUANTITY		OTHER SYMBOLS
Dry	Absence of moist, dusty, dry to the touch	trace	0-5%	R Ring Sample
Slightly Damp	Below optimum moisture content for compaction	few	5-10%	S SPT Sample
Moist	Near optimum moisture content, will moisten the hand	little	10-25%	B Bulk Sample
Very Moist	Above optimum moisture content	some	25-45%	▼ Ground Water
Wet	Visible free water, below water table	mostly	50-100%	

BASIC LOG FORMAT:

Group name, Group symbol, (grain size), color, moisture, consistency or relative density. Additional comments: odor, presence of roots, mica, gypsum, coarse particles, etc.

EXAMPLE:

SILTY SAND w/trace silt (SM-SP), Brown, loose to med. Dense, fine to medium grained, damp

UNIFIED SOIL CLASSIFICATION SYSTEM

TEST DRILLING EQUIPMENT & PROCEDURES

Description of Subsurface Exploration Methods

Drilling Equipment – Truck-mounted drill rigs powered with gasoline or diesel engines are used in advancing test borings. Drilling through soil or softer rock is performed with hollow-stem auger or continuous flight auger. Carbide insert teeth are normally used on bits to penetrate soft rock or very strongly cemented soils which require blasting or very heavy equipment for excavation. Where refusal is experienced in auger drilling, the holes are sometimes advanced with tricone gear bits and NX rods using water or air as a drilling fluid.

Coring Equipment – Portable electric core drills are used when recovery of asphalt or concrete cores is necessary. The core drill is equipped with either a 4" or 6" diameter diamond core barrel. Water is generally used as a drilling fluid to facilitate cooling and removal of cuttings from the annulus.

Sampling Procedures - Dynamically driven tube samples are usually obtained at selected intervals in the borings by the ASTM D1586 test procedure. In most cases, 2" outside diameter, 1 3/8" inside diameter, samplers are used to obtain the standard penetration resistance. "Undisturbed" samples of firmer soils are often obtained with 3" outside diameter samplers lined with 2.42" inside diameter brass rings. The driving energy is generally recorded as the number of blows of a 140-pound, 30-inch free fall drop hammer required to advance the samplers in 6-inch increments. These values are expressed in blows per foot on the boring logs. However, in stratified soils, driving resistance is sometimes recorded in 2- or 3-inch increments so that soil changes and the presence of scattered gravel or cemented layers can be readily detected and the realistic penetration values obtained for consideration in design. "Undisturbed" sampling of softer soils is sometimes performed with thin-walled Shelby tubes (ASTM D1587). Tube samples are labeled and placed in watertight containers to maintain field moisture contents for testing. When necessary for testing, larger bulk samples are taken from auger cuttings. Where samples of rock are required, they are obtained by NX diamond core drilling (ASTM D2113).

Boring Records - Drilling operations are directed by our field engineer or geologist who examines soil recovery and prepares boring logs. Soils are visually classified in accordance with the Unified Soil Classification System (ASTM D2487), with appropriate group symbols being shown on the logs.

Appendix B

LAB NO.	BORING NO.	SAMPLE DEPTH (ft)	SIEVE ANALYSIS, CUMULATIVE PERCENT PASSING (%)														ATTERBERG LIMITS			CONSOL-IDATION TEST	MOISTURE CONTENT (%)	DENSITY		CLASSIFICATION
			1 ½"	1"	¾"	½"	⅜"	No. 4	No. 8	No. 10	No. 16	No. 30	No. 40	No. 50	No. 100	No. 200	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX			WET (pcf)	DRY (pcf)	
16300	B-1	2 ½	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Attached	7.0	100.9	94.3	Fat CLAY (CH)
16301	B-1	5	-	-	-	-	-	100	100	99	97	86	77	67	51	40	39	17	22	-	6.9	-	-	Clayey SAND (SC)
16302	B-1	7 ½	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Attached	4.9	104.8	99.9	Clayey SAND (SC)
16303*	B-2	2 - 3	-	-	-	-	-	100	100	100	100	99	98	98	97	95	76	24	52	-	15.4	-	-	Fat CLAY (CH)
16304	B-3	2 ½	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Attached	12.0	115.2	102.9	Fat CLAY (CH)
16306	B-3	5	-	-	-	-	-	-	-	-	-	-	-	-	-	30	NLL	NPL	NP	-	4.4	-	-	Silty SAND (SM)
16307	B-3	7 ½	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.7	104.1	102.4	Well Graded SAND with silt (SW-SM)
16308	B-4	2 ½	-	-	-	-	-	-	-	-	-	-	-	-	-	92	63	25	38	-	11.3	-	-	Fat CLAY (CH)
16309	B-4	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Attached	13.4	123.4	108.8	Fat CLAY (CH)
16310	B-4	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.4	103.8	100.4	Well Graded SAND with silt (SW-SM)
16311	B-5	1 - 2	-	-	-	-	-	-	100	100	100	98	97	96	94	90	56	22	34	-	26.1	-	-	Fat CLAY (CH)

NLL = No Liquid Limit
NPL = No Plastic Limit
NP = Non-Plastic
* = Corrosivity Attached

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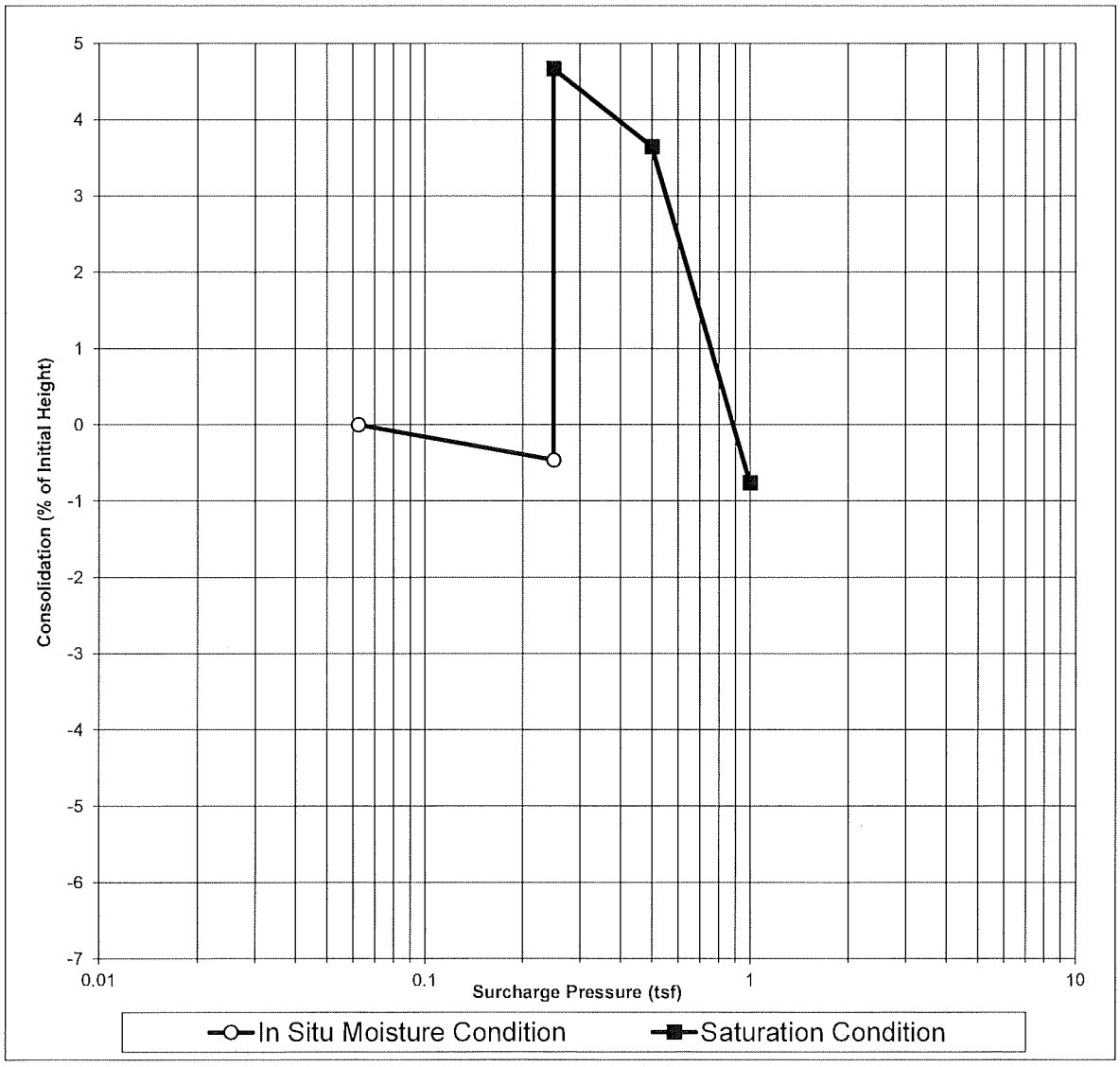
SUMMARY OF SOIL TESTS
Page 1 of 1

Project Name	NMSU Extension Building
Project No.	232-4633
Location	Aztec, New Mexico
Date(s) of Exploration	10/27/2023

PROJECT:	NMSU Extension Building	**JOB NO:**	232-4633
CLIENT:	San Juan County	**WORK ORDER NO:**	N/A
MATERIAL:	Fat **CLAY** (CH)	**LAB NO:**	16300
SAMPLE SOURCE:	B-1 @ 2 ½'	**DATE SAMPLED:**	10/27/2023
SAMPLE PREP.:	In Situ	**SAMPLED BY:**	CB

ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS (ASTM D2435)

INITIAL VOLUME (cu.in)	4.60	FINAL VOLUME (cu.in)	4.57
INITIAL MOISTURE CONTENT	7.0%	FINAL MOISTURE CONTENT	27.0%
INITIAL DRY DENSITY(pcf)	94.3	FINAL DRY DENSITY(pcf)	94.6
INITIAL DEGREE OF SATURATION	19%	FINAL DEGREE OF SATURATION	75%
INITIAL VOID RATIO	0.76	FINAL VOID RATIO	0.75
ESTIMATED SPECIFIC GRAVITY	2.651	SATURATED AT	0.25 tsf



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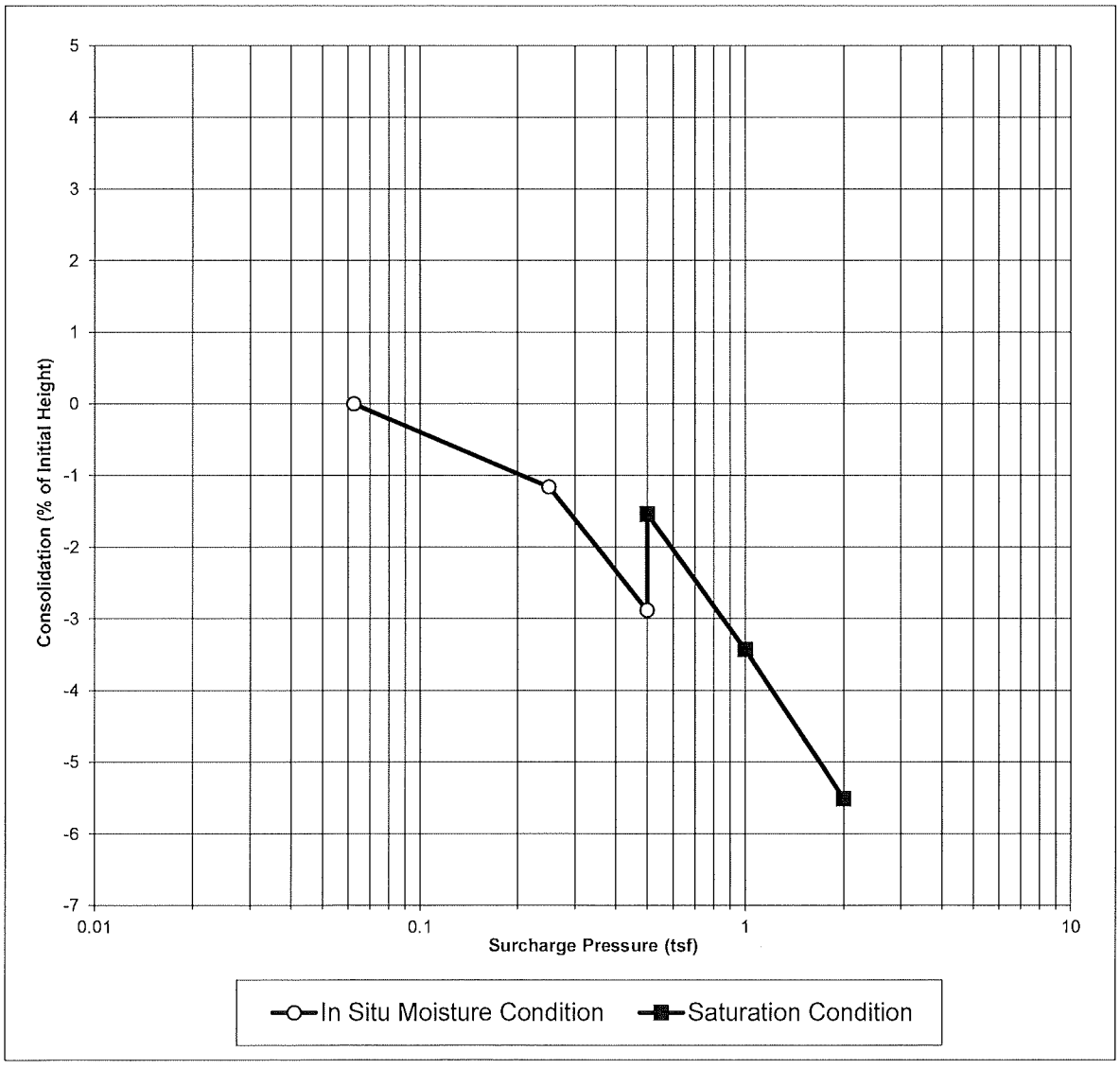
PROJECT:	NMSU Extension Building	**JOB NO:**	232-4633
CLIENT:	San Juan County	**WORK ORDER NO:**	N/A
MATERIAL:	Clayey **SAND** (SC)	**LAB NO:**	16302
SAMPLE SOURCE:	B-1 @ 7 ½'	**DATE SAMPLED:**	10/27/2023
SAMPLE PREP.:	In Situ	**SAMPLED BY:**	CB

ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS (ASTM D2435)

INITIAL VOLUME (cu.in)	4.60	FINAL VOLUME (cu.in)	4.35
INITIAL MOISTURE CONTENT	4.9%	FINAL MOISTURE CONTENT	17.1%
INITIAL DRY DENSITY(pcf)	99.9	FINAL DRY DENSITY(pcf)	105.2
INITIAL DEGREE OF SATURATION	15%	FINAL DEGREE OF SATURATION	58%
INITIAL VOID RATIO	0.66	FINAL VOID RATIO	0.57
ESTIMATED SPECIFIC GRAVITY	2.651	SATURATED AT	0.5 tsf

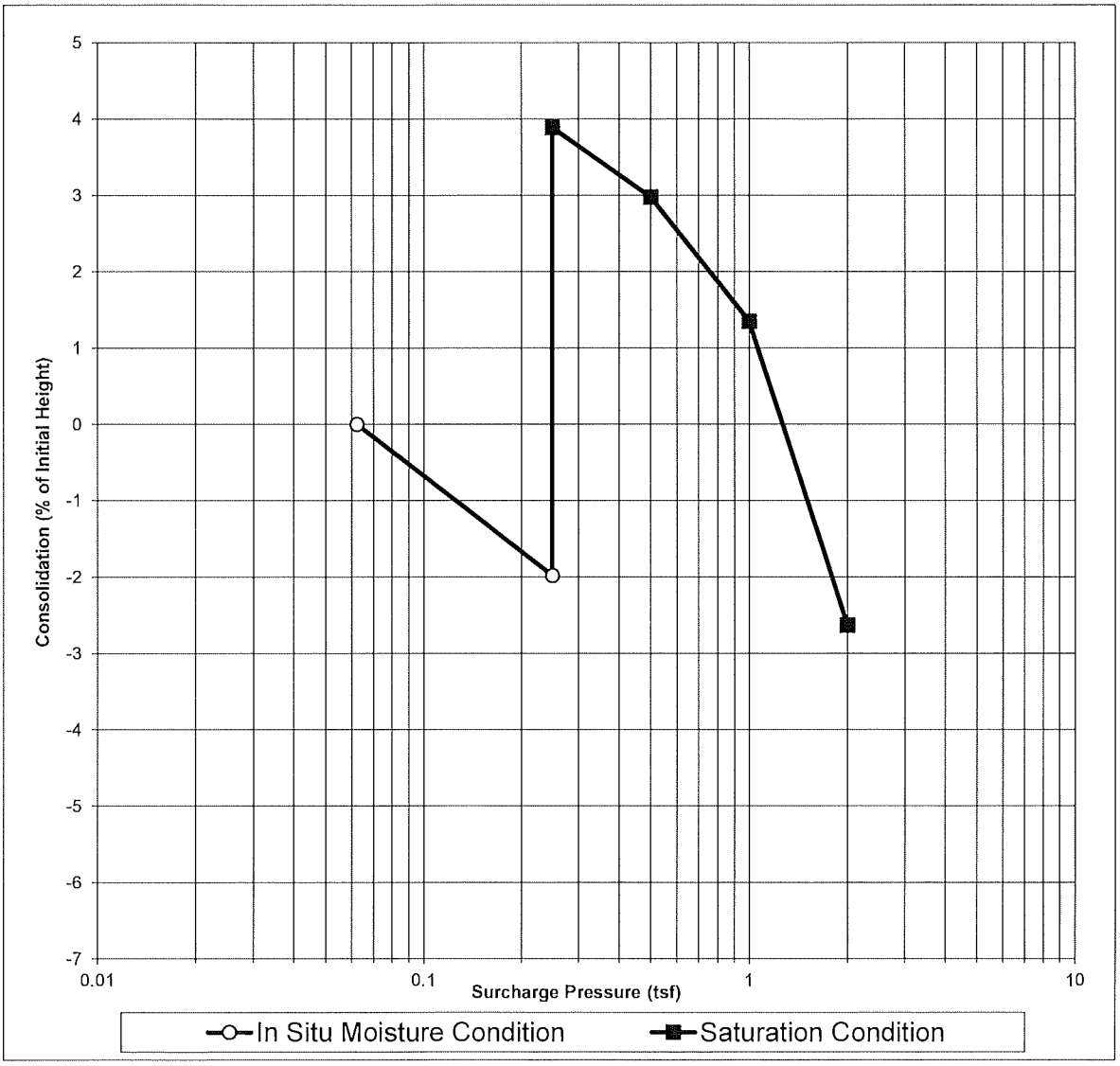


GEOMAT INC.

PROJECT:	NMSU Extension Building	JOB NO:	232-4633
CLIENT:	San Juan County	WORK ORDER NO:	N/A
MATERIAL:	Fat CLAY (CH)	LAB NO:	16304
SAMPLE SOURCE:	B-3 @ 2 ½'	DATE SAMPLED:	10/27/2023
SAMPLE PREP.:	In Situ	SAMPLED BY:	CB

ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS (ASTM D2435)

INITIAL VOLUME (cu.in)	4.60	FINAL VOLUME (cu.in)	4.48
INITIAL MOISTURE CONTENT	12.0%	FINAL MOISTURE CONTENT	21.6%
INITIAL DRY DENSITY(pcf)	102.9	FINAL DRY DENSITY(pcf)	105.1
INITIAL DEGREE OF SATURATION	39%	FINAL DEGREE OF SATURATION	73%
INITIAL VOID RATIO	0.62	FINAL VOID RATIO	0.57
ESTIMATED SPECIFIC GRAVITY	2.651	SATURATED AT	0.25 tsf



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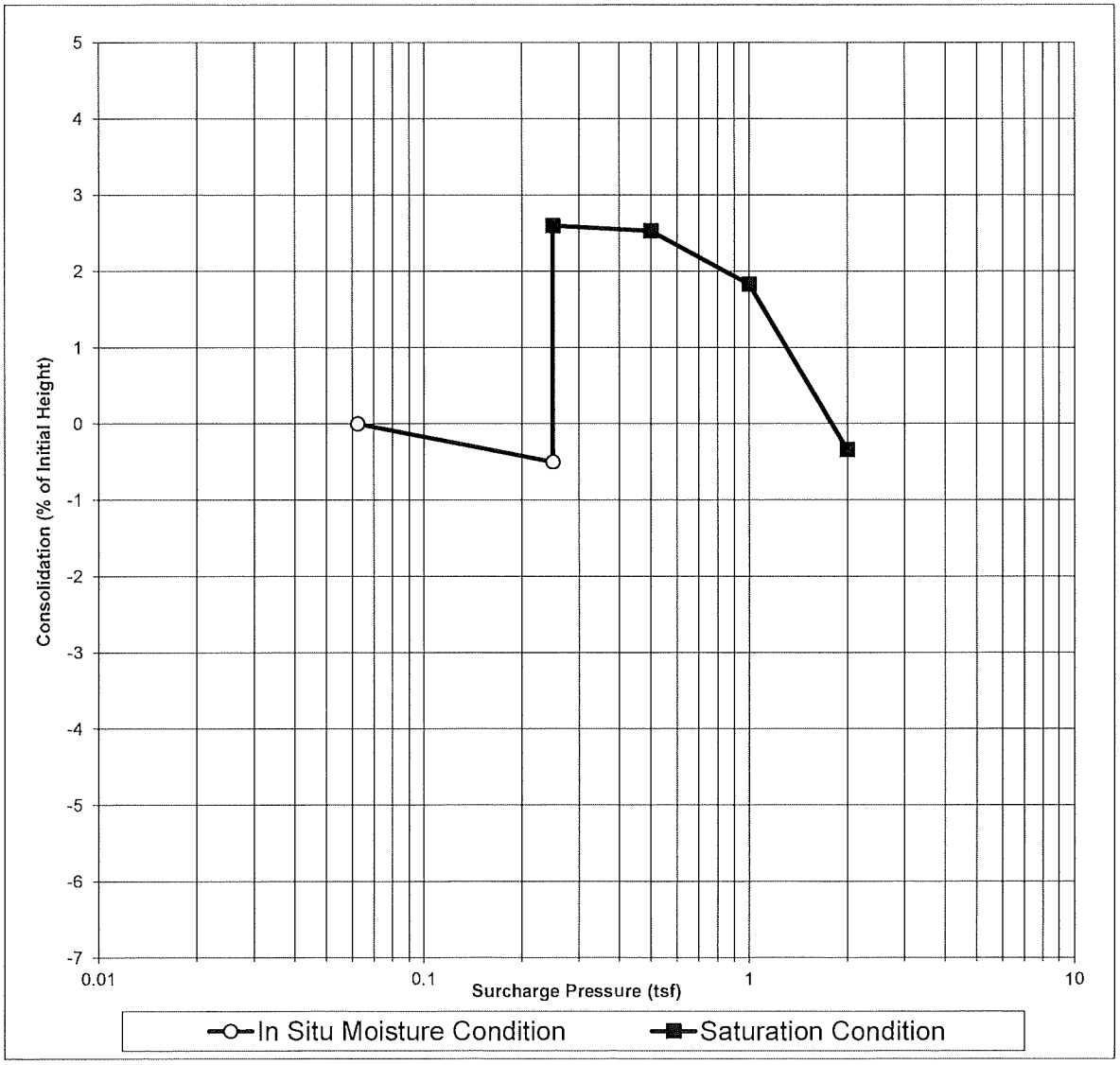
PROJECT:	NMSU Extension Building	JOB NO:	232-4633
CLIENT:	San Juan County	WORK ORDER NO:	N/A
MATERIAL:	Fat CLAY (CH)	LAB NO:	16309
SAMPLE SOURCE:	B-4 @ 5'	DATE SAMPLED:	10/27/2023
SAMPLE PREP.:	In Situ	SAMPLED BY:	CB

ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS (ASTM D2435)

INITIAL VOLUME (cu.in)	4.60	FINAL VOLUME (cu.in)	4.59
INITIAL MOISTURE CONTENT	13.4%	FINAL MOISTURE CONTENT	17.8%
INITIAL DRY DENSITY(pcf)	108.8	FINAL DRY DENSITY(pcf)	108.6
INITIAL DEGREE OF SATURATION	49%	FINAL DEGREE OF SATURATION	65%
INITIAL VOID RATIO	0.53	FINAL VOID RATIO	0.52
ESTIMATED SPECIFIC GRAVITY	2.651	SATURATED AT	0.25 tsf



GEOMAT INC.

LABORATORY TESTING PROCEDURES

Laboratory testing is performed by trained personnel in our accredited laboratory or may be subcontracted by GEOMAT through a qualified outside laboratory if necessary. Actual types and quantities of tests performed for any project will be dependent upon subsurface conditions encountered and specific design requirements.

The following is an abbreviated table of laboratory testing that may be performed by GEOMAT with the applicable standards listed. Testing for a specific project may include all or a selected subset of the laboratory work listed. Laboratory testing beyond those listed may be available and could be incorporated into the project scope at the discretion of GEOMAT.

PROCEDURE	ASTM	AASHTO
Moisture Content	ASTM D2216	AASHTO T 265
Sieve Analysis	ASTM C136	AASHTO T 27
Fines Content	ASTM D1140	T 11
Hydrometer	ASTM D422	T 88
Atterberg Limits	ASTM D4318	AASHTO T 89/T 90
Soil Compression/Expansion	ASTM D2435	T 216
Soil Classification	ASTM D2487	M 145
Direct Shear	ASTM D3080	T 236
Unconfined Compressive Strength of Soils	ASTM D2166	T 208
Unconfined Compressive Strength of Rock Cores	ASTM D4543	-

Appendix C

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept*

responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are <u>not</u> final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals' plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for information purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are <u>Not</u> Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer's services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will <u>not</u> of itself be sufficient to prevent moisture infiltration. Confront the risk of moisture infiltration*** by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are <u>not</u> building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

Telephone: 301/565-2733
e-mail: info@geoprofessional.org www.geoprofessional.org

SECTION 03 10 00
CONCRETE FORMING AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Formwork for cast-in place concrete with shoring, bracing and anchorage
2. Openings for other work
3. Form stripping.
4. Form accessories

B. Related Sections:
1. Section 03 20 00 - Concrete Reinforcing.
2. Section 03 30 00 - Cast-In-Place Concrete.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Formwork (Vertical Structures):
1. Basis of Measurement: By the cubic yard.
2. Basis of Payment: Includes form materials, placement, placing accessories, stripping.

1.3 REFERENCES

A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials.

B. ACI 347 – Recommended Practice For Concrete Formwork.

C. PS-1 – Construction and Industrial Plywood.

1.4 DESIGN REQUIREMENTS

A. Design, engineer and construct formwork, shoring and bracing to conform to applicable code requirements to achieve and hold concrete shape, line and dimension as indicated on Drawings.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 301 and ACI 318.

B. Maintain one copy of each document on site.

C. Special inspections shall be performed as required by the 2021 International Building Code and as outlined on sheet S4 of the contract documents.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store off ground in ventilated and protected manner to prevent deterioration from moisture.

1.7 COORDINATION

A. Coordinate this Section with other sections of work, requiring attachment of components to formwork.

PART 2 - PRODUCTS

2.1 WOOD FORM MATERIALS

A. Lumber Forms:
   1. Application: Use for edge forms and unexposed finish concrete.
   2. Lumber: Hem-Fir #2 with grade stamp clearly visible.

B. Plywood: Douglas Fir species; solid one side. Sound undamaged sheets with clean, true edges.

2.2 PREFABRICATED FORMS

A. Preformed Steel Forms: Minimum 16 gage matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.

B. Tubular Column Type: Round, spirally wound laminated fiber material, surface treated with release agent, non-reusable, of sizes required.

C. Other Preformed Forms: Proprietary systems of inter-locking panels, form ties, fastening devices, etc. that are tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.

2.3 FORMWORK ACCESSORIES

A. Form Ties: Snap-off type, galvanized metal, fixed length, cone type.

B. Form Release Agent: Colorless mineral oil that will not stain concrete, absorb moisture or impair natural bonding or color characteristics of coating intended for use on concrete.

C. Corners: Chamfer, wood strip type; ¾" x ¾" size; maximum possible lengths.

D. Flashing Reglets: Galvanized steel, 22 gage thick, longest possible lengths, with alignment splines for joints, release tape sealed slots, anchors for securing to concrete formwork.

E. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Size, strength and character to maintain formwork in place while placing concrete.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify lines, levels, and centers before proceeding with formwork. Verify dimensions agree with Drawings.

B. When formwork is placed after reinforcement resulting in insufficient concrete cover over reinforcement, request instructions from Architect/Engineer before proceeding.

3.2 INSTALLATION

A. Earth Forms: (only when approved by the Engineer)
1. Trench earth forms neatly, accurately, and at least 2 inches wider than footing widths indicated on Drawings.
2. Trim sides and bottom of earth forms.
3. Construct wood edge strips at top of each side of trench to secure reinforcing and prevent trench from sloughing.
4. Form sides of footings where earth sloughs.
5. Tamp earth forms firm and clean forms of debris and loose material before depositing concrete.

B. Formwork - General:
1. Construct forms to correct shape and dimensions, mortar-tight, braced, and of sufficient strength to maintain shape and position under imposed loads from construction operations. Comply with requirements of ACI 301.
2. Carefully verify horizontal and vertical positions of forms. Correct misaligned or misplaced forms before placing concrete.
3. Complete wedging and bracing before placing concrete.
4. Provide bracing to ensure stability of formwork and as required to hold formwork in position and shape for the final intended concrete dimensions. Shore brace and strengthen formwork that may be subject to over-stressing by construction loads.
5. Align joints. Keep form joints to a minimum.
6. Place neatly shaped blocks to be used for keyways with draft securely in formwork where cold-joints are required between concrete placements and cold joints there in. See details in the structural plans.

C. Erect formwork, shoring, and bracing to achieve design requirements, in accordance with requirements of ACI 301.

D. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores. Formwork may be left on surfaces for curing of those surfaces.

E. Obtain Architect/Engineer's approval before framing openings in structural members not indicated on Drawings.

3.3 APPLICATION - FORM RELEASE AGENT

A. Apply form release agent on formwork in accordance with manufacturer's recommendations.

B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.

C. Do not apply form release agent where concrete surfaces will receive, concrete, special finishes or applied coverings which are effected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.4 INSTALLATION - INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Install formed openings for items to be embedded in or passing through concrete work.

B. Locate and set in place items required to be cast directly into concrete.

C. Coordinate with Work of other sections in forming and placing openings, slots, reglets, sleeves, bolts, anchors, plates, other inserts, and components of other Work.

D. Install accessories straight, level, and plumb. Ensure items are not disturbed during concrete placement. Items to be exposed and flush, when finished, to the exposed finished formed surface of concrete shall be fastened tightly and directly to the formwork.

E. Provide temporary ports or openings in formwork where required to facilitate cleaning, air escape, concrete consolidation and inspection. Locate openings at bottom of forms to allow flushing water to drain.

F. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

G. Form Ties:
1. Use sufficient strength and sufficient quantity to prevent spreading of forms.
2. Place ties at least 2 inches away from finished ends and surfaces of concrete.
3. Leave inner rods in concrete when forms are stripped.
4. Space form ties equidistant, symmetrical and aligned vertically and horizontally unless otherwise shown on Drawings.

H. Arrangement: Arrange formwork to allow proper erection sequence and to permit form removal without damage to concrete. Sequence form erection to allow for timely observation / inspection of reinforcement without having to disassemble formwork in the event changes are required.

I. Embedded Items:
1. Make provisions for pipes, sleeves, anchors, inserts, reglets, anchor slots, nailers, water stops, dowels, and other features as indicated in the plans.
2. Do not embed wood or uncoated aluminum in concrete.
3. Obtain installation and setting information for embedded items furnished under other Specification sections.
4. Securely anchor embedded items in correct location and alignment prior to placing concrete.
5. Verify conduits and pipes, including those made of coated aluminum, meet requirements of ACI 318 for size and location limitations.

J. Cleanouts and Access Panels:
1. Provide removable cleanout sections or access panels at bottoms of forms to permit inspection and effective cleaning of loose dirt, debris and waste material.
2. Clean forms and surfaces against which concrete is to be placed. Remove chips, saw dust and other debris. Thoroughly blow out forms with compressed air just before concrete is placed.

3.5 FORM CLEANING

A. Clean forms as erection proceeds, to remove foreign matter within forms.

B. Clean formed cavities of debris prior to placing concrete.

C. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.

D. During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

3.6 FORM REMOVAL

A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads and removal has been approved by Architect/Engineer.

B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

C. Store removed forms in manner that surfaces to be in contact with fresh concrete will not be damaged. Discard damaged forms.

D. Leave forms in place for minimum number of days as specified in ACI 347.

E. Repair damage to concrete caused by form removal.

3.7 ERECTION TOLERANCES

A. Construct formwork to maintain tolerances required by ACI 301.

3.8 FIELD QUALITY CONTROL

A. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and that supports, fastenings, wedges, ties, and items are secure.

B. Notify Architect/Engineer after placement of reinforcing steel and forms are set to one side only of wall for reinforcing steel inspection.

C. Schedule concrete placement to permit formwork inspection before placing concrete.

END OF SECTION

SECTION 03 20 00
CONCRETE REINFORCING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Reinforcing bars, welded wire fabric for cast-in-place concrete.
2. Reinforcement accessories.

B. Related Sections:
1. Section 03 10 00 - Concrete Forming and Accessories.
2. Section 03 30 00 - Cast-In-Place Concrete.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Bar Reinforcement:
1. Basis of Measurement: By the cubic yard.
2. Basis of Payment: Includes reinforcement, placement, and accessories.

1.3 REFERENCES

A. American Concrete Institute:
1. ACI 301 - Specifications for Structural Concrete.
2. ACI 318 - Building Code Requirements for Structural Concrete.
3. ACI SP-66 - ACI Detailing Manual.

B. ASTM International:
1. ASTM A615/A615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
2. ASTM A706/A706M - Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.

C. American Welding Society:
1. AWS D1.4 - Structural Welding Code - Reinforcing Steel.

D. Concrete Reinforcing Steel Institute:
1. CRSI - Manual of Standard Practice.
2. CRSI - Placing Reinforcing Bars.

1.4 SUBMITTALS

A. Shop Drawings: Indicate bar sizes, spacings, locations and quantities of reinforcing steel bending and cutting schedules and supporting and spacing devices.

B. Certificates: Submit AWS qualification certificate for welders employed on the Work when reinforcement is to be welded.

C. Manufacturer's Certificate: Certify Products meet or exceed specified requirements if requested by Architect or Engineer.
1. Submit certified copies of mill test report of reinforcement materials analysis unless waived by the Architect or Engineer.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 301and ACI 318.

B. Prepare shop drawings in accordance with ACI SP-66.

C. Maintain one copy of each document on site.

D. Special inspections shall be performed as required by the 2021 International Building Code and as outlined on sheet S4 of the contract documents.

1.6 QUALIFICATIONS

A. Welders: AWS qualified or re-qualified within previous 12 months.

1.7 COORDINATION

A. Coordinate with placement of formwork, formed openings and other Work.

PART 2 PRODUCTS

2.1 REINFORCEMENT

A. Deformed Reinforcement: ASTM A615/A615M; 40 ksi yield strength for #4 bars and 60 ksi yield strength for #5 bars and larger unless noted otherwise, steel bars, unfinished.

B. Welded Wire Fabric (WWF): ASTM A185. In flat sheets. For use in project only where specifically called for in plans.

2.2 ACCESSORY MATERIALS

A. Tie Wire: Minimum 16 gage annealed type.

B. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions including load bearing pad on bottom of chairs for placement on earth.

C. Special Chairs, Bolsters, Bar supports, Spacers adjacent to weather exposed concrete surfaces: plastic tipped steel type; size and shape to meet project specifications.

2.3 FABRICATION

A. Fabricate concrete reinforcement in accordance with ACI 318 and CRSI Manual of Practice.

B. Form reinforcement bends with minimum diameters in accordance with ACI 318.

C. Weld reinforcement in accordance with AWS D1.4.

D. Locate reinforcement splices not indicated on Drawings, at point of minimum stress.

E. Reinforcing shall not be heated to be bent. All reinforcing shall be cold bent to ACI allowable bend diameters. Hooks and laps shall be of minimum lengths specified by ACI.

PART 3 EXECUTION

3.1 PLACEMENT

A. Place, support and secure reinforcement against displacement. Do not deviate from required position. Locate splices so they are staggered unless indicated otherwise in the plans and details.

B. Accommodate placement of formed openings. Add reinforcement around openings as indicated in plan and details.

C. Space reinforcement bars with minimum clear spacing in accordance with ACI 318.
   1. Where bars are indicated in multiple layers, place upper bars directly above lower bars.

D. Maintain concrete cover around reinforcement in accordance with drawings.

E. Splice reinforcing where indicated on Drawings and in accordance with ACI 318.

F. Maintain minimum concrete cover around reinforcing as follows:

Item	Coverage
*Reinforcement in concrete cast to earth:	3"
*Foundation concrete cast against formwork	1 ½"
*Slabs on Grade	1 ½"

(Note: specific dimensions and clearances shown in the plans shall govern over minimums shown in this schedule.)

G. Wire tie splices together.

H. Lap Welded Wire Fabric 6" (when applicable in the plans).

I. Chair Welded Wire Fabric on 1" chairs as described in the plans.

3.2 FIELD QUALITY CONTROL

A. Field observations will be performed at the discretion of the Architect / Engineer. Special Inspections shall be provided by an approved special inspector as required in the special inspection schedule indicated in the plans. The Special Inspector and Engineer shall be notified of all concrete placements for observations and special inspections. Notification shall be provided a minimum of 48 hours in advance of the pour. The Architect and Engineer shall be advised on a regular and frequent basis for all subsequent work to choose appropriate observation times.

END OF SECTION

SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SUMMARY

A. Section includes cast-in-place concrete for the following:
   1. Footings, stemwalls, grade beams and other foundations.
   2. Slabs-on-grade.
   3. Slabs on metal deck.

B. Related Sections:
   1. Section 03 10 00 - Concrete Forming and Accessories: Formwork and accessories. Placement of joint device anchors in formwork.
   2. Section 03 20 00 - Concrete Reinforcing.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Concrete - Vertical in Forms and horizontal in foundations and slabs-on-grade.
   1. Basis of Measurement: By the cubic yard.
   2. Basis of Payment: Includes concrete, placement accessories, consolidating, curing.

1.3 REFERENCES

A. American Concrete Institute:
   1. ACI 301 - Specifications for Structural Concrete.
   2. ACI 305 - Hot Weather Concreting.
   3. ACI 306.1 - Standard Specification for Cold Weather Concreting.
   4. ACI 308.1 - Standard Specification for Curing Concrete.
   5. ACI 318 - Building Code Requirements for Structural Concrete.
   6. ACI 304 – Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete.

B. ASTM International:
   1. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
   2. ASTM C33 - Standard Specification for Concrete Aggregates.
   3. ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
   4. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.
   5. ASTM C150 - Standard Specification for Portland Cement.
   6. ASTM C172 - Standard Practice for Sampling Freshly Mixed Concrete.
   7. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
   8. ASTM C231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
   9. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
   10. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete.
   11. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcinated Natural Pozzolan for Use as a Mineral Admixture in Concrete.

12. ASTM C685/C685M - Standard Specification for Concrete Made By Volumetric Batching and Continuous Mixing.
13. ASTM C845 - Standard Specification for Expansive Hydraulic Cement.
14. ASTM C1064/C1064M - Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete.
15. ASTM C1157 - Standard Performance Specification for Hydraulic Cement.
16. ASTM D994 - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).

1.4 SUBMITTALS

A. Product Data: Submit data on joint devices, attachment accessories, admixtures and anchorages.

B. Concrete Design Data:
1. Submit concrete mix designs for each use and concrete strength. Submit separate mix designs when admixtures are required for the following:
   a. Hot and cold weather concrete work.
   b. Air entrained concrete work.
2. Identify mix ingredients and proportions, including admixtures.
3. Identify each location and type of finished product that each mix is submitted for use in.

C. Submit all truck batch tickets to the Architect or Engineer and identify where the batch was place in the project.

D. Manufacturer's Installation Instructions: Submit installation procedures and interface required with adjacent Work.

E. Accurately record actual locations of embedded utilities and components which are concealed from view.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 301.

B. Conform to ACI 305 when concreting during hot weather.

C. Conform to ACI 306.1 when concreting during cold weather.

D. Acquire cement and aggregate from one source for Work.

E. Maintain one copy of each document on site.

F. Special inspections shall be performed as required by the 2021 International Building Code and as outlined on sheet S4 of the contract documents.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Maintain concrete temperature after installation at minimum 50 degrees F for minimum 7 days. Maintain job site environmental record of maximum and minimum daily temperatures.

1.7 COORDINATION

A. Coordinate placement of joint devices, sleeves, block-outs, etc. with erection of concrete formwork and placement of form accessories.

B. Coordinate work with all other trades related to the concrete placement and embedments.

PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

A. Cement: ASTM C150, Type II.

B. Normal Weight Aggregates: ASTM C33. Coarse aggregate maximum size: 3/4 inches and in accordance with ACI 318.

C. Water: ACI 318; potable, without deleterious amounts of chloride ions.

D. Synthetic Fiber Reinforcement (when specified in the plans): ASTM C948; For use at limited exterior slabs-on-grade locations with the approval of the Architect / Engineer and at other locations as specified in the contract documents. The synthetic fiber reinforcement shall be batched integrally in the concrete mix.

2.2 ADMIXTURES

A. Air Entrainment: ASTM C260.

B. Chemical: ASTM C494/C494M: Type A - Water Reducing. Approval by engineer required. Other admixtures may be allowed for specific uses when specifically requested for approval.

C. Fly Ash: ASTM C618 Class F. See general notes for additional requirements.

D. Plasticizing: ASTM C1017/C1017M Type II, plasticizing and retarding. Approval by Engineer required.

E. Fly Ash: ASTM C618, Class 'F'; 25% maximum, 10% minimum of total cementitious content of the mix. Fly ash shall be used at a ratio of 1.0 lb for each 1.0 lb. of Portland Cement which it replaces.

2.3 CONCRETE MIX

A. Mix concrete in accordance with ACI 304. Deliver concrete in accordance with ASTM C94.

B. Select proportions for normal weight concrete in accordance with ACI 301 and 318 or from successful historical performance of previously used mix designs.

C. Provide concrete to the following criteria – 4000 psi:

1. Minimum Compressive Strength (7 days): 2500 psi.
2. Minimum Compressive Strength (28 days): 4000 psi, see plans for specific strength for specific uses.

3. Minimum Cement Content: 564 lbs. per c.y.
4. Slump: 2 ½ to 4 ½ inches.
5. Maximum Water/Cementitious Ratio: 0.46.
6. Synthetic Fiber Reinforcement: approved rate as recommended by mfr. (when specified in the plans).

D. Provide concrete to the following criteria – 3000 psi:
1. Minimum Compressive Strength (7 days): 2100 psi.
2. Minimum Compressive Strength (28 days): 3000 psi, see plans for specific strength for specific uses.
3. Minimum Cement Content: 519 lbs. per c.y.
4. Slump: 2 ½ to 4 ½ inches.
5. Maximum Water/Cementitious Ratio: 0.52.
6. Synthetic Fiber Reinforcement: approved rate as recommended by manufacturer (when specified in the plans).

E. Admixtures: Include admixture types and quantities indicated in concrete mix designs only when approved by Architect/Engineer.
1. Use accelerating admixtures in cold weather only when approved by Architect / Engineer. Use of admixtures will not relax cold weather placement requirements.
2. Do not use calcium chloride nor admixtures containing calcium chloride.
3. Use set retarding admixtures during hot weather only when approved by the engineer.
4. Add air entraining agent to normal weight concrete mix for work permanently exposed to exterior and for work exposed to a freezing environment in the first 7 days after pour. Entrained air shall be 4% to 8% by volume.

F. Average Compressive Strength Reduction: Not permitted.

G. Ready Mixed Concrete: Mix and deliver concrete in accordance with ASTM C94/C94M.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify requirements for concrete cover over reinforcement.

B. Verify anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with placing concrete.

C. Verify site conditions meet plan requirements.

D. Verify formwork and all locations for concrete placement are clean.

3.2 PREPARATION

A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent. All debris and loose material shall be cleaned or washed off of reinforcing, formwork and existing work before placing concrete.

B. In locations where new concrete is doweled to existing work, drill holes in existing concrete and clean the holes by wire brushing and flushing out with compressed air. Insert steel dowels in Hilti Hit Adhesive Anchor System or approved equivalent. Verify wall contraction joint chamfers are in place in appropriate locations.

C. Remove debris and ice from formwork, reinforcement, earth and concrete substrates.

D. Remove water from areas receiving concrete before concrete is placed.

3.3 PLACING CONCRETE

A. Place concrete in accordance with ACI 301. All concrete shall be placed against formwork. All construction joints shall be cast against straight and secure bulkheads with block-outs to key the two placements together.

B. Notify Architect/Engineer minimum 24 hours prior to commencement of operations.

C. Ensure reinforcement, inserts, embedded parts, formed expansion and contraction joints, etc. are not disturbed during concrete placement.

D. Place joint filler in wall pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.

E. Consolidate all concrete by mechanical vibration, including flat work.

F. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

G. Place concrete continuously between predetermined expansion, contraction and construction joints.

H. Temporary anchors, shotpins, anchor bolts, expansion anchors, etc. shall not be used for anchorage in areas of slabs which shall be exposed.

I. When required by the plans and details, separate slabs from vertical and / or horizontal surfaces with 30# building paper. See plans.

J. Install contraction joints and construction joints in pattern and locations shown on plans. Install top of construction joint form to required elevations. Secure to resist movement by wet concrete.

K. Thoroughly vibrate all concrete, including flat work, immediately behind placement. Do not over-vibrate concrete. Do not move concrete by vibration. Do not cause segregation. The workman operating the vibration equipment shall be experienced in proper techniques and procedures. He shall be familiar with and follow ACI recommendations. The Engineer may inspect, evaluate and reject. At least one spare vibrator shall be available at each concrete placement.

L. Saw cut slab contraction joints within 3 hours after placing concrete. Use Soft-Cut saw system. Cut approximately 5/8" of depth into slab thickness.

M. Screed flat floor slabs level, maintaining surface flatness of 1/8 inch maximum variation from specified elevation. Also, the surface shall not vary more than 1/8" in any 8'-0" length. Screed sloping slabs according to elevations given in the plans. Sloping flatwork shall maintain the plane of intended slope within 1/8" in any 8'-0" in any direction.

N. Slope concrete surfaces where and as required in the plans.

3.4 CONCRETE FINISHING

A. Provide formed concrete surfaces where they will be left exposed.

B. Finish concrete floor surfaces in accordance with ACI 301.

C. Wood float surfaces which will receive tile with full bed setting system.

D. Steel trowel surfaces which will receive carpeting, resilient flooring, seamless flooring or thin set tile.

E. Steel trowel surfaces which are scheduled to be exposed.

F. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly down to drains at 1/8 inch per foot unless indicated differently on Drawings.

G. Provide light broom finish on exposed exterior slabs.

H. Provide a dust-proof sealer on all interior exposed concrete surfaces. The sealer product information and instructions for its use shall be submitted to the Architect for approval.

3.5 CURING AND PROTECTION

A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

C. Cure concrete in accordance with ACI 308.1. Cure slab surfaces with a wet cure method. The concrete shall be maintained in a moist condition for 7 days. No area shall be allowed to dry out before the 7 days. Slabs shall not be cured with curing compound unless specifically approved by the Architect / Engineer.

D. Concrete other than slabs shall be cured with approved curing compound as soon as the sheen has gone or when the forms are removed. Do not apply curing compound to surfaces which will receive future concrete pours.

3.6 FIELD QUALITY CONTROL

A. Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.

B. Field inspection and testing will be performed in accordance with ACI 301 and 318.

C. Provide free access to Work and cooperate with appointed observation / testing firm. A testing laboratory technician shall be present for all concrete placement.

D. Submit proposed mix design of each type of concrete to the Engineer and testing firm for review and approval a minimum of 14 days prior to commencement of Work.

E. Three concrete test cylinders shall be taken for every 75 or less cu. yds. of each type of concrete placed. A minimum of 1 set of 3 cylinders shall be taken for any concrete placed in one day. Record location of concrete placed for each set of concrete tests.

F. One additional test cylinder shall be taken during cold weather concreting for each 75 cu. yds. or less.

G. Cylinders shall be cured for 3 days minimum under the same field conditions as that of the concrete they represent.

H. One slump test shall be taken for each set of test cylinders taken and for every 24 c.y. placed. Concrete to be slumped shall be sampled from the middle 1/3 of the load. A slump shall be taken anytime the concrete appears to have a slump greater than 4". Excessive slump shall be sufficient cause for rejection of concrete. The location of concrete placement for all concrete with excessive slump or otherwise out of specification shall be recorded. The Architect / Engineer shall be immediately notified of out-of-specification concrete.

I. Air entrainment shall be tested when each set of cylinders are made.

J. Maintain records of concrete placement. Record date, location, quantity, air temperature and test samples taken.

3.7 PATCHING

A. Allow Architect/Engineer to inspect concrete surfaces immediately upon removal of forms.

B. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Architect/Engineer upon discovery.

C. Patch imperfections as directed by Architect/Engineer and in accordance with ACI 301.

3.8 DEFECTIVE CONCRETE

A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.

B. Repair or replacement of defective concrete will be determined by Architect/Engineer.

C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect/Engineer for each individual area.

D. Concrete slabs out of vertical tolerance shall be repaired or replaced under the specific direction of the Architect / Engineer.

E. Repair or replacement of defective concrete shall be done at no expense to the owner.

END OF SECTION

SECTION 03 3500

POLISHED CONCRETE FINISHING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Polished concrete.

1.2 RELATED SECTIONS

A. Section 03 3000 - Cast-in-Place Concrete.

B. Section 07 9126 - Joint Fillers.

1.3 REFERENCES

A. American Concrete Institute (ACI): ACI 302.1R - Guide for Concrete Floor and Slab Construction.

B. American National Standards Institute (ANSI): Standards B-101.1/2009.

1.4 SYSTEM DESCRIPTION

A. Performance Requirements: Provide polished flooring that has been designed, manufactured and installed to achieve the following:

1. Abrasion Resistance: ASTM C779, Method A, high resistance, no more than 0.008 inch (0.20 mm) wear in 30 minutes.
2. Reflectivity: Increase of 35% as determined by standard gloss meter.
3. Waterproof Properties: Rilem Test Method 11.4, 70% or greater reduction in absorption.
4. High Traction Rating: NFSI 101-A, ANSI B-101.1 2009 non-slip properties.

B. Design Requirements:

1. Hardened Concrete Properties:

a. Minimum Concrete Compressive Strength: 3500 psi (24 MPa).
b. Normal Weight Concrete: No lightweight aggregate.
c. Non-air entrained.

2. Placement Properties:

a. Natural concrete slump of 4-1/2 inches to 5 inches (114 to 127 mm). Admixtures may be used.
b. Flatness Requirements:

1) Overall FF 50.
2) Local FF 40.

3. Hard-Steel Troweled (3 passes) Concrete: No burnishing marks. Finish to ACI 302.1R, Class 5 floor.

a. Class 6 floors, special colored mineral aggregate hardener with repeated hard steel trowel finish.

4. Curing Options:

   a. Membrane forming curing compounds (ASTM C309, Type 1, Class B, all resin, dissipating cure).

      1) Acrylic curing and sealing compounds not recommended.

1.5 SUBMITTALS

A. Submit under provisions of Section 01 3000 - Administrative Requirements.

B. Shop Drawings: Indicate information on shop drawings as follows:

1. Typical layout including dimensions and floor grinding schedule.
2. Hardener, sealer, densifier identified in notes.

C. Product Data: Submit product data, including manufacturer's SPEC-DATA product sheet, for specified products.

1. Material Safety Data Sheets (MSDS).
2. Preparation and concrete grinding procedures.
3. Colored Concrete Surface, Dye Selection Guides.

D. Operation and Maintenance Data: Submit operation and maintenance data for installed products.

1. Manufacturer's instructions on maintenance renewal of applied treatments.
2. Protocols and product specifications for joint filing, crack repair and/or surface repair.

1.6 QUALITY ASSURANCE

A. Installer Qualifications:

1. Installer with a minimum of 5 years' experience in performing work of this section who has specialized in installation of work similar to that required for this project.

B. Concrete finishing components and materials shall be from single manufacturer.

C. Manufacturer Qualifications:

1. Manufacturer capable of providing field service representation during construction and approving application method.
2. Manufacturer shall have a minimum 5 years of experience in manufacturing components similar to or exceeding requirements of project.

D. Mock-Ups:

1. Mock-Up Size: 100 sf (9.3 m2) sample panel at jobsite at location as directed under conditions similar to those which will exist during actual placement.
2. Mock-up will be used to judge workmanship, concrete substrate preparation, operation of equipment, material application, color selection and shine.
3. Allow 24 hours for inspection of mock-up before proceeding with work.
4. When accepted, mock-up will demonstrate minimum standard of quality required for this work.

   a. Approved mock-up may not remain as part of finished work. Remove mock-up

and dispose of materials when no longer required and when directed by Architect.

b. Approved mock-up may remain as part of finished work.

5. Mock-Up will demonstrate required level of cut:

a. Level 2 - Salt/Pepper Finish: Expose the fine aggregate such as sand and small aggregate with the concrete. The depth of grind will depend greatly on the placement and finishing procedures. Generally, this level of cut can be achieved within 1/16" of the surface.

b. Sheen Level A: Sheen (glossy) as determined by a gloss reading of 45 - 60.

1.7 DELIVERY, STORAGE AND HANDLING

A. Ordering: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.

B. Delivery: Deliver materials in manufacturer's original packaging with identification labels and seals intact.

C. Storage and Protection: Store materials protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.

1.8 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

B. Protect Concrete Slab:

1. Protect from petroleum stains during construction.
2. Diaper hydraulic power equipment.
3. Restrict vehicular parking.
4. Restrict use of pipe cutting machinery.
5. Restrict placement of reinforcing steel on slab.
6. Restrict use of acids or acidic detergents on slab.

1.9 PROJECT AMBIENT CONDITIONS

A. Installation Location: Comply with manufacturer's written recommendations.

1.10 SEQUENCING

A. Sequence with Other Work: Comply with manufacturer's written recommendations for sequencing construction operations.

1.11 WARRANTY

A. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and does not limit, other rights Owner may have under Contract Documents.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: L&M Construction Chemicals, which is located at: 1 LATICRETE Park N.; Bethany, CT 06524-3423; Toll Free Tel: 800-362-3331; Tel: 402-453-6600; Email:request info (info@lmcc.com); Web:www.laticrete.com/lmcc

B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 POLISHED CONCRETE

A. Products/Systems:

1. Hardener, Sealer, Densifier: Proprietary, water based, odorless liquid, VOC compliant, environmentally safe chemical hardening solution leaving no surface film.

a. Acceptable Material: L & M Construction Chemicals, Inc., FGS Hardener Plus. Basis of design.

2. Joint Filler: Semi-rigid, 2-component, self-leveling, 100% solids, rapid curing, polyurea control joint and crack filler with Shore A 80 or higher hardness.

a. Acceptable Material: L & M Construction Chemicals, Inc., Joint Tite 750.

3. Oil Repellent Sealer: Ready to use, silane, siloxane and fluoropolymers blended water based solution sealer, quick drying, low-odor, oil and water repellent, VOC compliant and compatible with chemically hardened floors.

a. Acceptable Material: L & M Construction Chemicals, Inc., Petrotex.

4. Cleaning Solution: Proprietary, mild, highly concentrated liquid concrete cleaner and conditioner containing wetting and emulsifying agents; biodegradable, environmentally safe and certified High Traction by National Floor Safety Institute (NFSI).

a. Acceptable Material: L & M Construction Chemicals, Inc., FGS Concrete Conditioner.

5. Stain Guard Sealer: Ready to use, is a low odor, VOC compliant, topical sealer consisting of low molecular emulsified cross-linking, coupling polymers that effectively protect concrete and other natural stone floor surfaces from the damaging effects of staining, defacing and deterioration due to contaminant penetration.

a. Acceptable Material: L& M Construction Chemicals, Inc. Permaguard SPS.

6. Finish: Standard High gloss (HG-1), 1500 grit.

PART 3 EXECUTION

3.1 EXAMINATION

A. Site Verification of Conditions:

1. Verify that concrete substrate conditions, which have been previously installed under other sections or contracts, are acceptable for product installation in accordance with manufacturer's instructions prior to installation of concrete finishing materials.

B. Do not begin installation until substrates have been properly prepared.

C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

D. Verify Concrete Slab Performance Requirements:

1. Verify concrete is cured to 28 day duration and 3500 psi (24 MPa) strength.
2. Verify concrete surfaces have received a hard steel-trowel finish (3 passes) during placement.
3. Verify overall floor flatness is a minimum of Ff 40.

3.2 PREPARATION

A. Ensure surfaces are clean and free of dirt and other foreign matter harmful to performance of concrete finishing materials.

B. Examine surface to determine soundness of concrete for polishing.

3.3 INSTALLATION

A. Compliance: Comply with manufacturer's written data, including product technical bulletins, product catalog installation instructions, product carton installation instructions.

B. Floor Surface Polishing and Treatment:

1. Provide polished concrete floor treatment in entirety of slab indicated by drawings. Provide consistent finish in all contiguous areas.
2. Apply floor finish prior to installation of fixtures and accessories.
3. Diamond polish concrete floor surfaces with power disc machine recommended by floor finish manufacturer. Sequence with coarse to fine grit. Installer to determine the optimum starting grit in order to achieve the specified aggregate exposure.

    a. Comply with manufacturer's recommended polishing grits for each sequence to achieve desired finish level. Following the initial passes of metal bond diamonds, the installer shall drop back a minimum of one grit level when transitioning to resin bond diamonds. The separation in grit designation shall be a minimum of 50 for the transitioning step. The installer shall refine each abrasive grit to its fullest potential before moving on to the next level. Floor shall be thoroughly scrubbed between each grit pass to remove all loose material. Level of sheen shall match that of approved mock-up.
    b. Expose aggregate in concrete surface only as determined by approved mock-up.
    c. All concrete surfaces shall be as uniform in appearance as possible.

4. Hardener and Densifier Application:

    a. First coat of FGS Hardener Plus at 250 ft2/gal (6.25 m2/L), following the 400 grit level. (Lion Hard at 400-600 sq ft / gallon).
    b. Second coat of FGS Hardener Plus at 350 ft2/gal (8.75 m2/L), prior to the final polishing pass (Lion Hard at 600-800 sq ft / gallon).
    c. Follow manufacturer's recommendations for drying time between successive coats.

5. Remove defects and re-polish defective areas.
6. Finish edges of floor finish adjoining other materials in a clean and sharp manner.

3.4 ADJUSTMENTS

A. Re-polish those areas not meeting specified gloss levels per mock-up.

B. Fill joints flush to surface prior to the start of polishing operations.

3.5 FINAL CLEANING

A. Upon completion, remove surplus and excess materials, rubbish, tools and equipment.

3.6 PROTECTION

A. Protect installed product from damage during construction in accordance with manufacturer's recommendations.

END OF SECTION

SECTION 05 12 00
STRUCTURAL STEEL FRAMING

PART 1 GENERAL

1.1 SUBMITTALS

A. Action Submittals:
   1. Shop Drawings: Illustrate products, installation, and relationship to adjacent construction.

1.2 SYSTEM DESCRIPTION

A. Design framing to withstand live and dead loads in accordance with the 2021 International Building Code and as indicated on Drawings.

B. System design to be performed by qualified professional engineer licensed in State of New Mexico.

1.3 QUALITY ASSURANCE

A. Fabricator and Installer Qualifications: Firm specializing in work of this Section, with minimum 5 years' experience.

B. Employ qualified professional engineer licensed in State of New Mexico to perform system design.

C. Special inspections shall be performed as required by the 2021 International Building Code and as outlined on sheet S4 of the contract documents.

PART 2 PRODUCTS

2.1 MATERIALS

A. Steel:
   1. Shapes, bars, and plates: ASTM A36/A36M. ASTM A572/A572M, Grade 50. ASTM A992.
   2. Hollow structural sections: ASTM A500, Grade B.
   3. Pipe: ASTM A53/A53M, Grade B. ASTM A501.
   4. Shear connectors: ASTM A108, Grade 1015, forged steel, headed, unfinished.

2.2 FABRICATION

A. Fabricate structural steel in accordance with AISC Manual and approved Shop Drawings.

2.3 FINISHES

A. Exterior Ferrous Metal: Galvanized; ASTM A123/A123M, to 2.0 ounces per square foot.

B. Interior Ferrous Metal:
   1. Shop painted except steel to be encased in concrete and surfaces to be welded.
   2. Surface preparation: SSPC SP6 - Commercial Blast Cleaning.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install structural steel in accordance with AISC Specifications and approved Shop Drawings.

B. Welding to conform to AWS D1.1/D1.1M.

C. Installation Tolerances:
   1. Maximum variation from plumb: 1/4 inch per story, noncumulative.
   2. Maximum variation from level: 1/4 inch in 10 feet, noncumulative.'
   3. Maximum offset from alignment of adjacent members: 1/4 inch.

END OF SECTION

SECTION 05 21 00
STEEL JOIST FRAMING

PART 1 GENERAL

1.1 SUBMITTALS

A. Informational Submittals:
   1. Shop Drawings: Illustrate products, installation, and relationship to adjacent construction.

1.2 SYSTEM DESCRIPTION

A. Design framing to withstand live and dead loads in accordance with the 2021 International Building Code and as indicated on Drawings.

B. System design to be performed by qualified professional engineer licensed in State of New Mexico.

1.3 QUALITY ASSURANCE

A. Fabricator and Installer Qualifications: Firm specializing in work of this Section, with minimum 5 years' experience.

B. Employ qualified professional engineer licensed in State of New Mexico to perform system design.

C. Special inspections shall be performed as required by the 2021 International Building Code and as outlined on sheet S4 of the contract documents.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Following manufacturers are acceptable if products meet specified requirements:
   1. Canam Buildings. www.canam-construction.com/en
   2. Nucor. www.nucor.com
   3. New Millennium Building Systems. www.newmill.com
   4. Vulcraft

B. Substitutions: Refer to Division 01.

2.2 MATERIALS

A. Steel Shapes: ASTM A36/A36M. ASTM A572/A572M, Grade 50.

2.3 FABRICATION

A. Joists: SJI Series K. Series LH – Longspan. Series DLH - Deep Longspan. Joist Girder.

2.4 FINISHES

A. Exterior Ferrous Metal: Galvanized; ASTM A123/A123M, to 2.0 ounces per square foot.

B. Interior Ferrous Metal:
   1. Shop painted except steel to be encased in concrete and surfaces to be welded.
   2. Surface preparation: SSPC SP6 - Commercial Blast Cleaning.

PART 3 EXECUTION

3.1 ERECTION

A. Erect joists in accordance with SJI Specifications, manufacturer's instructions, and approved Shop Drawings.

B. Welding to conform to AWS D1.1/D1.1M.

END OF SECTION

SECTION 05 31 00
STEEL DECKING

PART 1 GENERAL

1.1 SUBMITTALS

A. Action Submittals:
   1. Shop Drawings: Illustrate products, installation, and relationship to adjacent construction.
   2. Product Data: Manufacturer's descriptive data and product attributes for decking.

1.2 SYSTEM DESCRIPTION

A. Design decking to withstand live and dead loads in accordance with the 2021 International Building Code and as indicated on Drawings.

B. System design to be performed by qualified professional engineer licensed in State of New Mexico.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: Firm specializing in work of this Section, with minimum 5 years' experience.

B. Perform work in accordance with SDI Manual.

C. Special inspections shall be performed as required by the 2021 International Building Code and as outlined on sheet S4 of the contract documents.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Following manufacturers are acceptable if products meet specified requirements:
   1. Cordeck. www.cordeck.com
   2. Epic Metals. www.epicmetals.com
   3. Nucor. www.nucor.com

B. Substitutions: Refer to Division 01.

2.2 MATERIALS

A. Steel Sheet: ASTM A1008/A1008M.

B. Galvanized Steel Sheet: ASTM A653/A653M, Structural Quality, G90 coating class.

2.3 ACCESSORIES

A. Fasteners: Puddle Welds and Hot-dip galvanized coated steel, self-tapping.

2.4 FABRICATION - STEEL ROOF DECKING

A. Fabricate decking to SDI Design Manual.

B. Fabricate decking from minimum 22 gage galvanized steel sheets.

C. Deck Type: SDI wide rib configuration.

D. Formed Width: 36 inches.

E. Minimum Depth: 1-1/2 inches.

F. Side Joints: Lapped.

G. Roof Sump Pans: 14 gage galvanized sheet steel, sloped sides, recessed 1-1/2 inches below roof deck surface, 3 inch wide bearing flange, joints sealed watertight.

H. Finish: Manufacturer's standard painted finish.

2.5 FABRICATION - STEEL FLOOR DECKING

A. Fabricate decking to SDI Design Manual.

B. Fabricate decking from minimum 22 gage galvanized steel sheets.

C. Deck Type: Composite configuration.

D. Formed Width: 36 inches.

E. Nominal Depth: 1-1/2 inches.

F. Side Joints: Lapped or Locked Seam

PART 3 EXECUTION

3.1 INSTALLATION

A. Install decking in accordance with manufacturer's instructions and approved Shop Drawings.

B. Weld decking to supporting members. Welding to conform to AWS D1.3/D1.3M.

C. Mechanically fasten side laps between adjacent deck units.

END OF SECTION

SECTION 05 40 00
COLD-FORMED METAL FRAMING

PART 1 GENERAL

1.1 SUBMITTALS

A. Action Submittals:
   1. Shop Drawings: Illustrate products, installation, and relationship to adjacent construction.
   2. Product Data: Manufacturer's descriptive data and product attributes for framing materials.

B. Informational Submittals:
   1. Certificate of Compliance: Certification that installed products meet specified design requirements.

1.2 SYSTEM DESCRIPTION

A. Design interior wall stud system to withstand:
   1. Live and dead loads in accordance with the 2021 International Building Code.
   2. Wind pressure loads in accordance with ASCE 7.
   3. Movement caused by an ambient temperature range of 120 degrees F and a surface temperature range of 160 degrees F.
   4. Maximum deflection under loading: L/240 without sheathing materials.
   5. Minimum 1/2 inch vertical deflection of structure.

B. Design joist system to withstand:
   1. Live and dead loads in accordance with the 2021 International Building Code.
   2. Maximum deflection under loading: L/240 without decking materials.

C. System design to be performed by qualified professional engineer licensed in State of New Mexico.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: Firm specializing in work of this Section, with minimum 5 years' experience.

B. Manufacturer: Current member of SFIA or SSMA.

C. Special inspections shall be performed as required by the 2021 International Building Code and as outlined on sheet S4 of the contract documents.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Following manufacturers are acceptable if products meet specified requirements:
   1. CEMCO. www.cemcosteel.com
   2. Clarkwestern Dietrich Building Systems. www.clarkdietrich.com
   3. SCAFCO. www.scafco.com
   4. Quail Run Building Materials. www.qrbm.com
   5. United Metal Products. www.unitedmetalproducts.com

B. Substitutions: Refer to Division 01.

2.2 MATERIALS

A. Framing Materials:

1. Steel sheet: ASTM A653/A653M or A1003/A1003M, minimum 33 KSI yield strength, galvanized, G60 coating class.
2. Fabricate components to AISI S240.
3. Studs and joists: C-shaped, punched for utility access.
4. Tracks:
   a. Stud track profile, U-shaped, same gage and depth as studs, unpunched.
   b. Top track: Deflection type, deep leg track with slotted screw holes; permit plus or minus 1/2 inch movement of overhead structure without damage to framing.
   c. Top and bottom track: 1-1/4 inch high legs.
   d. Rim track: Provide closure for ends of joists.

2.3 ACCESSORIES

A. Fasteners: ASTM C1513; self-drilling, self-tapping screws.

PART 3 EXECUTION

3.1 INSTALLATION - GENERAL

A. Install framing components in accordance with AISI S240, manufacturer's instructions, and approved Shop Drawings.

3.2 INSTALLATION - STUD FRAMING

A. Place top and bottom tracks in straight lines with ends butted.

B. Fasten tracks as indicated.

C. Place studs at spacing indicated on Drawings and at maximum 16 in.

3.3 INSTALLATION – JOIST FRAMING

A. Place joists at spacing indicated on Drawings and at maximum 16 in. Align joists over studs below.

B. Set members parallel and level; install lateral bracing and bridging where indicated.

3.4 INSTALLATION TOLERANCES

A. In accordance with AISI S240.

END OF SECTION

SECTION 05 5133

ALTERNATING TREAD STEEL STAIRS

PART 1 - GENERAL

1.1 SCOPE OF WORK

Fabricate and install carbon steel or stainless steel alternating tread stair assemblies in accordance with the requirements set forth in this section.

(Note: Terminology used for the component covered by this specification varies among the codes or standards that address the component. This specification uses the term alternating tread stair. MasterFormat uses the term alternating tread ladder. The International Building Code and NFPA-101, Life Safety Code use the term alternating tread device.)

1.2 ADDITIONAL WORK INCLUDED IN THIS SECTION

A. Field measurements of alternating tread stair installation sites and verification of vertical distance between floors.

B. Top landing connection to steel structure.

1.3 WORK SPECIFICALLY EXCLUDED IN THIS SECTION

The items in this section are not to be included in the metal stair contractor's work:

A. Temporary shoring or bracing.

B. Temporary lights or electricity.

C. Temporary safety rails.

D. Protection after erection.

E. Final surface cleaning, passivation, or application of surface protectant after installation.

1.4 RELATED DOCUMENTS:

Project drawings and specifications and general provisions of Contract; including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.5 SUMMARY:

A. Provide all material, labor, equipment and services and perform all operations necessary or required for the work of this section, in accordance with the Drawings and Specifications, and including fabrication and installation of alternating tread aluminum Stairs.

1.6 REFERENCES

National Association of Architectural Metal Manufacturers (NAAMM)

A. NAAMM, STANDARD AMP 510-92 Metal Stairs Manual 5th Edition

Aluminum Association

A. Aluminum standards and data, latest Edition

American Welding Society

A. AWS D1.2, Structural Welding Code, Aluminum

1.7 PERFORMANCE REQUIREMENTS:

A. Alternating Tread Stair Treads: shall be capable of withstanding a single concentrated 1000 pound load without permanent deformation; or 100 pounds per square foot or 300 pounds on an area of 4 square inches without exceeding the allowable working stress of the material.

B. Alternating Tread Stair Guard/Handrail: shall be capable of withstanding a single concentrated load of 200 pounds or a uniform load of 50 pounds per linear foot applied in any direction at any point on the rail without exceeding the allowable working stress of the material.

C. Alternating Tread Stair Stringers: shall be capable of withstanding a single concentrated load of 1000 pounds at any point on the stair without permanent deformation; or a uniform live loading of 100 pounds per square foot applied in a downward direction to all tread surfaces or a 300 pound load on an area of 4 square inches without exceeding the allowable working stress of the material.

1.8 CONSTRUCTION REQUIREMENTS:

A. Landings, Treads, and Mounting Base: shall be stamped and formed from single piece material. Stock shapes, hand forming, or welded remnants shall not be permitted. All stamped parts shall have integrally formed rigidizing bends and shall be spot welded to stringers of like material.

B. Welds: shall be a minimum of 6 welds per tread, and 12 welds each on the landing and mounting base. Each weld shall be quality controlled and be capable of withstanding a minimum of 2800 lbs. in shear.

C. Landing and Tread Surfaces: shall be punched through with upset non-skid openings.

D. Riser Spacing: shall be equally spaced to within 3/16" for adjacent risers and to within 3/8" for any two non-adjacent risers on a stair.

E. Guards and Handrails: shall be contoured for body guidance and underarm support and shall be attached to the outside stringers and landings by bolting.

F. Landing Reinforcement: shall be with 1/4" steel angle notched and punched and factory welded to the landing at the points of a guard or handrail attachment.

G. Rubber Bumper: shall be affixed to the central portion of the landing. A rubber bumper strip shall be attached or will be provided for field attaching to the central stringer.

1.9 DIMENSIONS:

A. Alternating Tread Stair Angle: 56 or 68 degrees from horizontal as specified in the drawings.

B. Vertical Drop: the change in elevation, as shown on the drawings, between the upper finished floor surface where the top landing will be attached and the lower finished floor surface where the base of the alternating tread stair will be secured is 13' - 6".

1.10 SUBMITTALS:

Dimensional Prints: shall be submitted for approval prior to fabrication.

1.11 DELIVERY STORAGE AND HANDLING

A. Deliver materials to the job-site in good condition and properly protected against damage to finished surfaces.

A. Store material in a location and manner to avoid damage. Do not stack components. Lay out components on firm foundation material such that bending cannot occur.

B. Store metal components in a clean dry location, away from uncured concrete, cement, or masonry products, acids, oxidizers, rain water, or any other chemical or substance that might damage the material or finish.

C. Plan work and storage locations to keep on-site handling to a minimum.

D. Exercise particular care to avoid damage to material finishes or unprotected surfaces when handling.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURER:

A. Lapeyre Stair, Inc.
5117 Toler St.
Harahan, LA. 70123
1-(800)-535-7631 or 1-(504)-733-6009
Fax 1-(504)-733-4393
LS.SALES@LAPEYRESTAIR.COM
WWW.LAPEYRESTAIR.COM

B. Approved Substitutions: Vestil Stair Co.

2.2 MATERIALS:

A. Landings, Treads and Foot Castings: Aluminum alloy F356F

B. Guards/Handrails:

1. 1-1/2" Φ x 1/8".Tube; Aluminum Alloy 6063-T4

C. Central Stringer:

1. HSS 1-3/4" x 4" x 1/8"; Aluminum Alloy 6063-T52

D. Miscellaneous Materials

1. Rubber Spine: Hollow Neoprene strip
2. Bolts: Landing to Structure, ASTM F593, SS304, SS316 or 18-8 SS-bolts

3. Nuts: ASTM 594, SS304, SS316 or 18-8 SS nuts
4. Washers: ASTM F844 or F436

2.3 FINISH:

Natural Finish

2.4 FABRICATION:

General: Fabricate alternating tread aluminum stairs to conform to performance and construction requirements, in accordance with approved shop drawings or dimensional prints. Fabricate and shop-assemble to greatest extent possible.

A. Gas metal arc welded (GMAW/MIG) and/or gas tungsten arc welded (GTAW/TIG) using 4043, 4943 or other approved welding wire.

PART 3 - EXECUTION:

3.1 PREPARATIONS:

A. Coordination: Coordinate start and installation of steel alternating tread stair with all other related and adjacent work. Installation shall not start until the construction has progressed to the point that weather conditions and remaining construction operations will not damage alternating tread stair installation.

B. Verification: Verify that dimensions and angle are correct and that substrate is in proper condition for alternating tread stair installation. Do not proceed with installation until all necessary corrections have been made.

3.2 INSTALLATION:

A. If bumper has not been installed at the factory, install the bumper in accordance with the manufacturer's instructions (peel and stick).

B. Prepare mounting holes.

C. Position alternating tread stair with top tread at same elevation as upper finished floor or roof surface.

D. Secure alternating tread stair with not less than 2 bolts or studs at top and with not less than 2 at bottom of stair.

E. Touch up with matching paint any chipped or abraded damage to factory finish or

F. Touch up any damage to galvanized surfaces using galvanized repair paint in accordance with ASTM A780.

3.3 CLEAN-UP:

Leave work area clean and free of debris.

END OF SECTION

SECTION 06 1000

ROUGH CARPENTRY

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Roof curbs.

B. Roof insulation / Decking.

C. Concealed wood blocking for support of washroom accessories, wall cabinets, chalk/tackboards and other architectural features.

D. Miscellaneous framing and sheathing: Edge Blocking, cants for roofing system and related metal flashing.

1.2 QUALITY ASSURANCE

A. Perform work in accordance with the following agencies:

1. Lumber Grading Agency: NFPA.
2. Plywood Grading Agency: Certified by APA.
3. Nailable Roof Insulation: ASTM C1289, Type V. UL Standard 790 (ASTM E108).

1.3 REFERENCE STANDARDS

A. PS 1 - Construction and Industrial Plywood.

B. PS 20 - American Softwood Lumber Standard.

C. PS 51 - Hardwood and Decorative Plywood.

D. PS 58 - Basic Hardwood.

E. National Forest Products Association (NFPA) - National Design Specification for Stress Grade Lumber and its Fastening.

PART 2 PRODUCTS

2.1 LUMBER MATERIALS

A. Lumber Grading Rules: NFPA.

B. Non-structural Light Framing and Roof Edge Blocking: Stress Group B, Pine, Hem-Fir, No. 2 grade, 19 percent maximum moisture content. Fb=1150 PSI; E=1,100,000.

C. Roof curbs, and other related roof framing materials: Stress Group C, Redwood species, No. 1 grade, 19 percent maximum moisture content. Fb-1400 PSI, E-1, 250,000. Pressure treated Douglas Fir for water resistance may be substituted.

D. Nailable Roof Insulation: Closed cell foam polyisocyanurate insulation board bonded to 7/16" OSB top face. 5" total thickness. Atlas, ACFoam Nail Base or equal. See

Specification 07 2200.

E. Wall Sheathing: 7/16" OSB APA rated sheathing. See S3 for fasteners required.

2.2 ACCESSORIES MATERIALS

A. Nails, spikes, and staples: galvanized for exterior locations, high humidity locations and treated wood; plain finish for other interior locations; size and type to conform to plans and suit applications.

B. Bolts, nuts, washers, lag bolts, screws: medium carbon steel; sized to suit application and conform to plans; galvanized for exterior locations and treated wood; plain finish for other interior locations.

C. Fasteners: toggle bolt type for anchorage to hollow masonry; expansion type (Wej-it or equivalent) for anchorage to grouted masonry and concrete; power activated type (Hilti or equivalent) for anchorage to steel and concrete (when permitted by ENGINEER). Fasteners shall be ICBO approved.

PART 3 EXECUTION

3.1 FRAMING

A. Erect wood framing members in accordance with UBC code. Place members level and plumb.

B. General: Provide for adequate support for all wall and horizontal framing. Install all wood framing making proper provisions for work of other trades. Do all cutting of wood required to accommodate plumbing, heating and ventilating, electrical and other trades. Fit neatly around all exposed systems such as outlet boxes, conduit, pipes, and ducts.

C. Coordination: Coordinate with concealed Work and finish materials. Provide supplemental strength for support of Work attached to or supported by system.

D. Erect wood framing members true to lines and levels. Do not deviate from true alignment more than 1/4 inch.

E. Rough Framing: Fit closely, set accurately to required lines and levels, and secure rigidly in place. Set horizontal and inclined members with crown edge up. Do not cut, notch, or bore structural members without specific approval. Reinforce cut members as directed. Bolt, nail, and spike in a thorough manner with not less than the sizes and quantities indicated or specified.

F. Provide backup at wall mounted door stops and similar impact points.

G. Provide cant strips, nailers for roofing.

H. Curb all roof openings except where curbs are provided with equipment. Construct curb members of single pieces per side.

I. Provide all wood backing, furring, stripping or blocking indicated or necessary for the proper installation and attachment of work of all other trades.

3.2. CONNECTIONS

A. Nails: Bright common wire nails, galvanized for exterior work. Subdrill where necessary to prevent splitting.

B. Bolts: Drill bolt holes 1/16 inch larger than bolt diameter. Use standard cut mallable iron washers under heads and nut where they bear against wood. Retighten bolts immediately prior to concealing with finish work. Retighten bolts immediately prior to final inspection.

C. Screws: Medium carbon steel; sized to suit application and conform to plans. Galvanized self-tapping for exterior locations, plain finish for other interior locations.

END OF SECTION

SECTION 06 4116

PLASTIC LAMINATED CASEWORK

PART 1 GENERAL

1.1 DESCRIPTION:

A. Scope of Work:

1. It is the intent of this specification to establish minimum performance and quality criteria consistent with pre-established standards of design and function herein described. Laminated plastic casework not meeting these minimum standards will be unacceptable.
2. Where specific materials, finishes, construction details and hardware are specified herein, the casework contractor shall be held in strict accordance.

B. Work included in this section:

1. Installation of all specified items and as shown on plans.
2. Fixed laminated plastic casework, including casework hardware.
3. Laminated plastic counter tops.
4. General millwork and wood trim items.
5. Blocking or furring where required.

1.2 SUBMITTALS:

A. Shop drawings: Submit shop drawings showing details, materials, dimensions, location of hardware and other accessories.

B. Samples:

1. Laminated plastic: Submit actual samples of Wilsonart laminates or approved equal included in laminate manufacturer's standard offering. Submittal to include percent of light reflectivity value for each color/pattern, plus physical properties information.
2. Other color samples necessary for color/finish selection.

PART 2 PRODUCTS

2.1 GENERAL:

A. All cabinets in this section and indicated on the drawings are designated custom casework. Casework must conform to design, quality of materials, workmanship, and function of casework specified and/or shown on plans.

2.2 SAMPLES/PRODUCT DATA

A. To provide a means of evaluation, all bidders wishing approval shall be required to submit catalogs and specifications showing general construction, joinery materials, and finishes which they propose to furnish.

2.3 HARDWARE:

A. Pulls: Stanley – 4" wire with 26D Satin Chrome Finish. Part #4484-26D.

B. Hinges:

1. Blum, cliptop, Blumotion, soft closing, 110 degree opening

2. 2 hinges per door under 36" H.
   3 hinges per door 36" to 62 H.
   4 hinges per door over 62" to 84" H.
   5 hinges per door over 84" H.

C. Catches: One (1) magnetic catch per door. Two (2) for tall door minimum 5 lb. pull.

D. Drawer Guides:

1. Blum 230M series, 75 lb., ¾ extension bottom mount for standard drawers.
2. KV8400 series or Accuride #3832 series 100 lb. full extension at file drawers and as noted.
3. Furnish file drawer drawers with hanging rails.

E. Locks: Comp X National, Part #C8080 disc tumbler keyed alike per room, US 26 finish.

F. Keyboard Tray: Knape & Vogt adjustable height, tilt and swivel with left or right mouse platform. Part #KVSD4.

2.4 CASEWORK:

A. Cabinet Bodies: Shall be flush overlay construction conforming to AWI Section 400B, custom grade.

B. Bodies of base cabinets:

1. Bottom and sides shall be made of 3/4" industrial particle board, 45-47 lb. density, face side laminated with 8 to 9 mil white melamine resin-saturated overlay and the non-exposed side laminated with a phenolic backing sheet for balanced construction.
2. The back panel shall be made of 1/4" 45-47 lb. density industrial particle board with 8-9 mil white melamine resin-saturated overlay on the face side and the non-exposed side with a sealer for balanced construction.
3. Top of the base cabinets and below the top set of drawers to be full framed in wood.
4. Back panels shall be rabbeted into the sides and bottom and secured with staples and hot weld glue around entire back perimeter.
5. Sides, top and bottom shall be fastened securely to insure stability and prevent racking when fully loaded.

C. Bases:

1. For proper leveling bases shall be continuous 4-1/8" high and 3/4" thick plywood bridged 2-0" on center. Two positioning strips permanently attached to bottom of cabinets for self aligning cabinets with bases shall be provided

D. Bodies of upper and /or full height cases:

1. These units shall be made of similar materials and construction as described in Paragraph 1 except the top member shall be solid 3/4" 45-47 lb. density industrial particle board laminated with 8 to 9 mil with melamine resin-saturated overlay rather than a wood frame.

2. On wall units a 3/4" x 2" hanging filler strip shall be screwed and glued to the top and

bottom of the cabinet.

3. On full height cabinets a 3/8" x 2-1/2" fill strip shall be screwed and glued to the top and bottom of the cabinet.

E. Flush overlay construction: All door and drawer fronts to have to be full overlay on top, bottom and sides.

F. Vertical surface high pressure plastic laminate:

1. High pressure plastic laminate for exterior cabinet surfaces shall meet NEMA standards for vertical grade material.
2. Provide finished high pressure laminate and panels where exposed to view. The interior of open cabinets shall have a white melamine surface.

G. Exposed edging:

1. Exposed edging shall be heat and pressure machine applied PVC edging, 3 mm thick, using nonradiused edges and water insoluble glues.

H. Drawers:

1. All drawer sides, backs, and sub-fronts shall be 1/2" solid red oak, or 1/2" 7 Ply Baltic Birch Plywood, or 1/2" 7 Ply Apple Birch Plywood. All drawers are dovetailed front and back and securely glued to form a positive joint. Shoulder lock or dowelled joints will be acceptable.
2. The drawer bottoms shall be 1/4" hardboard, rabbeted into sides and back, stapled, and secured with a hot weld glue around the entire perimeter of the bottom side of the drawer.
3. After fabrication and prior to drawer front assembly, the drawer body shall be finished with one coat sealer and one coat clear industrial lacquer.
4. Drawer shall have front fastened with four screws from inside of the drawer.

I. Shelves and partitions:

1. Standard shelves and partitions shall be 3/4" industrial particle board 45-47 lb. density laminated both sides with 8 to 9 mil white melamine resin saturated overlay. Shelves 36" long or over shall be 1" thick. Front shall be edged per paragraph F above.
2. Adjustable shelves shall be installed on recessed KV-255 standards and KV-256 brackets or LH heavy duty nylon or metal supports with drilled holes at 32mm spacing.

2.5 COUNTERTOPS

A. Countertops for all base cabinets, lavatory tops and service counters shall be made of solid surface material. Acceptable manufacturers includes: Hi-Macs, Wilsonart, Corian. Countertops shown on Elevations 8/A11.2 ad 7A11.2 shall be plastic laminate. Provide rolled front edge 1½".

B. Tops shall have a 1½" edge with a ¾" radius top edge. Provide adequate support for attachment to cabinets or brackets.

C. Backsplash where shown shall be 4" high with ¾" radius top, square bottom. Caulk joints.

PART 3 EXECUTION

3.1 JOB DIMENSIONS:

A. Protection of Adjacent Surfaces: The Contractor shall take all measures necessary during the course of work to protect existing property including adjacent surfaces, equipment, electrical systems, piping, furnishings, and landscaping from damage during the course of the work and shall repair promptly any such damage at his own expense and to the satisfaction of Farmington Municipal Schools.

B. Protection of the Work: The Contractor is responsible for the protection and security of all materials, tools, and equipment until the final acceptance.

C. The work shall be performed in a neat, workmanlike manner in strict accordance with manufacturer's standards and shall be supervised by factory trained technicians.

D. All upper wall cabinets shall be securely anchored with screws at 12" 0.C. top and bottom. Screws shall be a minimum of 1" long.

E. Adjust all doors, catches, drawers, etc., after installation to provide proper operation, be plumb, level and equal gaps between doors and drawers.

F. Leave cabinetry clean and free from installation residue.

G. Installer shall be responsible for the immediate removal of all trash, crating, etc.

H. Repair to factory finish or replace damaged exposed surfaces.

3.2 WARRANTY:

A. Furnish a written warranty that all work will be free from defects in material and workmanship for a period of one (1) year after Owner acceptance of the project and the repairs/replacements of said defects shall be performed in a timely manner at no expense to the Owner.

END OF SECTION

SECTION 07 2100

BUILDING INSULATION

PART 1 GENERAL

1.1. SECTION INCLUDES

A. Batt thermal insulation in furred out exterior walls.

B. Sound Attenuation Batts

1.2 STANDARDS

A. FS HH-I-521E - Insulation Blankets, Thermal finer, for Ambient Temperatures.

B. Thermal resistivity or R-value represents the rate of heat flow through a homogenous material exactly 1" thick and are expressed by the temperature difference in degrees F between the two exposed faces required to cause 1 BTU to flow through 1 sq. ft. per hr. at mean temperatures indicated.

C. File Performance Characteristics: Provide insulation with fire performance characteristics indicated per ASTM E 119, ASTM E 84 and E 136, as applicable, and which correspond to products listed in UL "Fire Resistance Directly" or "Building Materials Directory."

1.3 ENVIRONMENTAL REQUIREMENTS

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

PART 2 PRODUCTS

2.1 INSULATION MATERIALS

A. Batt Insulation (exterior walls) R-21 Kraft Faced Batts.

B. Acoustical Insulation: ASTM C665, Type 1, all interior walls.

Batt/Roll Size:	16 inches
Facing:	Unfaced
Thickness:	3"/R-13

2.2 ADHESIVES

A. Adhesive: Type recommended by insulation manufacturer for application.

2.3 ACCESSORIES

A. Tape: Bright aluminum self-adhering type. Mesh reinforced.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that substrate, adjacent materials, and insulation boards are dry and ready to receive insulation and adhesive.

3.2 INSTALLATION - BATT INSULATION

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

B. Install in exterior walls without gaps or voids.

C. Fit insulation tight in spaces. Leave no gaps or voids.

D. Install friction fit insulation tight to framing members, completely filling prepared spaces at walls.

END OF SECTION

SECTION 07 2200

ROOF AND DECK INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Flat Polyiso Roof Insulation

1. Faced with oriented strand board or waferboard on one major surface of the core foam and GRF or CGF facer on the other major surface of the core foam.

a. ACFoam® Nail Base

B. Tapered Polyiso Roof Insulation

1. Faced with non-asphaltic, fiber-reinforced cellulosic organic felt facers on both major surfaces of the core foam (GRF).

a. Tapered ACFoam®-II

C. Accessories

1. Atlas Nailable Insulation Fasteners

1.2 RELATED SECTIONS

A. 07 5400 Thermoplastic Membrane Roofing

1.3 REFERENCES

A. ASTM C1289: Standard Specification for Faced Rigid Cellular Polyisocyanurate Insulation Board.

1.4 DEFINITIONS

A. LTTR (Long Term Thermal Resistance): Defined as using techniques from ASTM C1303 or CAN/ULC-S770-09, the predicated R-Value that has been shown to be equivalent to the average performance of a permeably faced foam insulation product over 15 years. LTTR applies to ALL foam insulation products with blowing agents other than air, such as Polyiso, extruded polystyrene and polyurethane. The new method is based on consensus standards in the US and Canada.

1.5 SUBMITTALS

A. Submit under provisions of Section 01 3400.

B. Product Data:

1. Manufacturer's Specifications.
2. Installation instructions for insulation board and fasteners.
3. Product Data as per ASTM E2129: Standard Practice for Data Collection for Sustainability Assessment of Building Products.

C. Shop Drawings:

1. Roof plan showing layout of boards and fastening patterns.

D. Certificates:

1. System Manufacturer's or Insulation Manufacturer's Certification that the insulation meets Zero ODP (Ozone Depletion Potential) and Zero GWP (Global Warming Potential) specification requirements.

E. Thermal Warranty:

1. Submit sample warranty indicating conditions and limitations.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing Products specified in this section with minimum twenty five years documented experience.

B. Installer Qualifications: Company specializing in the installation of products specified in this section with minimum 5 years documented experience in installing products of the same type and scope as specified.

C. Pre-installation Meeting: Conduct pre-installation meeting to verify project requirements, substrate conditions and insulation manufacturer's installation instructions.

1.7 DELIVERY, STORAGE AND HANDLING

A. Comply with general requirements specified in sections 01 3400.

B. Deliver product in packages labeled with material name, thermal value and product code.

C. When stored outdoors or on the jobsite, the insulation should be stacked on pallets at least three inches above ground level and completely covered with a waterproof covering such as a tarpaulin. The temporary factory-applied packaging should be slit or removed to prevent accumulation of condensation. Insulation which has become wet or damaged should be removed and replaced with solid, dry insulation.

1.8 SEQUENCING

A. Ensure that information required for installation of products in this section is furnished to affected trades in time to prevent interruption of construction progress.

B. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

C. Coordinate installation with roof membrane manufacturer's installation instructions.

1.9 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Atlas Roofing Corporation

1. Address: 2000 Riveredge Parkway Suite 800 Atlanta, GA 30328
2. Phone: 800-388-6134
3. Fax: 770-952-3170
4. Web: www.atlasroofing.com

B. Requests for substitutions will be considered in accordance with provisions of Section 01 6300.

2.2 MATERIALS

A. ACFoam® Nail Base Nailable Roof Insulation: Thermally efficient non-structural composite insulation. Consisting of closed-cell ACFoam®-II or ACFoam®-III polyisocyanurate (polyiso) roof insulation board bonded to Oriented Strand Board (OSB) or CDX Plywood on the top face.

1. Compliance:

a. ASTM C1289, Type V.
b. UL Standard 1256 Classification: Construction No. 120, 123 and 458.
c. UL Standard 790 (ASTM E108): For use with Class A, B or C Shingles, Metal or Tile Roof Coverings.
d. UL Standard 263 (ASTM E119): Fire Resistance Classification.
e. UL Standard 1897: Uplift Resistance
f. FM Standard 4450 and 4470 Approved (1-90, 1-105): Approved for Class 1 Insulated Roof Deck Construction. Refer to FM Approvals® RoofNav for Specific Systems Details.
g. IBC Chapter 26 and National Building Code: Sections on Foam Insulation.
h. California State Insulation Quality Standards and Title 25 Foam Flammability Criteria (T 1231).
i. Miami-Dade County Product Control Approved: NOA No. 17-1211.05.
j. State of Florida Product Approval: FL17989.
k. APA and TECO Rated OSB Nailing Surface.
l. United States Voluntary Product Standard: PS 2 Compliant.
m. Dimensional Stability (ASTM D2126): less than 2 percent.
n. Compressive Strength (ASTM D1621): 20 pounds per square inch (140 kPa) or 25 pounds per square inch (172 kPa).
o. Water Absorption (ASTM C209): less than 1.5 percent.
p. Water Absorption (ASTM D2842): less than 3.5 percent.
q. Water Vapor Transmission (ASTM E96): less than 1.0 perm (57.5ng/(Pa•s•m^2)).
r. Product Density (ASTM D1622): nominal 2.0 pounds per cubic foot (32.04 kg/m^3).
s. Flame Spread (ASTM E84 10 minutes): 40-60.
t. Smoke Development (ASTM E84 10 minutes): 50-170.
u. Tensile Strength (ASTM D1623): greater than 730 pounds per square foot (35 kPa).
v. Service Temperature: -100°F to +250°F.
w. Panel Area:

1) 4 feet x 8 feet (1220 millimeters x 2440 millimeters)

x. Composite Panel Thickness: Composite calculations include polyiso layer and 7/16 inch OSB (R-0.55).

1) 1.5 inch (38.1 millimeters): LTTR - 6.3

y. Wood Layer Compatibility:

1) OSB

i. 7/16 inch (11.1 millimeters): R - 0.55

a. Available Certifications: FSC, Fire-Treated and Preservative-Treated

B. Tapered ACFoam®-II or Tapered ACFoam®-III and flat ACFoam®-II or ACFoam®-III.

1. Compliance:

a. ACFoam®-II faced product: Tapered or Flat closed-cell polyisocyanurate (polyiso) foam core integrally bonded to non-asphaltic, fiber-reinforced organic felt facers.

1) ASTM C1289, Type II, Class 1, Grade 2 (20 pounds per square inch) or Grade 3 (25 pounds per square inch).
2) CAN/ULC-S704 Type 2, Class 3 or Type 3, Class 3.
3) CCMC No. 12464-L.
4) UL Certified for Canada: Insulated Roof Deck Assemblies Construction No. C38 and 52. Meets CAN/ULC-S126, CAN/ULC-S101 and CAN/ULC-S107.
5) UL Standard 1256 Classification: Construction No. 120, 123 and 292.
6) UL Standard 790 (ASTM E108): Roofing Systems Classification.
7) UL Standard 263 (ASTM E119): Fire Resistance Classification.
8) UL Standard 1897: Uplift Resistance.
9) FM Standard 4450 and 4470 Approved: Refer to FM Approvals® RoofNav for Specific Systems Details.
10) IBC Chapter 26 and National Building Code: Sections on Foam Insulation.
11) California State Insulation Quality Standards and Title 25 Foam Flammability Criteria (T 1231).
12) Miami-Dade County Product Control Approved: NOA No. 17-1211.05.
13) State of Florida Product Approval: FL17989.
14) Dimensional Stability (ASTM D2126): less than 2 percent.
15) Compressive Strength (ASTM D1621): 20 pounds per square inch (140 kPa) or 25 pounds per square inch (172 kPa).
16) Water Absorption (ASTM C209): less than 1.5 percent.
17) Water Absorption (ASTM D2842): less than 3.5 percent.
18) Water Vapor Transmission (ASTM E96): less than 1.5 perm (85.5ng/(Pa•s•m^2)).
19) Product Density (ASTM D1622): nominal 2.0 pounds per cubic foot (32.04 kg/m^3).
20) Flame Spread (ASTM E84 10 minutes): 40-60.
21) Smoke Development (ASTM E84 10 minutes): 50-170.
22) Tensile Strength (ASTM D1623): greater than 730 pounds per square foot (35 kPa).
23) Service Temperature: -100°F to +250°F.

b. Flat Panel Thickness:

1) 2.0 inch (50.8 millimeters): R - 11.4

2.3 ACCESSORIES

A. Atlas Nail Base Fastener: Engineered standard or light duty fastener for ACFoam® Nail Base and ACFoam® CrossVent® Nailable insulation to an approved substrate. Required for proper attachment of all ACFoam® Nailable insulation products.

1. Material: Case hardened and Tempered Carbon Steel
2. Head Style/Drive: Pancake Head with T-30 Internal Drive
3. Head Diameter: 0.625 inch
4. Shank Diameter: 0.190 inch
5. Thread Length: 2.750 inch
6. Point: #2 (0.135 inch diameter) Drill Point
7. Coating: Epoxy E-Coat (Black)
8. Overall Length:

    a. 7.0 inch (178 millimeters)

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine roof deck for suitability to receive insulation.

B. Verify that substrate is dry, clean and free of foreign material that will damage insulation or impede installation.

C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

D. Verify that roof drains, scuppers, roof curbs, nailers, equipment supports, vents and other roof accessories are secured properly and installed in conformance with Contract Documents.

E. Verify that deck is structurally sound to support installers, materials and equipment without damaging or deforming work.

1. Start of installation indicates installer accepts conditions of existing deck surfaces.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Verify the manufacturer's roof edge details for accuracy to fit the assembly

3.3 INSTALLATION

A. Install in accordance with manufacturer's written installation instructions.

B. Install specified insulation using approved mechanical fasteners, hot asphalt or adhesives in accordance with manufacturer's written instructions and as required by governing codes and Owner's insurance carrier.

C. Install with end joints staggered to avoid having insulation joints coinciding with joints in deck. In multi-layer installations, stagger joints in top and bottom layers.

3.4 PROTECTION

A. Remove trash and construction debris from insulation surface prior to application of roofing membrane.

B. Do not leave installed insulation exposed to weather. Cover and waterproof completed roof system immediately after installation.

   1. Temporarily seal exposed insulation edges at the end of each day.
   2. Remove and replace installed insulation that has become wet or damaged with new insulation.

C. Protect installed insulation and roof cover from traffic by use of protective covering materials during and after installation.

END OF SECTION

SECTION 07 3100

ASPHALT SHINGLES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Asphalt roofing shingles.

B. Underlayment.

C. Metal flashing associated with shingle roofing.

1.2 RELATED SECTIONS

A. Section 06 1000 - Rough Carpentry.

B. Section 07 6200 - Sheet Metal Flashing and Trim.

1.3 REFERENCES

A. Asphalt Roofing Manufacturers Association (ARMA).

B. ASTM International (ASTM):

1. ASTM D 3018 - Standard Specification for Class A Asphalt Shingles Surfaced with Mineral Granules.

C. National Roofing Contractors Association (NRCA).

D. Sheet Metal and Air Conditioning Contractors National Association, 1nc. (SMACNA) - Architectural Sheet Metal Manual.

1.4 DEFINITIONS

A. Roofing Terminology: Refer to ASTM D1079 and the glossary of the National Roofing Contractors Association (NRCA) Roofing and Waterproofing Manual for definitions of roofing terms related to this section.

1.5 SUBMITTALS

A. Submit under provisions of Section 01300 - Administrative Requirements.

B. Product Data: Manufacturer's data sheets on each product to be used, showing compliance with requirements.

C. Installation Instructions: Manufacturer's installation instructions, showing required preparation and installation procedures.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Provide all primary roofing products, including shingles, underlayment, by a single manufacturer.

B. Installer Qualifications: Installer must be approved by manufacturer for installation of all roofing products to be installed under this section.

1.7 REGULATORY REQUIREMENTS

A. Provide a roofing system achieving an Underwriters Laboratories (UL) Class A fire classification.

B. Install all roofing products in accordance with all federal, state and local building codes.

C. All work shall be performed in a manner consistent with current OSHA guidelines.

1.8 PRE-INSTALLATION MEETINGS

A. Convene a pre-installation meeting a minimum two weeks prior to starting work of this section.
   1. Contractor shall schedule and arrange meeting and meeting place and notify attendees.
   2. Mandatory Attendees: Roofing installer and manufacturer's technical representative.
   3. Optional Attendees: Owner's representative, Architect's representative, prime Contractor's representative.
   4. Review all pertinent requirements for achieving the warranty specified below and set schedule for final warranty inspection.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened labeled packaging until ready for installation.

B. Store products in a covered, ventilated area, at temperature not more than 110 degrees F (43 degrees C); do not store near steam pipes, radiators, or in sunlight.

C. Store bundles on flat surface to maximum height recommended by manufacturer; store rolls on end.

D. Store and dispose of solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.10 WEATHER CONDITIONS

A. Proceed with work only when existing and forecasted weather conditions will permit work to be performed in accordance with roofing shingle manufacturer's recommendations.

1.11 WARRANTY

A. Provide manufacturer's standard limited warranty:

   1. Provide to the Owner a GAF Shingle and Accessory Ltd. Warranty.

      a. Warranty Duration: 15 years.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: GAF, Residential Roofing Products.

B. Substitutions: Owens-Corning, IKO, Certain Teed.

C. Requests for substitutions will be considered in accordance with provisions of Section 01 6000 - Product Requirements.

2.2 VENTILATED ROOF INSULATION PANELS

A. Preassembled panel consisting of a oriented strand board top surface a wood spacer block separating a layer of Isocyanurate insulation on the bottom, ThermaCal 1 Ventilating Roof Insulation Panel by GAF-Cornell.
   1. OSB Thickness: 7/16 inch (11 mm).
   2. OSB Thickness: 5/8 inch (16 mm).
   3. OSB Thickness: 3/4 inch (19 mm).
   4. Wood Spacer Block Thickness: 1 inch (25 mm).
   5. Wood Spacer Block Thickness: 1-1/2 inches (38 mm)
   6. Wood Spacer Block Thickness: 2 inches (51 mm).

B. Preassembled panel with two layers of oriented strand board separated by spacer blocks and isocyanurate insulation on the bottom, ThermaCal 2 Ventilating Roof Insulation Panel by GAF-Cornell.
   1. OSB Thickness: 7/16 inch (11 mm).
   2. OSB Thickness: 5/8 inch (16 mm).
   3. OSB Thickness: 3/4 inch (19 mm).
   4. Wood Spacer Block Thickness: 1 inch (25 mm).
   5. Wood Spacer Block Thickness: 1-1/2 inches (38 mm)
   6. Wood Spacer Block Thickness: 2 inches (51 mm).

2.3 SHINGLES

A. Timberline NS Natural Shadow Lifetime Shingles, by GAF:

   1. Self sealing, granule surfaced, asphalt shingle with a strong fiberglass reinforced Micro Weave core and StainGuard protection, which prevents pronounced discoloration from blue-green algae through formulation/unique blends of granules.
   2. Architectural laminate styling provides a wood shake appearance with 5-5/8 inch exposure. Features the classic Natural Shadow effect.
   3. UL 790 Class A rated with UL 997 Wind Resistance Label; ASTM D 7158, Class H; ASTM D 3161, Type 1; ASTM D 3018, Type 1; ASTM D 3462; AC438 compliant; CSA 123.5-98; Dade County Approved, Florida Building Code Approved, Texas Dept of Insurance Approved, ICC Report Approval.

2.4 HIP AND RIDGE SHINGLES

A. Distinctive self-sealing hip and ridge cap shingle complementing the color of selected roof shingle. Each bundle covers approx. 31 lineal feet (9.45 m) with an 8 inch (203 mm) exposure Ridglass 8 inch Ridge Cap Shingles by GAF.

2.5 STARTER STRIPS

A. Self-sealing starter shingle designed for all roof shingles. Each bundle covers approx. 120 lineal feet (36.58 m). ProStart Starter Strip by GAF.

2.6 LEAK BARRIER

A. Self-adhering, self-sealing, bituminous leak barrier surfaced with fine, skid-resistant granules. Approved by UL, Dade County, ICC, State of Florida and Texas Department of Insurance. Each roll contains approx. 150 sq ft (13.9 sq m), 36 inches X 50 feet (0.9 m x 20.3 m) or 200 sq ft (18.6 sq m), 36 inches X 66.7 feet (0.9 m x 20.3 m). WeatherWatch Ice and Water Leak Barrier, by GAF.

2.7 UNDERLAYMENT

A. Water repellent, breather type cellulose/glass fiber composite roofing underlayment. Meets or exceed ASTM D226 and D4869. Each roll contains approximately 4 squares (432 sq ft) of material and is 36 x 144 inches. Shingle-Mate Roof Deck Protection, by GAF.

2.8 ROOFING CEMENT

A. Asphalt Plastic Roofing Cement meeting the requirements of ASTM D 4586, Type I or II.

2.9 ROOF ACCESSORIES

A. Compression Collars: UV stable solid molded PVC compression collar, Kynar PVDF coated 24 gauge galvanized flange, Ultimate Pipe Flashing by Lifetime Tool.

2.10 ATTIC VENTILATION

A. Roof Louvers:

1. Rooftop mounted, low-profile square-top designed, high-impact resin exhaust ventilator designed to evacuate hot air from attics. Each vent provides 60 sq in NFVA. Lomanco, Model 600 (type for 14).

B. Gable Louvers:
1. Surfaced mounted, flush or recessed one piece integral construction in all aluminum. Lomanco, Model 907, White finish (typ for 2).

2.11 NAILS

A. Nails: Standard round wire, zinc-coated steel or aluminum; 10 to 12 gauge, smooth, barbed or deformed shank, with heads 3/8 inch (9 mm) to 7/16 inch (11 mm) in diameter. Length must be sufficient to penetrate into solid wood at least 3/4 inch (19 mm) or through plywood or oriented strand board by at least 1/8 inch (3.18 mm).

2.12 METAL FLASHING

A. Prefinished Steel: 24 gauge hot-dip galvanized steel sheet, complying with ASTM A 653/A 653M, G90/Z275. Colors from manufacturer's full standard line.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until roof deck has been properly prepared.

B. If roof deck preparation is the responsibility of another installer, notify Architect or building owner of unsatisfactory preparation before proceeding.

3.2 PREPARATION OF SUBSTRATE

A. Clean deck surfaces thoroughly prior to installation of leak barrier and roof deck protection.

B. At areas to receive leak barrier, fill knot holes and cracks with latex filler.

3.3 INSTALLATION OF UNDERLAYMENT

A. Install using methods recommended by manufacturer in accordance with local building code. When local codes and application instructions are in conflict, the more stringent

requirements shall take precedence.

B. Eaves:

1. Place eave edge metal flashing tight with fascia boards; lap joints 2 inches (50 mm) and seal with plastic cement; nail at top of flange.
2. On roofs with slope between 2:12 and 4:12, and on all roofs in the north, install leak barrier up the slope from eave edge to 36 inches from the edge or at least 24 inches (610 mm) beyond the interior face of the warm exterior wall, whichever is greater; lap ends 6 inches (150 mm) and bond.

C. Valleys:

1. Install leak barrier at least 36 inches wide centered on valley; lap ends 6 inches (150 mm) and seal.
2. Where valleys are indicated to be "open valleys", install metal flashing over leak barrier before roof deck protection is installed; DO NOT NAIL THROUGH metal flashing; secure by nailing at 18 inches (457 mm) on center just beyond edge of flashing so that nail heads hold down edge.

D. Hips and Ridges:

1. Install GAF leak barrier along entire lengths. If ridge vents are to be installed, position the GAF leak barrier so that the ridge slots will not be covered.

E. Roof Deck:

1. Install one layer of roof deck protection over entire area not protected by eave or valley membrane; run sheets horizontally lapped so water sheds; nail in place.
2. On roofs sloped at more than 4 in 12, lap horizontal edges at least 2 inches (50 mm) and at least 2 inches (50 mm) over eave protection membrane.
3. On roofs sloped between 2 in 12 and 4 in 12, lap horizontal edges at least 19 inches (480 mm) and at least 19 inches (485 mm) over eave protection membrane.
4. Lap ends at least 4 inches (100 mm); stagger end laps of each layer at least 36 inches (915 mm).
5. Lap roof deck protection over valley protection at least 6 inches (152 mm).

F. Shingle Mate Application

1. Shingle Mate shall be installed over a clean, dry deck.
2. Install Weather Watch or StormGuard Leak Barrier at eaves, valleys, rakes, skylights, dormers and other vulnerable leak areas.
3. Lay Shingle Mate over deck and overlap 3 inch (76 mm) at side laps and 6 inch (152 mm) at end laps.
4. For exposure to rain or snow, overlap 12 inch (305 mm) at end laps.
5. For side and end laps: fasten Shingle Mate 12 inch (305 mm) o.c. (6 inch (152 mm) o.c. for high wind areas).
6. For middle of the roll: fasten Shingle Mate 24 inch (610 mm) o.c. (12 inch (305 mm) o.c. for high wind areas).
7. For exposure to rail or snow, completely cover all side laps, end laps and fasteners with tape.
8. For long term exposure see complete Shingle Mate installation instructions for side lap detail.
9. If roof may be exposed to high winds, apply tape over all fasteners at the center of the roll to prevent rain or snow from entering at the fasteners.

G. Penetrations:

1. At vent pipes, install a 24 inch (610 mm) square piece of leak barrier lapping over roof deck protection; seal tightly to pipe.
2. At rake edges, install metal edge flashing over leak barrier and roof deck protection; set tight to rake boards; lap joints at least 2 inches (50 mm) and seal with plastic cement; secure with nails.
3. At hips and ridges, install leak barrier along entire lengths. If ridge vents are to be installed, position the leak barrier so that the ridge slots are not covered.

3.4 INSTALLATION OF SHINGLES

A. Install in accordance with manufacturer's instructions and requirements of local building code.

1. Avoid breakage of shingles by avoiding dropping bundles on edge, by separating shingles carefully (not by "breaking" over ridge or bundles), and by taking extra precautions in temperatures below 40 degrees F (4 degrees C).
2. Handle carefully in hot weather to avoid damaging shingle edges.
3. Secure with 4 to 6 nails per shingle; use number of nails required by manufacturer or by code, whichever is greater. Nails must be long enough to penetrate through plywood or OSB, or 3/4 inch (19 mm) into dimensional lumber.

B. Install hip and ridge shingles as required by the manufacturer. At ridges, install hip and ridge shingles over ridge or ridge vent material.

C. Make valleys using "woven valley" technique.

1. Run shingles from both roof slopes at least 12 inches (305 mm) across center of valley, lapping alternate sides in a woven pattern.
2. Nail not closer than 6 inches (150 mm) to center of valley.

D. All penetrations are to be flashed according to GAF, ARMA and NRCA application instructions and construction details.

3.5 INSTALLATION OF VENTILATION

A. Code Requirements: Ventilation shall meet or exceed current FHA, HUD and local code requirements.

B. Rooftop Vents:

1. Install according to manufacturer's instructions.
2. Install vents in sufficient quantity to equal or exceed the exhaust vent area, calculated as specified by manufacturer.
3. Install as shown located on Roof Plan.
4. Cut vent hole through sheathing as specified by the manufacturer for the type of vent to be installed.
5. Install a 24 inches (610 mm) square of leak barrier, centered around the hole.
6. Install according to manufacturer's instructions for flashing vent penetrations.

3.6 PROTECTION

A. Stage work progress so that traffic is minimized over completed roofing.

B. Protect installed products until completion of project

END OF SECTION

SECTION 07 4200

METAL WALL PANELS

PART 1 GENERAL

1.1 SUMMARY

A. Provide manufactured metal board and batten wall panels and all associated top, base, drip, door and window trims.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.

B. Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction.

C. Samples: Submit two representative samples of each material specified indicating visual characteristics and finish. Include range samples if variation of finish is anticipated.

D. Warranty: Submit manufacturers standard warranty. Include labor and materials to repair or replace defective materials.

1. Warranty Period: 10 years.
2. Paint Warranty: 30 Years.

1.3 QUALITY ASSURANCE

A. Comply with governing codes and regulations. Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 MATERIALS

A. Metal Wall Panels:

1. Manufacturers: Metal Exteriors (419-896-2200) Other approved suppliers: Pac-Clad forma Steel Western States Metal.
2. Basis of Design: Metal Exteriors, Metal Batten Color form full standard line.
3. Type: Field-assembled wall panels with concealed fasteners.
4. Panel Supports and Anchorage:

a. Base and Sill Angles: 14 gauge (.0747 inch) galvanized steel.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install materials and systems in accordance with manufacturer's instructions and approved

submittals. Install materials and systems in proper relation with adjacent construction and with uniform appearance. Coordinate with work of other sections.

B. Restore damaged components and finishes. Clean and protect work from damage.

END OF SECTION

SECTION 07 4400

CEMENTITIOUS PANELS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Cementitious express/reveal jointed panel with accessories. James Hardie, Hardie Panel, Sierra 8.

B. To be used on all sloped soffits. See A9.

1.2 RELATED SECTIONS

A. Section 06 1000 - Rough Carpentry.

1.3 REFERENCES

A. ASTM International (ASTM):

1. ASTM B136 - Standard Method for Measurement of Stain Resistance of Anodic Coatings on Aluminum.
2. ASTM B244 - Standard Test Method for Measurement of Thickness of Anodic Coatings on Aluminum and of Other Nonconductive Coatings on Nonmagnetic Basis Metals with Eddy-Current Instruments.
3. ASTM C834 - Standard Specification for Latex Sealants.
4. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
5. ASTM C1186 - Standard Specification for Flat Non-Asbestos Fiber-Cement Sheets.
6. ASTM D523 - Standard Test Method for Specular Gloss.
7. ASTM D1117 - Standard Guide for Evaluating Nonwoven Fabrics.
8. ASTM D1308 - Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes.
9. ASTM D1730 - Standard Practices for Preparation of Aluminum and Aluminum-Alloy Surfaces for Painting.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 3400 - Administrative Requirements.

B. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Installation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Manufacturer's best practice guide.
4. Technical data sheet.

C. Shop Drawings: Provide detailed drawings of atypical non-standard applications of cladding junctions and penetrations which are outside the scope of the standard details and specifications provided by the manufacturer.

1.5 QUALITY ASSURANCE

A. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques

1. Finish areas designated by Architect.

2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
3. Refinish mock-up area as required to produce acceptable work.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store siding flat on a smooth level surface. Protect edges and corners from chipping. Store sheets under cover and keep dry prior to installing.

C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.8 WARRANTY

A. Manufacturer's Warranty: Provide Hardie HZ5 or HZ10 Reveal Panel Limited Product Warranty, with 30-year limited product warranty against manufacturing defects.

1. Application Warranty: Application limited warranty for 2 years.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Requests for approval of equal substitutions will be considered in accordance with provisions of Section 01 6300.

2.2 CLADDING

A. Cement Cladding Panels: Hardie Panel, SIERRA 8 as manufactured by James Hardie Building Products, Inc. 7/16 inches (11 mm) thick, 3 feet 11.5 inches (1206 mm) wide by 7 feet 11.5 inches (2426 mm) long. Product shall be engineered for climate conditions.

1. Refer to hardiezone.com to identify the specific zone of your project.

B. Code Compliance Requirement for Siding Materials:

1. Fiber-cement siding, complies with ASTM C 1186 Type A Grade II.
2. Fiber-cement siding, complies with ASTM E 136 as a noncombustible material.
3. Fiber-cement siding, complies with ASTM E 84 Flame Spread Index = 0, Smoke Developed Index = 5.
4. Fiber-cement siding, complies with ASTM E 119 1 hour and 2 hour fire resistive assemblies listed with Warnock Hersey.
5. Fiber-cement siding, tested to ASTM E330 for Transverse Loads.
6. Intertek Warnock Hersey Product Listing.
7. Manufacturer's Technical Data Sheet.

2.3 FASTENERS

A. Fasteners: For attaching Hardie Reveal Panel direct to sheathing to a rain screen provide the

following:

1. Steel Framing, Exposed Screws: No. 10 by 0.472 inch (11.99 mm) head diameter by 1-1/4 inch (32 mm) long.

2.4 FINISHES

A. Factory Primer: Provide factory applied universal primer.

1. Primer: Factory applied sealer/primer by James Hardie. Apply flat sheen finishes to panels.
2. Topcoat: Refer to Section 09 9623 - Painting and Coating and Exterior Finish Schedule.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If framing preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Ensure that drainage plane in intact and all penetrations are sealed.

3.3 INSTALLATION

A. Metal Framing: Minimum 20 gauge (33 mm) 1½" x 1½" angle each side for soffit.

1. Install per Detail 6/A6.1.

B. Installation: Install materials in strict accordance with manufacturer's installation instructions.

1. Fastening Method: Exposed.
2. Place fasteners no closer than 3/4 inch (9.5 mm) from panel edges and 2 inches (51 mm) from panel corners.
3. Use fasteners as specified in the James Hardie Tech Data sheet and in the Hardie Reveal Panel Installation Instruction.
4. Specific framing and fastener requirements - refer to the applicable building code compliance reports.

3.4 FINISHING

A. Finish factory primed siding with a minimum of one coat of high quality 100 percent acrylic exterior flat grade paint with flat finish within 180 days of installation. Follow paint manufacturer's written product recommendation and written application instructions.

B. Field cut edges shall be coated during the installation process using an exterior grade primer/sealer that is compatible with the type of paint to use on project.

3.5 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 07 5423

TPO MECHANICALLY FASTENED ROOFING SYSTEM

PART 1 GENERAL

The project includes the provision of a complete Firestone Building Products UltraPly™ TPO Mechanically Attached Membrane Roofing System.

1.01 SUMMARY

A. Furnish and install elastomeric sheet roofing system, including:

1. Roofing manufacturer's requirements for the specified warranty.
2. Preparation of roofing substrates.
3. Wood nailers for roofing attachment.
4. Insulation.
5. Elastomeric membrane roofing.
6. Metal roof edging and copings.
7. Flashings.
8. Other roofing-related items specified or indicated on the drawings or otherwise necessary to provide a complete weatherproof roofing system.

B. Disposal of demolition debris and construction waste is the responsibility of Contractor. Perform disposal in manner complying with all applicable federal, state, and local regulations.

C. Comply with the published recommendations and instructions of the roofing membrane manufacturer, at http://manual.fsbp.com .

D. Commencement of work by the Contractor shall constitute acknowledgement by the Contractor that this specification can be satisfactorily executed, under the project conditions and with all necessary prerequisites for warranty acceptance by roofing membrane manufacturer. No modification of the Contract Sum will be made for failure to adequately examine the Contract Documents or the project conditions.

1.02 RELATED SECTIONS

A. Section 06 10 00 - Rough Carpentry: Wood nailers associated with roofing and roof insulation.

B. Section 07 62 00 - Sheet Metal Flashing and Trim: Formed metal flashing and trim items associated with roofing.

C. Section 22 10 00 - Plumbing Piping and Roof Drains.

1.03 REFERENCES

A. Referenced Standards: These standards form part of this specification only to the extent they are referenced as specification requirements.

1. ASTM C 1177/C 1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2004.
2. ASTM C 1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2013.
3. ASTM C 1549 - Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer; 2009.
4. ASTM D 638 - Standard Test Method for Tensile Properties of Plastics; 2010.
5. ASTM D 1004 - Standard Test Method for Initial Tear Resistance of Plastic Film and Sheeting; 2009.
6. ASTM D 3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2000.

1.04 SUBMITTALS

A. Product Data:

1. Provide membrane manufacturer's printed data sufficient to show that all components of roofing system, including insulation and fasteners, comply with the specified requirements and with the membrane manufacturer's requirements and recommendations for the system type specified; include data for each product used in conjunction with roofing membrane.
2. Where UL or FM requirements are specified, provide documentation that shows that the roofing system to be installed is UL-Classified or FM-approved, as applicable; include data itemizing the components of the classified or approved system.
3. Installation Instructions: Provide manufacturer's instructions to installer, marked up to show exactly how all components will be installed; where instructions allow installation options, clearly indicate which option will be used.

B. Shop Drawings: Provide:

1. The roof membrane manufacturer's standard details customized for this project for all relevant conditions, including flashings, base tie-ins, roof edges, terminations, expansion joints, penetrations, and drains.

C. Pre-Installation Notice: Copy to show that manufacturer's required Pre Installation Notice (PIN) has been accepted and approved by the manufacturer.

D. Executed Warranty.

1.05 QUALITY ASSURANCE

A. Applicator Qualifications: Roofing installer shall have the following:

1. Current Firestone Master Contractor status.
2. At least five years, experience in installing specified system.

B. Pre-Installation Conference: Before start of roofing work, Contractor shall hold a meeting to discuss the proper installation of materials and requirements to achieve the warranty.

1. Require attendance with all parties directly influencing the quality of roofing work or affected by the performance of roofing work.
2. Notify Architect well in advance of meeting.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver products in manufacturer's original containers, dry and undamaged, with seals and labels intact and legible.

B. Store materials clear of ground and moisture with weather protective covering.

C. Keep combustible materials away from ignition sources.

1.07 WARRANTY

A. Comply with all warranty procedures required by manufacturer, including notifications, scheduling, and inspections.

B. Warranty: Firestone 30 year Red Shield Limited Warranty covering membrane, roof insulation, and membrane accessories.

1. Limit of Liability: No dollar limitation.
   a. Scope of Coverage: Repair leaks in the roofing system caused by:
   b. Ordinary wear and tear of the elements.
   c. Manufacturing defect in Firestone brand materials.

d. Defective workmanship used to install these materials.
e. Damage due to winds up to 90 mph.

2. Not Covered:
   a. Damage due to winds in excess of 100 mph.
   b. Damage due to hurricanes or tornadoes.
   c. Hail.
   d. Intentional damage.
   e. Unintentional damage due to normal rooftop inspections, maintenance, or service.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturer - Roofing System: Firestone Building Products Co., Carmel, IN. www.firestonebpco.com. Other acceptable mfgrs are Carlisle, GAF Everguard.

B. Roofing systems manufactured by others may be acceptable provided the roofing system is completely equivalent in materials and warranty conditions and the manufacturer meets the following qualifications:

   1. Specializing in manufacturing the roofing system to be provided.
   2. Minimum ten years of experience manufacturing the roofing system to be provided.
   3. Able to provide a no dollar limit, single source roof system warranty that is backed by corporate assets in excess of one billion dollars.

C. Manufacturer of Insulation :GAF Therma-Cal or Atlas or equal

D. Manufacturer of Metal Roof Edging:

   1. Same manufacturer as roof membrane.
   2. Exceptional Metals
   3. Field- or shop-fabricated metal roof edging.

E. Substitution Procedures: See Instructions to Bidders.

   1. Submit evidence that the proposed substitution complies with the specified requirements.

2.02 ROOFING SYSTEM DESCRIPTION

A. Roofing System:

   1. Membrane: Thermoplastic Polyolefin (TPO).
   2. Thickness: As specified elsewhere.
   3. Membrane Attachment: Mechanically attached.
   4. Slope: varies from ¼" per foot to 3/8" per foot. See framing plan.
   5. Comply with applicable local building code requirements.
   6. Provide assembly having Underwriters Laboratories, Inc. (UL) Class A, Fire Hazard Classification.
   7. Provide assembly complying with Factory Mutual Corporation (FM) Roof Assembly Classification, FM DS 1-28 and 1-29, and meeting minimum requirements of FM 90 wind uplift rating.

B. Insulation:

   1. Total System R Value: 30, minimum.
   2. Maximum Board Thickness: 2½" inches (50 mm); use as many layers as necessary; stagger joints in adjacent layers. Provide 5" total thickness.

3. Base Layer: Polyisocyanurate foam board, non-composite.
   a. Attachment: Mechanical through fastening.
4. Top Layer: Polyisocyanurate foam board, non-composite.
   a. Attachment: Mechanical through fastening.

2.03 TPO MEMBRANE MATERIALS

A. Membrane: Flexible, heat weldable sheet composed of thermoplastic polyolefin polymer and ethylene propylene rubber; complying with ASTM D 6878, with polyester weft inserted reinforcement and the following additional characteristics:

1. Thickness: 0.080 inch plus/minus 10 percent, with coating thickness over reinforcement of 0.024 inch (0.61 mm) plus/minus 10 percent.
2. Puncture Resistance: 265 lbf (1174 N), minimum, when tested in accordance FTM 101C Method 2031.
3. Solar Reflectance: 0.79, minimum when tested in accordance with ASTM C 1549.
4. Color: White
5. Acceptable Product: UltraPly TPO by Firestone.

A. Membrane Fasteners: Type and size as required by roof membrane manufacturer for roofing system and warranty to be provided; use only fasteners furnished by roof membrane manufacturer.

B. Curb and Parapet Flashing: 60 mil, with encapsulated edge which eliminates need for seam sealing the flashing-to-roof splice; precut to 18 inches (457 mm) wide.

C. Formable Flashing: Non-reinforced, flexible, heat weldable sheet, composed of thermoplastic polyolefin polymer and ethylene propylene rubber.

1. Thickness: 0.060 inch (1.52 mm) plus/minus 10 percent.
2. Tensile Strength: 1550 psi (10.7 MPa), minimum, when tested in accordance with ASTM D 638 after heat aging.
3. Elongation at Break: 650 percent, minimum, when tested in accordance with ASTM D 638 after heat aging.
4. Tearing Strength: 12 lbf (53 N), minimum, when tested in accordance with ASTM D 1004 after heat aging.
5. Color: Same as field membrane.
6. Acceptable Product: UltraPly TPO Flashing by Firestone.

E. Tape Flashing: 5-1/2 inch (140 mm) nominal wide TPO membrane laminated to cured rubber polymer seaming tape, overall thickness 0.065 inch (1.6 mm) nominal; TPO QuickSeam Flashing by Firestone.

F. Pourable Sealer: Two-part polyurethane, two-color for reliable mixing; Pourable Sealer by Firestone.

G. Seam Plates: Steel with barbs and Galvalume coating; corrosion-resistance complying with FM 4470.

H. Termination Bars: Aluminum bars with integral caulk ledge; 1.3 inches (33 mm) wide by 0.10 inch (2.5 mm) thick; Firestone Termination Bar by Firestone.

I. Cut Edge Sealant: Synthetic rubber-based, for use where membrane reinforcement is exposed; UltraPly TPO Cut Edge Sealant by Firestone.

J. General Purpose Sealant: EPDM-based, one part, white general purpose sealant; UltraPly TPO General Purpose Sealant by Firestone.

K. Molded Flashing Accessories: Unreinforced TPO membrane pre-molded to suit a variety of flashing details, including pipe boots, inside corners, outside corners, etc.; UltraPly TPO Small and Large Pipe Flashing by Firestone.

2.04 ROOF INSULATION AND COVER BOARDS

A. Polyisocyanurate Board Insulation: Closed cell polyisocyanurate foam with black glass reinforced mat laminated to faces, complying with ASTM C 1289 Type II Class 1, with the following additional characteristics:

1. Thickness: As indicated elsewhere.
2. Size: 48 inches (1220 mm) by 96 inches (2440 mm), nominal.
3. Exception: Insulation to be attached using adhesive or asphalt may be no larger than 48 inches (1220 mm) by 48 inches (1220 mm), nominal.
4. R-Value (LTTR): 1.0 inch (25 mm) Thickness: 5.7 R, minimum.
5. Compressive Strength: 20 psi (138 kPa) when tested in accordance with ASTM C 1289.
6. Acceptable Product: ISO 95+ polyiso board insulation by Firestone, Atlas Roofing Products, GAF ThermaCal

2.06 METAL ACCESSORIES

A. Metal Roof Edging and Fascia: Continuous metal edge member serving as termination of roof membrane and retainer for metal fascia; watertight with no exposed fasteners; mounted to roof edge nailer.

1. Wind Performance:
   a. Membrane Pull-Off Resistance: 100 lbs/ft (1460 N/m), minimum, when tested in accordance with ANSI/SPRI ES-1 Test Method RE-1, current edition.
   b. Fascia Pull-Off Resistance: At least the minimum required when tested in accordance with ANSI/SPRI ES-1 Test Method RE-2, current edition.
   c. Provide product listed in current Factory Mutual Research Corporation Approval Guide with at least FM 1-270 rating.
2. Description: Two-piece; 45 degree sloped galvanized steel sheet edge member securing top and bottom edges of formed metal fascia; Firestone EdgeGard.
3. Fascia Face Height: 8 inches (127 mm).
4. Edge Member Height above Nailer: 1-1/4 inches (31 mm).
5. Length: 144 inches (3650 mm).
6. Functional Characteristics: Fascia retainer supports while allowing for free thermal cycling of fascia.
7. Aluminum Bar: Continuous 6063-T6 alloy aluminum extrusion with pre-punched slotted holes; miters welded; injection molded EPDM splices to allow thermal expansion.
8. Anchor Bar Cleat: 20 gage, 0.036 inch (0.9 mm) G90 coated commercial type galvanized steel with pre-punched holes.
9. Curved Applications: Factory modified.
10. Fasteners: Factory-provided corrosion resistant fasteners, with drivers; no exposed fasteners permitted.
11. Special Shaped Components: Provide factory-fabricated pieces necessary for complete installation, including miters, scuppers, and end caps; minimum 14 inch (355 mm) long legs on corner pieces.
12. Scuppers: Welded watertight.
13. Accessories: Provide matching downspout, extenders, and other special fabrications as shown on the drawings.

B. Parapet Copings: Formed metal coping with galvanized steel anchor/support cleats for capping any parapet wall; watertight, maintenance free, without exposed fasteners; butt type joints with concealed splice plates; mechanically fastened as indicated; Firestone PTCF.

1. Wind Performance:
   a. At least the minimum required when tested in accordance with ANSI/SPRI ES-1 Test Method RE-3, current edition.
   b. Provide product listed in current Factory Mutual Research Corporation Approval Guide with at least FM 1-90 rating.

2. Description: Coping sections allowed to expand and contract freely while locked in place on anchor cleats by mechanical pressure from hardened stainless steel springs factory attached to anchor cleats; 8 inch (200 mm) wide splice plates with factory applied dual non-curing sealant strips capable of providing watertight seal.
3. Material and Finish: 24 gage, 0.024 inch (0.06 mm) thick galvanized steel with Kynar 500 finish in manufacturer's standard color; matching concealed joint splice plates; factory-installed protective plastic film.
4. Dimensions:
   a. Wall Width: As indicated on the drawings.
   b. Piece Length: Minimum 144 inches (3650 mm).
   c. Curved Application: Factory fabricated in true radius.
5. Anchor/Support Cleats: 20 gage, 0.036 inch (0.9 mm) thick pre-punched galvanized cleat with 12 inch (305 mm) wide stainless steel spring mechanically locked to cleat at 72 inches (1820 mm) on center.
6. Special Shaped Components: Provide factory-fabricated pieces necessary for complete installation, including miters, corners, intersections, curves, pier caps, and end caps; minimum 14 inch (355 mm) long legs on corner, intersection, and end pieces.
7. Fasteners: Factory-furnished; electrolytically compatible; minimum pull out resistance of 240 pounds (109 kg) for actual substrate used; no exposed fasteners.

2.07 ACCESSORY MATERIALS

A. Wood Nailers: PS 20 dimension lumber, Structural Grade No. 2 or better Southern Pine, Douglas Fir; or PS 1, APA Exterior Grade plywood; pressure preservative treated.

PART 3 INSTALLATION

3.01 GENERAL

A. Install roofing, insulation, flashings, and accessories in accordance with roofing manufacturer's published instructions and recommendations for the specified roofing system. Where manufacturer provides no instructions or recommendations, follow good roofing practices and industry standards. Comply with federal, state, and local regulations.

B. Obtain all relevant instructions and maintain copies at project site for duration of installation period.

C. Do not start work until Pre-Installation Notice has been submitted to manufacturer as notification that this project requires a manufacturers' warranty.

D. Perform work using competent and properly equipped personnel.

E. Temporary closures, which ensure that moisture does not damage any completed section of the new roofing system, are the responsibility of the applicator. Completion of flashings, terminations, and temporary closures shall be completed as required to provide a watertight condition.

F. Install roofing membrane only when surfaces are clean, dry, smooth and free of snow or ice; do not apply roofing membrane during inclement weather or when ambient conditions will not allow proper application; consult manufacturer for recommended procedures during cold weather. Do not work with sealants and adhesives when material temperature is outside the range of 60 to 80 degrees F (15 to 25 degrees C).

G. Protect adjacent construction, property, vehicles, and persons from damage related to roofing work; repair or restore damage caused by roofing work.

   1. Protect from spills and overspray from bitumen, adhesives, sealants and coatings.
   2. Particularly protect metal, glass, plastic, and painted surfaces from bitumen, adhesives, and sealants within the range of wind-borne overspray.
   3. Protect finished areas of the roofing system from roofing related work traffic and traffic by other trades.

H. Until ready for use, keep materials in their original containers as labeled by the manufacturer.

I. Consult membrane manufacturer's instructions, container labels, and Material Safety Data Sheets (MSDS) for specific safety instructions. Keep all adhesives, sealants, primers and cleaning materials away from all sources of ignition.

3.02 EXAMINATION

A. Examine roof deck to determine that it is sufficiently rigid to support installers and their mechanical equipment and that deflection will not strain or rupture roof components or deform deck.

B. Verify that surfaces and site conditions are ready to receive work. Correct defects in the substrate before commencing with roofing work.

C. Examine roof substrate to verify that it is properly sloped to drains.

D. Verify that the specifications and drawing details are workable and not in conflict with the roofing manufacturer's recommendations and instructions; start of work constitutes acceptable of project conditions and requirements.

3.03 PREPARATION

A. Take appropriate measures to ensure that fumes from adhesive solvents are not drawn into the building through air intakes.

B. Prior to proceeding, prepare roof surface so that it is clean, dry, and smooth, and free of sharp edges, fins, roughened surfaces, lose or foreign materials, oil, grease and other materials that may damage the membrane.

C. Fill all surface voids in the immediate substrate that are greater than 1/4 inch (6 mm) wide with fill material acceptable insulation to membrane manufacturer.

D. Seal, grout, or tape deck joints, where needed, to prevent bitumen seepage into building.

3.05 INSULATION INSTALLATION

A. Install insulation in configuration and with attachment method(s) specified in PART 2, under Roofing System.

B. Install only as much insulation as can be covered with the completed roofing system before the end of the day's work or before the onset of inclement weather.

C. Lay roof insulation in courses parallel to roof edges.

D. Neatly and tightly fit insulation to all penetrations, projections, and nailers, with gaps not greater than 1/4 inch (6 mm). Fill gaps greater than 1/4 inch (6 mm) with acceptable insulation. Do not leave the roofing membrane unsupported over a space greater than 1/4 inch (6 mm).

E. Mechanical Fastening: Using specified fasteners and insulation plates engage fasteners through insulation into deck to depth and in pattern required by Factory Mutual for FM Class specified in PART 2 and membrane manufacturer, whichever is more stringent.

3.06 SINGLE-PLY MEMBRANE INSTALLATION

A. Beginning at low point of roof, place membrane without stretching over substrate and allow to relax at least 30 minutes before attachment or splicing; in colder weather allow for longer relax time.

B. Lay out the membrane pieces so that field and flashing splices are installed to shed water.

C. Install membrane without wrinkles and without gaps or fishmouths in seams; bond and test seams and laps in accordance with membrane manufacturer's instructions and details.

D. Install membrane mechanically attached to the substrate using fasteners and edge securement as specified and as required by membrane manufacturers.

E. Mechanical Attachment: Install fasteners in the seams, covered by membrane.

1. Lay out fasteners in compliance with FM Class specified in PART 2, as recommended by membrane manufacturer, and as indicated, whichever is most stringent.
2. Properly engage fasteners in the deck with head flush with the countersunk portion of seam plate.

F. Edge Securement: Secure membrane at all locations where membrane terminates or goes through an angle change greater than 2 in 12 inches (1:6) using mechanically fastened reinforced perimeter fastening strips, plates, or metal edging as indicated or as recommended by roofing manufacturer.

1. Exceptions: Round pipe penetrations less than 18 inches (460 mm) in diameter and square penetrations less than 4 inches (200 mm) square.
2. Metal edging is not merely decorative; ensure anchorage of membrane as intended by roofing manufacturer.

3.07 FLASHING AND ACCESSORIES INSTALLATION

A. Install flashings, including laps, splices, joints, bonding, adhesion, and attachment, as required by membrane manufacturer's recommendations and details.

B. Metal Accessories: Install metal edgings, gravel stops, and copings in locations indicated on the drawings, with horizontal leg of edge member over membrane and flashing over metal onto membrane.

1. Follow roofing manufacturer's instructions.
2. Remove protective plastic surface film immediately before installation.
3. Install water block sealant under the membrane anchorage leg.
4. Flash with manufacturers' recommended flashing sheet unless otherwise indicated.
5. Where single application of flashing will not completely cover the metal flange, install additional piece of flashing to cover the metal edge.
6. If the roof edge includes a gravel stop and sealant is not applied between the laps in the metal edging, install an additional piece of self-adhesive flashing membrane over the metal lap to the top of the gravel stop; apply seam edge treatment at the intersections of the two flashing sections.
7. When the roof slope is greater than 1:12, apply seam edge treatment along the back edge of the flashing.

C. Scuppers: Set in sealant and secure to structure; flash as recommended by manufacturer.

D. Roofing Expansion Joints: Install as shown on drawings and as recommended by roofing manufacturer.

E. Flashing at Walls, Curbs, and Other Vertical and Sloped Surfaces: Install weathertight flashing at all walls, curbs, parapets, curbs, skylights, and other vertical and sloped surfaces that the roofing membrane abuts to; extend flashing at least 8 inches (200 mm) high above membrane surface.

1. Use the longest practical flashing pieces.
2. Evaluate the substrate and overlay and adjust installation procedure in accordance with membrane manufacturer's recommendations.
3. Complete the splice between flashing and the main roof sheet with specified splice adhesive before adhering flashing to the vertical surface.
4. Provide termination directly to the vertical substrate as shown on roof drawings.

F. Roof Drains:

1. Taper insulation around drain to provide smooth transition from roof surface to drain. Use specified pre-manufactured tapered insulation with facer or suitable bonding surface to achieve slope; slope not to exceed manufacturer's recommendations.

2. Position membrane, then cut a hole for roof drain to allow 1/2 to 3/4 inch (12 to 19 mm) of membrane to extend inside clamping ring past drain bolts.
3. Make round holes in membrane to align with clamping bolts; do not cut membrane back to bolt holes.
4. Apply sealant on top of drain bowl where clamping ring seats below the membrane
5. Install roof drain clamping ring and clamping bolts; tighten clamping bolts to achieve constant compression.

G. Flashing at Penetrations: Flash all penetrations passing through the membrane; make flashing seals directly to the penetration.

1. Pipes, Round Supports, and Similar Items: Flash with specified pre-molded pipe flashings wherever practical; otherwise use specified self-curing elastomeric flashing.
2. Pipe Clusters and Unusual Shaped Penetrations: Provide penetration pocket at least 2 inches (50 mm) deep, with at least 1 inch (25 mm) clearance from penetration, sloped to shed water.
3. Structural Steel Tubing: If corner radii are greater than 1/4 inch (6 mm) and longest side of tube does not exceed 12 inches (305 mm), flash as for pipes; otherwise, provide a standard curb with flashing.
4. Flexible and Moving Penetrations: Provide weathertight gooseneck set in sealant and secured to deck, flashed as recommended by manufacturer.

3.09 FIELD QUALITY CONTROL

A. Inspection by Manufacturer: Provide final inspection of the roofing system by a Technical Representative employed by roofing system manufacturer specifically to inspect installation for warranty purposes (i.e. not a sales person).

B. Perform all corrections necessary for issuance of warranty.

3.10 CLEANING

A. Clean all contaminants generated by roofing work from building and surrounding areas, including bitumen, adhesives, sealants, and coatings.

B. Repair or replace building components and finished surfaces damaged or defaced due to the work of this section; comply with recommendations of manufacturers of components and surfaces.

C. Remove leftover materials, trash, debris, equipment from project site and surrounding areas.

3.11 PROTECTION

A. Where construction traffic must continue over finished roof membrane, provide durable protection and replace or repair damaged roofing to original condition.

END OF SECTION

SECTION 07 9200

SEALANTS

PART 1 GENERAL

1.1 WORK INCLUDED

A. Clean and prepare surfaces to receive sealant materials.

B. Install sealant and backing materials in exterior joints around perimeter of exterior located windows and door frames and exterior joints between dissimilar materials and control joints.

C. Install sealant around joint at walls and floors of dissimilar materials.

D. Install sealant between metal counter flashing and masonry.

1.2 RELATED WORK

A. Section 13 3419: Sealants used in conjunction with metal flashings.

B. Section 08 4523: Aluminum Windows.

C. Section 03 3000: Cast-in Place Concrete.

1.3 REFERENCE STANDARDS

A. ASTM C804 - Recommended Practices for use of Solvent-Release Type Sealants.

B. ASTM D1565 - Specification for Flexible Cellular Materials - Vinyl Chloride Polymers and Copolymers (Open Cell Foam).

C. FS TT-S-001543A - Sealing Compound, Silicone Rubber.

1.4 SUBMITTALS

A. SUBMIT COLOR SAMPLES AND PRODUCT DATA to the Architect-Engineer in accord with Section 01340.

1.5 JOB CONDITIONS

A. WEATHER AND TEMPERATURE. Install sealants on dry days with temperatures between 40F and 90F

1.6 SEQUENCING

A. Install Sealant adjacent to painted surfaces before adjacent surfaces receive their final coat of paint.

B. Install Exterior Sealants after concrete masonry is washed down and before water-repellent treatment is applied.

PART 2 PRODUCT

2.1 MATERIALS

A. THERMOSETTING PAVING SEALANTS shall be two-part polysulfide (Thickol) or polyurethane sealants meeting the requirements of FS TT-S-00227E, Type I, and of the following types and manufacture:

Sonolastic Paving Joint Sealant	Sonneborn Building Products
Vulkem 245	Mameco International
NR-200 Urexpan Sealant	Pecorea Corporation
Sikaflex 12SL	Sika Chemical Corp.
Thorospan Heavy	Standard Drywall Products, Inc.
Pourthane Sealant	W.R. Meadows, Inc.
Chem-Calk 550	Woodmont Products, Inc.

B. THERMOSETTING BUILDING SEALANT shall be two-part polysulfide (Thiokol), meeting the requirements of FS TT-S-230C, Type II, or FS TT-S-00227E, Type II, FS TT-S-001543A, and of the following types and manufacture:

DAP 230	Morton Thiokol, Inc.
GC-5 Synthacalk	Pecora Corp.
Sikaflex 412	Sika Chemical Corp.
Sololastic Sealant Two-Part	Sonneborn Building Products
Thorospan S	Standard Drywall Products, Inc.
Chem-Calk 200	Woodmont Products, Inc.
Dymeric	Tremco Manufacturing Co.

C. ACRYLIC LATEX SEALANT shall be of the following types and manufacture:

DAP 230	DAP Inc.
AC-20 Acrylic Latex Calk	Pecora Corp.
Glidden Macco Latex	SCM Corporation
Sikaflex 420	Sika Chemical Corp.
Sonolac	Sonneborn Building Products
Acrylicalk	Standard Drywall Products, Inc.
Mono	Tremco Manufacturing Co.
Easaply Acrylic Latex Sealant	W.R. Meadows, Inc.
Chem-Calk 600	Woodmont Products, Inc.

D. SILICONE SEALANT, FS TT-S-001543A, Class A, shall be White and of the following types and manufacture:

Mildew-resistant Sealant	Dow Corning Corp.
SCS-1702	General Electric
Silicon	W.R. Meadows, Inc.

E. PRIMER shall be of the type and manufacture recommended by the sealant manufacturer for use with the sealant specified and the abutting materials.

F. BACKER ROD shall be a closed-cell polyethelene or an open cell polyurethane rod recommended by the sealant manufacturer, of a diameter 1/8 inch greater than the joint width up to 3/4-inch diameter and -inch diameter for 3/4 inch wide joints.

G. BOND BREAKER, where required to break the bond between sealant and the back-up

material or joint filler, shall be a tape material recommended by the sealant manufacturer, or shall be polyethelene film.

H. PERFORMED SEALANT shall be Acmaseal neoprene resilient extrusion manufactured by Acme Highway Products Corp. Series and style shall be in accord with the manufacturer's recommendations for the respective application at the time of the installation.

I. PREFORMED SEALANT ADHESIVE shall be Prima-Lube Adhesive manufactured by Acem Highway Products Corporation.

2.2 MIXING

A. MIX TWO-PART SEALANTS by mixing the activator with the resin, uniformly and thoroughly, in the proportions supplied to meet the recommendations of the sealant manufacturer. Mix sealant in a mechanical mixer, except very small amounts may be hand mixed with a trowel.

PART 3 EXECUTION

3.1 PREPARATION

A. CLEAN DOWN joint surfaces using oil free solvent for metal, glass, and other nonporous surfaces ad by wire brushing concrete and masonry surfaces. Surfaces to receive sealant shall be sound, clean, and dry, and free of frost, laitance, curing compounds, waterproofing compounds, mastic compounds, corrosion, mill scale, rust, oil, tar, wax, paint, mastic, and similar contaminates. Sandblast concrete in contact with form release agents.

B. MASK ADJACENT AREAS if necessary to obtain a neat sealant line.

C. PRIME, concrete, masonry, wood, and similar porous surfaces. Brush out excess material to insure a uniform film over the whole joint face. Allow primer to dry out before applying sealant.

3.2 INSTALLATION

A. INSTALL BACKER ROD with a blunt rod or plain faced roller. Recess into joint to meet the requirements of the sealant manufacturer's recommendations for joint width and depth ration. Do not puncture, fold, twist, or crease backer rod.

B. INSTALL BOND BREAKER where sealant would otherwise bond to backer rod or joint filler.

C. INSTALLATION OF COLD-APPLIED SEALANTS. Apply sealant by holding the gun nozzle at an angle of about 45 degrees and moving steadily along the joint so that a uniform bead is applied without dragging, tearing, or leaving unfilled spaces. Push the bead rather than draw it with the gun leading. Fill joints in vertical surfaces level with adjacent surfaces and tool within ten minutes of application with one continuous stroke to insure intimate contact with the joint faces, to remove any trapped air or voids, to consolidate material, and to provide a neat, uniform appearance. Fill joints in horizontal surfaces holding the top surface of the sealant slightly below the adjacent surface.

D. INSTALLATION OF PREFORMED SEALANT. Apply preformed sealant adhesive to both joint surfaces immediately prior to seal installation. Install preformed sealant in accord with the manufacturer's recommendation recess 3/8 inch.

3.3 CLEANING

A. CLEANING. Remove masking immediately after application and tooling operations are complete. Clean excess or spilled sealant from nonporous surfaces with solvent before curing. Clean excess or spilled sealant from porous surfaces with abrasive or mechanical means after curing.

3.4 SCHEDULE OF APPLICATION

A. APPLY THERMOSETTING PAVING SEALANT at the following locations:

At walk expansion joints
Where walks abut structural slabs or stoops
Where walks abut exterior walls of buildings
Where exposed interior concrete slabs abut vertical surfaces.

B. APPLY THERMOSETTING BUILDING SEALANT at the following locations:

At exterior masonry control joints
At framed openings at exterior walls, including sills and thresholds
Where tight joints are required between masonry and build-in materials
At miscellaneous locations where caulking is shown on the Drawings
At joints of horizontal ledge angles
At interior masonry control joints

C. APPLY ACRYLIC LATEX SEALANT at the following interior locations

Where rough and dissimilar materials abut one another and where tight joints are required prior to painting.

D. APPLY SILICONE SEALANT at the following locations:

At plumbing fixtures
At ceramic tile control joints

END OF SECTION

SECTION 08 1113

METAL DOORS AND FRAMES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Non-rated and fire rated rolled steel doors and frames

B. Window Frames

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Section 087100 Hardware

1.3 QUALITY ASSURANCE

A. Conform to the following requirements:

1. SDI-100 - Standard Steel Doors and Frames
2. SDI-105 - Recommended Erection Instructions for Steel Frames
3. DHI- Door Hardware Institute - The Installation of Commercial Steel Doors and Steel Frames, Insulated Steel Doors in Wood Frames and Builders Hardware
4. Fire Rated Door and Frame Construction: NFPA 80
5. NOTE: Frames fabricated form WCGS are NOT acceptable

1.4 HARDWARE TEMPLATES

A. HARDWARE TEMPLATES shall be furnished to the fabricator by the hardware manufacturer. The fabricator shall drill and tap holes, and make cutouts and reinforcement in doors and frames to receive hardware in a neat and proper manner.

1.5 REQUIREMENTS OF REGULATORY AGENCIES

A. LABELED DOORS AND FRAMES. Where noted or shown on the Drawings, furnish doors and frames tested in accord with ASTM E 152 and bearing the label of Underwriters Laboratories Inc. or Factory Mutual Engineering Corporation indicating applicable rating and wall opening classification specified.

B. SMOKE AND DRAFT CONTROL DOOR ASSEMBLIES

1. Installation. Install smoke and draft control door assemblies, tested in accord with UBC Standard 43-2, at head, jambs, and astragals at label cross-corridor doors and labeled door openings into fire-rated corridors and horizontal exits as noted on Door and Frame Schedule.

1.6 SUBMITTALS

A. SUBMIT SHOP DRAWINGS showing quantities, types, and locations. Door and frame construction shall be fully detailed showing weights of material, finish, framing, and reinforcing, and must indicate conformance with specified technical requirements.

1.7 DELIVERY STORAGE AND HANDLING

A. DELIVERY AND STORAGE. Doors shall be shipped individually packed. Ship frames with angle spreaders at door opening bottoms. Store doors and frames on the building site, in an upright position, under cover, on wood sills or floors, to prevent rust or damage. Ventilate canvas or plastic covers to prevent moisture traps.

PART 2 PRODUCTS

2.1 DOOR AND FRAMES

A. Manufacturers:

1. Steelcraft
2. Ceco
3. Western Hollowmetal
4. Republic Builders Products So.
5. Elco Metal Products
6. Tex-Steel Corporation
7. Curries

2.2 HOLLOW METAL DOORS

A. FACE SHEETS AND FILLERS. Face sheets shall be 16-gauge cold-rolled, stretcher-leveled steel internally welded to steel stiffeners of sufficient strength and spacing to support face sheets against impact and to assure flat face sheet surfaces, or shall be bonded to a rigid polystyrene, polyurethane, or a resin-impregnated honeycomb core. It steel stiffeners are used, fill doors with mineral rock wool or fiberglass, or sound deaden inside faces of face steel.

B. VERTICAL EDGES shall be minimum 16-gauge channels with each face sheet wrapped around channels, meeting at center of edge, with the resulting seam closed; continuously face welded, and ground smooth.

C. TOP AND BOTTOM EDGES shall be 16-gauge steel channels. Back of channel shall be flush with top and bottom of face sheets. Inverted channels, if use, shall have filler caps. Tops shall be smooth and flush.

D. FABRICATED STILE AND RAIL DOORS from 16-gauge tubular steel with corners mitered, reinforced with channels, face welded and ground smooth.

E. HARDWARE PREPARATION. Doors shall be mortised, reinforced, drilled, and tapped for scheduled mortise hardware and reinforced for scheduled surface applied hardware. Hinge reinforcing shall be 7-gauge or heavier steel plate, continuous from top to bottom. Closer reinforcing shall be minimum 12-gauge steel, and other reinforcing shall be 14-gauge steel.

F. APPLY astragals to the active leaf of pairs of doors scheduled to receive them.

G. WELDS shall be ground invisible, and depressions shall be filled smooth.

H. LOUVERS for metal doors shall be sight proof, inverted "Y" type, and the size shown on the Drawings.

I. SHOP PAINT. After fabrication, thoroughly clean doors and degrease, phosphatize, and paint with a rust-inhibitive primer.

J. UNDERCUT doors ½ inch to clear carpet where indicated in the Room Finish Schedule.

2.3 PRESSED METAL FRAMES FOR DOORS, WINDOW, WINDOW WALLS AND BORROWED LITES

A. FABRICATE pressed metal frames of 16-gauge cold-rolled steel, for exterior doors and 18-gauge cold-rolled steel for interior doors, formed to types and profiles as shown on the Drawings. Beaks, angles, and arises shall be uniform, straight, sharply defined, and true. Provide knock down frame for installation in existing opening.

B. JAMB ANCHORS. Frames shall have adjustable anchors of 16-gauge corrugated steel, permanently fastened to frame, for setting into masonry partitions or other appropriate anchors provide other types of anchors when required for other conditions. Provide a minimum of three anchors per jamb for frames up to 90 inches high and four anchors per jamb for frames over 90 inches high.

C. REINFORCING. Buff, closer, and holder reinforcing shall be 3/16-inch thick steel, continuous for the full height or length of frame for exterior and vestibule doors, and minimum 14 gauge for strike, 12 gauge for closer, and 7-gauge for steel buffs, at other doors. Frames shall be mortised, reinforced, drilled, and tapped for scheduled mortise hardware, and shall be reinforced for surface-applied hardware. Weld dust covers over drilled reinforcements.

D. SHOP PAINT. After fabrication, thoroughly clean frames and degrease, phosphatize, and paint with a rust-inhibitive primer.

E. Frames for 1-3/4 inch doors shall be 9-gauge steel hinge reinforcement plated for 4-1/2 inch x 4/1/2 inch template type hinges, 14-gauge steel strike reinforcement, and 12-gauge steel for closer. Frames shall be mortised, reinforced, drilled, and tapped for scheduled mortise hardware, and shall be reinforced for surface-applied hardware.

F. ANCHORS. Frames shall be leveling screw anchors at jambs and two base anchors pre-punched for secure nailing or screwing to the wall.

G. SHOP PAINT. After fabrication, thoroughly clean frames, phosphatize and finish with one coat of rust-inhibitive primer.

2.4 MISCELLANEOUS ITEMS

A. FABRICATE MISCELLANEOUS ITEMS, including metal stops for special conditions shown on the Drawings, and other special shapes, to meet the specifications for pressed metal frames.

PART 3 EXECUTION

3.1 INSTALLATION OF PRESSED METAL DOORS, FRAMES, AND MISCELLANEOUS ITEMS

A. INSTALL FRAMES plumb, square, straight, true, rigidly secured in place and properly braced. Anchor frames securely to floor and at jambs. Weld field joints, grind smooth, and

sill with body putty to completely conceal seams, and to form a smooth unbroken finished surface. Where frames are anchored with bolts, shall be coutersunk and surface made smooth with putty. Hang hollow metal doors, preserving clearness. Install miscellaneous items as shown on Drawings.

3.2 TOLERANCES

A. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

END OF SECTION

SECTION 08 1416

WOOD DOORS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Wood doors; fire rated and non-rated. Pre-finished

B. Install door hardware.

1.2 SUBMITTALS

A. Shop Drawings: Indicate door elevations and cutouts for glazing.

1.3 QUALITY ASSURANCE

A. Perform work in accordance with the following:

1. ANSI/NWWDA I.S.1.
2. Fire Door Construction: Conform to UL 10B.
3. Installed Door Assembly: Conform to NFPA 80 for fire rated class as scheduled.
4. AWI - Quality Standards Section 1300 and 1400, Premium grade

1.4 WARRANTY

A. Provide warranty under provisions of Section 01 7010 to the following term:

1. Life of Installation: Interior doors.

B. Include coverage for de-lamination of veneer, warping beyond specified installation tolerances and defective materials.

PART 2 PRODUCTS

2.1 DOOR TYPES

A. Acceptable Manufacturers:

1. Marshfield
2. Eggers
3. Buell
4. Algoma
5. Graham

B. Flush Interior Doors: 1-3/4 inches thick; solid core construction; fire rated as indicated. All doors to be five ply construction. Prefinished, color to be selected.

2.2 DOOR CONSTRUCTION

A. Solid Core, Non-Rated: ANSI/NWWDA, Type solid particle board equal to Marshfield DPC -

B. Solid Core, Fire Rated: ANSI/NWWDA, Type solid particle board core for 20 to 30 minutes

rated doors equal to Marshfield DFP 20/30. Where higher U.L. ratings are required, use material equal to Marshfield DFM Series.

2.3 FLUSH DOOR FACING

A. Wood Veneer: ANSI/NWWDA Premium grade; Plain Sliced White Birch, for transparent finish, slip matched.

B. Adhesive: ANSI/NWWDA, Type 1.

2.4 ACCESSORIES

A. Glass Stops: Rolled steel type conform to UL requirements. Note: Provide on all doors with glazing whether fire rated or not. Wood stops will not be accepted.

2.5 FABRICATION

A. Fabricate non-rated doors in accordance with ANSI/NWWDA I.S.1 requirements.

B. Fabricate fire rated doors in accordance with ANSI/NWWDA I.S.1 and to UL or Warnock-Hersey requirements. Attach fire rating label to door edge.

C. Astragals for Double Doors: Steel shaped, recessed at face edge.

D. Fabricate doors with hardware reinforcement blocking in place.

E. Factory machine doors for finish hardware.

2.6 FACTORY FINISH

A. Factory finish doors in accordance with WDMA G-17 Finish System Description or AWI Division 1500-S-4 - Finish System Standards. Factory finish to be water based stain and ultraviolet (UV) cured polyurethane to comply with EPA Title 5 guidelines for Volatile Organic Compound (VOC) emissions limitations. Finish must meet or exceed performance standards of TR-6 catalyzed polyurethane. Color shall be Marshfield Door Systems Enviroclad UV™ Designer Color to be selected.

B. For standing and running trim use Pittsburgh Paint stain formulated to match Marshfield Door Systems Enviroclad Design color.

C. Factory finished doors to be installed just prior to substantial completion and covered to avoid damages.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install doors in accordance with manufacturer's instructions, NFPA 80 and ITS-WH/UL requirements.

B. Coordinate installation of glass and glazing.

C. Install door louvers, plumb and level.

D. Coordinate installation of doors with installation of frames specified in Section 08 1113 and

hardware specified in Section 08 7100.

E. Adjust door for smooth and balanced door movement.

F. Trim non-rated door width by cutting equally on both jamb edges.

G. Trim door height by cutting edge, 3/4" max.

3.2 INSTALLATION TOLERANCES

A. Maximum Diagonal Distortion: 1/8 inch measured with straight edge, corner to corner.

END OF SECTION

SECTION 08 3600

OVERHEAD DOORS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Aluminum sectional overhead doors.

1.2 RELATED SECTIONS

A. Section 05 10 00 - Structural Metal Framing.

B. Section 06 10 00 - Rough Carpentry.

C. Section 09 90 00 - Painting and Coating.

D. Section 26 05 00 - Common Work Results for Electrical.

1.3 REFERENCES

A. America National Standards Institute (ANSI):

1. ANSI/DASMA 105 - Test Method for Thermal Transmittance and Air Infiltration of Garage Doors.
2. ANSI/DASMA 163 - R-Value and U-Factor As Applied To a Residential or Commercial Garage Door.

B. ASTM International (ASTM):

1. ASTM A653/A653M - Standard Specification for Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
2. ASTM B209 - Standard Specification for Aluminum-Alloy Sheet and Plate.
3. ASTM B221 - Standard Specification for Aluminum-Alloy Extruded Bars, Rods, Wires, Shapes and Tubes.
4. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
5. ASTM E283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen

C. Door and Access Systems Manufacturers Association (DASMA).

1.4 SYSTEM DESCRIPTION

A. Design doors to withstand:

B. Operation: Electric.

C. Track and Operating Hardware: Standard lift type. (Door 125A)

D. Track and Operating Hardware: High lift type. (Door 125A)

1.5 SUBMITTALS

A. Submit under provisions of Section 01 30 00 - Administrative Requirements.

B. Shop Drawings: Indicate opening dimensions and required tolerances, jamb connection details, anchorage spacing, hardware locations, installation details, and special conditions.

C. Provide information on components, application, hardware and accessories.

D. Closeout Submittals: Operation and maintenance data.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer shall provide an overhead door system capable of withstanding positive and negative wind loads as required by local building code for 10,000 cycles.

B. Installer Qualifications: Installer shall be authorized and qualified to install overhead door systems on the type and scope of project specified.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store and dispose of all materials in accordance with federal, state and local laws.

1.8 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.9 WARRANTY

A. Provide an original of the manufacturer's limited warranty against manufacturing defect and product workmanship.

1. Sections 10 years.
2. Springs and Hardware: One year.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: C.H.I. Overhead Doors, Overhead Door.

B. Substitutions: Per Specification Section 01 6300.

C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 MATERIALS

A. Galvanized Steel Sheet:

1. Galvanized commercial steel, (CS type) per ASTM A653/A653M, G90 and G60 coating class.

B. Aluminum:

1. Extrusions: ASTM B221, alloy and temper best suited to application.
2. Sheet: ASTM B209, alloy and temper best suited to application.

C. Glazing:

1. Tempered Glass: 1/4 inch (6 mm). (Door 126A)
2. Insulating glass. (Door 125A)

2.3 COMMERCIAL ALUMINUM DOORS

A. Aluminum Door Sections:

1. Material: Extruded aluminum, stile and rail.
2. Joints: Tongue-and-groove construction.
3. Rail Thickness: 2 inches (51 mm).
4. Stiles and Rails:

a. End Stiles, Bottom Rail and Top Rail: 4 inches (102 mm) face width.
b. Center Stiles and Intermediate Rails: 2 inches (51 mm) face width.
c. Assembled with through bolts for added strength and longevity.

B. Aluminum Full View Door:

1. Field Glazing: 1/8 inch (3 mm) tempered. (Door 126A)
2. Product: Model 3295 Aluminum Full View Door. Hollow Aluminum Rails.
3. Standards Compliance: ANSI/DASMA 105 and STC rating of 27.
4. Material: 6063-T6 Aluminum.

a. Finish: Clear anodized.

5. Rail Joints: Tongue and groove.

a. Integrated Bulb Seal: Between rails eliminating air and water infiltration.

6. Plank Sections: 24 inch (610 mm) high by width of door.
7. End Stiles: 8 inch (203 mm) face, thru bolted rails.
8. Center Stiles: 2 inch (51 mm) face, thru bolted rails.
9. Bottom Rail: 8 inch (203 mm) by full width of section.
10. Intermediate Rails: 2 inch (51 mm) by full width of section.
11. Top Rail: 8 inch (203 mm) by full width of section.
12. Tracks: 2 inches (51 mm).
13. Locking: Inside lock.
14. Field Glazing: 1/8 inch (3 mm) tempered. (Door 126A)
15. Field Glazing: 1/2 inch (13 mm) tempered insulated. (Door 125A)

2.4 COMPONENTS

A. Operation and Construction:

1. Electric operation.
2. Track and Operating Hardware: Standard lift. (Door 126A)
3. Track and Operating Hardware: Roof pitch. (Door 125A)
4. Tracks: 2 inches (51 mm) wide, roll-formed 16 gauge galvanized steel, gauge adjusted per design requirements. For doors up to 10 feet (3048 mm) high, 14 gauge for doors exceeding 10 feet (3048 mm) high.
5. Lower track sections adjustable for weathertight fit.
6. Horizontal tracks reinforced with minimum 13 gauge galvanized steel angle according

to door weight and size.

7. Track Mounting: Available in bracket mount, clip angle mount, angel mount, 12 inch (305 mm) radius.
8. Hardware:

    a. Hinges: 14 gauge galvanized steel.
    b. Roller Assemblies: Galvanized steel adjustable roller holders with floating hardened steel bearing rollers, located at top and bottom of each panel, each side.

        1) Rollers: 2 inch (51 mm) short-stem steel with 10 ball bearings.

9. Spring Counterbalance:

    a. Helically-wound, oil-tempered torsion springs mounted on cross-header shaft supported by galvanized steel ball bearing end plates and center carrier brackets as required.

10. Weatherstripping: (Door 125A)

    a. Bottom: Vinyl weather seal, full width of door.
    b. Head and Jamb: Flexible one-piece vinyl extrusions.

11. Lock Mechanism: Inside slide, adjustable keeper, spring activated.

B. Door Panel Configuration

1. Rectangular Vision Lites: 12 inches by 24 inches (395 mm by 610 mm) set with silicone sealant and screws.
2. Infill Panels, Insulated: Aluminum sheet, 16 gauge, located at bottom section.

C. Electric Operator:

1. Externally mounted on drive side of door. Liftmaster 98022 or equal.
2. Power Supply: 115 Volts AC single phase.
3. Control Station Power: 24 VDC.

D. Safety Reversing Device:

1. Safety Device: Photoelectric sensor; detect obstruction and reverse door without requiring door to contact obstruction.

E. Finish:

1. Color: White.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until work areas have been properly prepared.

B. If preparation is the responsibility of another installer, notify Architect of unsatisfactory conditions before proceeding.

3.2 INSTALLATION

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

B. Anchor to adjacent construction without distortion or stress.

C. Securely brace door tracks suspended from structure. Secure tracks to structural members only.

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

E. Position head and jamb weatherstripping to contact door sections when closed; secure in position.

F. Make wiring connections between power supply and operator and between operator and controls.

3.3 ADJUSTING

A. Adjust to operate smoothly throughout full operating range.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before substantial completion.

END OF SECTION

SECTION 08 4113

ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Aluminum entrance framing, fixed windows and entry doors.

B. Glazing.

1.2 SUBMITTALS

A. Submittals: Product Data, Shop Drawings, and color Samples.

1. For entrance doors, include hardware schedule.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Structural Performance: Design, engineer, fabricate, and install aluminum-framed storefronts to withstand structural loads indicated.

1. Limit deflection of framing members normal to wall plane to 1/175 of clear span or an amount that restricts edge deflection of individual glazing lites to 3/4 inch (19 mm), whichever is less.
2. Limit deflection of framing members parallel to glazing plane to L/360 of clear span or 1/8 inch (3.2 mm), whichever is smaller.

B. Structural Testing: Systems tested according to ASTM E 330 at 150 percent of inward and outward wind-load design pressures do not evidence material failures, structural distress, deflection failures, or permanent deformation of main framing members exceeding 0.2 percent of clear span.

C. Windborne-Debris Resistance: Framing system and doors pass basic-protection testing requirements in ASTM E 1996 for Wind Zone 3 when tested according to ASTM E 1886.

D. Air Infiltration: Limited to 0.06 cfm/sq. ft. of fixed framing and glass area when tested according to ASTM E 283 at a static-air-pressure difference of 1.57 lbf/sq. ft.

E. Water Penetration: Systems do not evidence water leakage when tested according to ASTM E 331 at minimum differential pressure of 20 percent of positive wind-load design pressure but not less than 6.24 lbf/sq. ft.

F. Thermal Transmittance (U-factor): Fixed glazing and framing areas shall have U-factor of not more than [0.45 Btu/sq. ft. x h x deg F.

2.2 ALUMINUM-FRAMED STOREFRONTS

A. Acceptable Maunfacturers

1. Kawneer
2. USG
3. Arcadia
4. Others in accordance with Specification Section 01 6300.

B. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated; ASTM B 209.

C. Framing Members: Manufacturer's standard extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads. Framing systems shall be Kawner 451 or equal.

1. Construction: Thermally broken

D. Doors: 1-3/4-inch- thick glazed doors with minimum 0.125-inch- thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods. Provide snap-on, extruded-aluminum glazing stops and preformed gaskets.

1. Door Design: Medium stile; 3-1/2-inch nominal width. Kawner 350 series.
2. Accessible Doors: Smooth surfaced for width of door in area within 12 inches above floor or ground plane.
3. Interior Doors: Provide BHMA A156.16 silencers, three on strike jamb of single-door frames and two on head of double-door frames.
4. Exterior Doors: Provide compression weather stripping at fixed stops. At other locations, provide sliding weather stripping retained in adjustable strip mortised into door edge.
5. Hardware: Manufacturer Standard push/pull, deadbolt lock, closer, threshold, weatherstripping, continuous hinges.

E. Glazing:

1. Door glazing tube 5/8" thick insulating glass clear over clear.
2. Window glazing to be 1" thick insulating glass, ¼" clear with low-E coating exterior and ¼" clear interior pane.

F. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.

G. Fasteners and Accessories: Compatible with adjacent materials, corrosion resistant, nonstaining, and nonbleeding. Use concealed fasteners except for application of door hardware.

H. Fabrication: Fabricate framing in profiles indicated for flush glazing (without projecting stops). Provide subframes and reinforcing of types indicated or, if not indicated, as required for a complete system. Factory-assemble components to greatest extent possible. Disassemble components only as necessary for shipment and installation.

1. Door Framing: Reinforce to support imposed loads. Factory-assemble door and frame units and factory-install hardware to greatest extent possible. Reinforce door and frame units for hardware indicated. Cut, drill, and tap for factory-installed hardware before finishing components.

I. Aluminum Finish: Class II, clear anodic finish.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Isolate metal surfaces in contact with incompatible materials, including wood, by painting contact surfaces with bituminous coating or primer or by applying sealant or tape recommended by manufacturer.

B. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.

C. Set continuous sill members and flashing in full sealant bed as specified in Section 079200 "Joint Sealants" to produce weathertight installation.

D. Install framing components true in alignment with established lines and grades to the following tolerances:

1. Variation from Plane: Limit to 1/8 inch in 12 feet; 1/4 inch over total length.
2. Alignment: For surfaces abutting in line, limit offset to 1/16 inch. For surfaces meeting at corners, limit offset to 1/32 inch.
3. Diagonal Measurements: Limit difference between diagonal measurements to 1/8 inch.

E. Install doors without warp or rack. Adjust doors and hardware to provide tight fit at contact points and smooth operation.

END OF SECTION

SECTION 08 5113

ALUMINUM WINDOWS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Extruded aluminum window field glazed.

B. Perimeter sealant.

1.2 RELATED SECTIONS

A. Section 07900 - Joint Sealers: Perimeter sealant and back-up materials.

1.3 REFERENCES

A. AAMA 101-88 - Specifications for Aluminum Windows.

B. AAMA 603.8 - Performance Requirements and Test Procedures for Pigmented Organic Coatings on Extruded Aluminum.

C. ASTM E283 - Rate of Air Leakage through Exterior Windows, Curtain Walls, and Doors.

D. ASTM E331 - Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

1.4 SYSTEM DESCRIPTION

A. Windows: Single thickness aluminum sections, shop fabricated, factory pre-finished, vision glass, related flashings, anchorage and attachment devices.

B. Configuration: Fixed.

C. Glazing: Interior.

1.5 PERFORMANCE REQUIREMENTS

A. Design and size components to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of wall to a design pressure of 25 lb/sq ft as measured in accordance with ASTM E330.

B. Limit member deflection to 1/200 with full recovery of glazing materials.

C. System to accommodate, without damage to components or deterioration of seals, movement between window and perimeter framing, deflection of lintel.

D. Limit air leakage through assembly to 0.16 cfm/ft. for sash, measured at a reference differential pressure across assembly of 1.57 psf as measured in accordance with ASTM E283.

E. Water Leakage: None, when measured in accordance with ASTM E331 with a test pressure difference of 6 lbf/sq ft.

F. Maintain continuous air and vapor barrier throughout assembly, primarily in line with inside pane of glass and heel bead of glazing compound.

G. Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to the exterior by a weep drainage network.

1.6 SUBMITTALS

A. Submit under provisions of Section 01340.

B. Shop Drawings: Indicate opening dimensions, framed opening tolerances, affected related work; and installation requirements.

C. Manufacturer's Certificate: Certify that Products meet or exceed specified requirements and furnish copies of test data.

1.7 QUALITY ASSURANCE

A. Perform Work in accordance with AAMA 101-88.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Section 01630.

B. Protect pre-finished aluminum surfaces with strippable coating. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.

1.9 ENVIRONMENTAL REQUIREMENTS

A. Do not install sealants when ambient temperature is less than 40 degrees F.

B. Maintain this minimum temperature during and after installation of sealants.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Kawneer

B. Substitutions in accordance with Section 1630

2.2 COMPONENTS (EXTERIOR WINDOWS)

A. Frames: Minimum 4½" inch wide section thermally broken with interior portion of frame insulated from exterior portion flush applied glass stops of snap-on type.

2.3 PRODUCTS

A. Non-operable Windows: Kawneer Trifab 45IT aluminum storefront. Color: Anodized Bronze.

2.4 GLASS AND GLAZING MATERIALS

A. Glass to be 1" insulating with Low E coating on surface 2. Sealed insulating glass, where used, shall meet SIGMA No. 65-7-2 and be of at least "A" quality.

2.5 SEALANT MATERIALS

A. Glass shall be set in channel type vinyl gaskets (marine glazing). Vinyl shall be of materials compatible with aluminum which will not promote corrosion and shall be resistant to deterioration by all forms of weathering and shall be suitably retained to maintain a watertight seal between the glass and its surrounding frame. Flexible vinyl, where used, shall be equal to Commercial Standard CS 230-60.

2.6 FABRICATION

A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.

B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.

C. Prepare components to receive anchor devices. Fabricate anchors.

D. Arrange fasteners and attachments to ensure concealment from view.

E. Prepare components with internal reinforcement for operating hardware.

F. Field glaze window units.

2.7 FINISHES

A. The exposed surfaces of all aluminum members shall be clean and free from serious surface blemishes. Painted finish to be electrostatic baked Fluropon and shall meet AAMA 605.2. Color: Anodized Bronze.

B. Apply one coat of bituminous paint to concealed aluminum [and steel] surfaces in contact with cementitious or dissimilar materials.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install window system in accordance with AAMA 101 - Specifications for Aluminum Windows.

B. Attach window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities.

C. Align window plumb and level, free of warp or twist. Maintain dimensional tolerances, aligning with adjacent work.

D. Provide thermal isolation where components penetrate or disrupt building insulation. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

E. Coordinate attachment and seal of perimeter air and vapor barrier materials.

F. Install operating hardware.

G. Install perimeter sealant to method required to achieve performance criteria.

3.2 CLEANING

A. Remove protective material from pre-finished aluminum surfaces.

B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.

C. Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.

END OF SECTION

SECTION 08 7100

FINISH HARDWARE

PART I - GENERAL

1.1 DESCRIPTION

A. Related Work:

1. Cabinet Hardware: Section 06 4100 Architectural Woodwork and 12304 Manufactured Cabinets and Casework.
2. Threshold Caulking: Section 07920 Joint Sealants.
3. Connecting Electrical Hardware: Division 16 - Electrical All wire, pulling of wire, and connections electric hardware are to be supplied by the Electrical Contractor. Wiring diagrams and riser diagrams to be furnished by the Finish Hardware Supplier.

1.2 QUALITY ASSURANCE

A. SUPPLIER QUALIFICATIONS: 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 20 years of Architectural Hardware experience, who shall be responsible for the detailing, scheduling, and ordering of the finish hardware for this Contract.

B. DESIGN CRITERIA: Provide Underwriter's Laboratory listed hardware for fire or accident hazard where scheduled or required to maintain rating of openings. Comply with requirements of door and door frame labels. Comply with NFPA No. 80 and local codes that are in effect in the area of the project.

1.3 SUBMITTALS

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

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

This schedule shall indicate the following details:

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

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

1.4 DELIVERY, STORAGE, AND HANDLING

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

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

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

1.5 WARRANTY

A. Furnish 1 copy of the following written warranty:

1. Warranty against mechanical failure of door closers for a 10 year period.
2. Warranty against failure of parts of all hardware except door closers for a period 1 year.
3. Warranty shall include cylinder locks.
4. Starting date for all warranty periods to be the date of substantial completion of building by owner.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A.	Butts:	Design Hdwr, Hager, Stanley, McKinney	DH
B.	Exit Devices:	Von Duprin, Falcon, Sargent	VON
C.	Door Closers:	Design HardwareLCN, Falcon, Norton	DH
D.	Locksets:	Design Hardware,Schlage	DH
E.	Thresholds & Weatherstrip:	National Guard, Reese, Zero	ZER
F.	Stops & Door Trim:	Ives, Trimco, Rockwood, Glynn Johnson	IVE
G.	Coordinators:	Ives, Glynn Johnson, DCI	IVE
H.	Auto Flush Bolts:	Ives, Glynn Johnson, DCI	IVE
I.	Auto Operators	NOT USED	LCN

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

2.2 SCHEDULED HARDWARE

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

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

2.3 MATERIALS AND FABRICATION

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

B. Base Metals: Produce hardware units of the basic metal and forming method indicated using the manufacturer's standard metal alloy, composition, temper, and hardness. Do not Furnish "Optional" materials or forming methods for those indicated except as otherwise specified.

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

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

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

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

2.4 BUTTS, HINGES, AND PIVOTS

A. Templates: Provide only template produced units.

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

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

1. Steel Hinges: Steel pins
2. Non-ferrous Hinges: Stainless steel pins
3. Exterior Doors: Non-removable pins (NRP)
4. Interior doors: Non-rising pins
5. Tips. Flat button and matching plug finished to match leaves

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

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

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

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

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

2.5 KEYING

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

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

C. All locksets and cylinders SHALL be keyed to the EXISTING SCHLAGE MASTERKEY SYSTEM and the instructions as provided by the Architect/Owner.

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

1. Five (5) Master Keys
2. Two (2) keys per lock or cylinder.

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

F. All keys shall be made of nickel silver. Stamp all keys with "DO NOT DUPLICATE".

2.6 CYLINDRICAL TYPE LOCKSETS

A. Heavy Duty Cylindrical Locks and Latches: Schlage "ND" Series. Fastened with through-bolts.

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

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

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

E. 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.

F. 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.

G. Springs: Full compression type.

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

2.7 DEADLOCKS

A. Deadlocks shall be cylindrical type with interior parts made of steel or bronze

B. All steel parts shall be bronze plated or coated with zinc-dichromate to resist rusting and corrosion.

2.8 CLOSER AND DOOR CONTROL DEVICES

A. Surface type door closers shall be fully hydraulic, full rack and pinion action with a one piece forged steel piston 1-1/2" diameter minimum at heavy duty closers, and have a cast iron case with a ten year warranty. Closers at fire rated doors shall be in compliance with UL 10 C and UBC 7.2 (1997) certified for positive pressure. Hydraulic fluid shall be of a type requiring no seasonal adjustments for temperatures from 120 degrees F. to -30 degrees F. Pinion shaft shall be minimum of 5/8" diameter. Barrier-free at all interior doors.

B. Separate adjusting valves shall be provided for closing speed, latching speed and backcheck.

C. Adjusting valves shall be of a metal material, concealed, adjustable only with special wrench, and shall be seated with "O" type rings.

D. All closers shall be supplied with forged steel main arms and out-swinging doors to be supplied with HEAVY DUTY forged steel parallel arms.

E. Closers shall NOT be supplied with "Pressure Relief Valves".

2.9 EXIT DEVICES

A. Provide all exit devices with roller strikes, deadlatching latchbolts, and fluid damper (to decelerate push pad on its return stroke thus reducing noises).

B. Lever Trim shall have a clutch "Break Away" mechanism. When locked, the lever feels locked but when 35 lbs. of torque are applied, the lever breaks away and travels to a 90-degree down position. To reset to its operating position a simple uplift motion of 15 lbs. or less of torque be applied. To further prevent damage to the interior parts or to the exit device, the lever spindle shall have a shear pin designed to break at 65 to 75 lbs. of torque.

C. Provide removable mullions that are easily removed by a single operation of the mortise cylinder.

D. Where exit devices are mounted on doors with raised glass beads / kits, supply the appropriate Glass Bead Kit for that condition.

2.10 ELECTRO-HYDRAULIC AUTOMATIC OPERATORS

A. Provide low energy automatic operator units with hydraulic closer complying with ANSI A156.19.

B. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.

C. Provide units with conventional door closer opening and closing forces unless power operator motor is activated. Provide door closer assembly with adjustable spring size, back-check, and opening and closing speed adjustment valves to control door.

D. Provide units with on/off switch for manual operation, motor start up delay, vestibule interface delay, electric lock delay, and door hold open delay.

E. Provide units with conventional door closer opening and closing forces unless power operator motor is activated. Provide door closer assembly with adjustable spring size, back-check valve, sweep valve, latch valve to control door.

F. Provide drop plates, brackets, or adapters for arms as required for details.

G. Provide hard-wired actuator switches for operation as specified.

H. Provide weather-resistant actuators at exterior applications.

I. Provide key switches with LED's, recommended and approved by manufacturer of automatic operator as required for function described in operation description of hardware group below. Cylinders: Refer to "KEYING" article, herein.

J. Provide complete assemblies of controls, switches, power supplies, relays, and parts/material recommended and approved by manufacturer of automatic operator for each individual leaf. Actuators control both doors simultaneously at pairs. Sequence operation of exterior and vestibule doors with automatic operators to allow ingress or egress through both sets of

openings as directed by Architect. Locate actuators, key switches, and other controls as directed by Architect.

K. Provide units with vestibule inputs that allow sequencing operation of two units, and SPDT relay for interfacing with latching or locking devices.

2.11 MISCELLANEOUS DOOR TRIM UNITS

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

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

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

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

E. Smoke Seal and astragals at all fire rated doors shall be in compliance with UL 10 C and UBC 7.2 (1997) for positive pressure.

2.12 TOOLS FOR MAINTENANCE

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

PART 3 - EXECUTION

3.1 INSTALLATION

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

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

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

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

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

3.2 PROTECTION

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

3.3 ADJUST AND CLEAN

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

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

C. Instruct Owner's personnel in proper adjustment and maintenance of hardware and hardware finishes during the final adjustment of hardware.

D. Adjust all closers to meet ADA Requirements for sweep time and opening force. Set the closer's backcheck valve to slow the doors opening from 85 degrees on.

3.4 HARDWARE SCHEDULE

A. It is intended the following schedule include all item of finish hardware necessary to complete the work. If a discrepancy is found in the schedule, such as a missing item, improper hardware for frame, door, or fire codes, the Preamble will be the deciding document.

B. All items shall be of proper type for attaching securely to type of material on which they occur.

C. The schedule of materials is as follows:

END OF SECTION

San Juan County

Extention Office

Hardware Schedule

Hardware Set: 01

Door Number:

100 -- PR LHR/RHR

100A -- PR LHR/RHR

2 EA - 3'0" x 7'0" x 1-3/4" ALD/ALF

Each To Have:

QTY		Description	Catalog Number		Finish	MFG
1	EA	Pivot Set	Provided by Aluminum Supplier		AL	KAW
1	EA	Exit Device	99-990NL 3'		626	VD
1	EA	Exit Device	99-990DT 3'		626	VD
1	EA	Mullion	KRM7		SP28	DH
1	EA	Mullion Seal	5110		BLK	PEM
1	EA	Rim Cylinder	20-057		626	SCH
1	EA	Mortise Cylinder	20-061		626	SCH
2	EA	FSIC Permanent Core	Provided & Installed by Owner			SCH
2	EA	Surface Closer	4040 XP RW/PA		689	LCN
1	EA	Electric Strike	RS300	ϟ	630	LOC
1	EA	Card Reader	Provided by Security Vendor	ϟ		
1	EA	Low Voltage Power	Provided by Security Vendor	ϟ		
2	EA	Door Position Switch	679-05	ϟ	BLK	SCE
1	EA	Remote Release	Proviced by Security Vendor	ϟ		
1	EA	Threshold	Provided by Aluminum Supplier		AL	KAW
1	EA	Gasketing	Provided by Aluminum Supplier		AL	KAW
2	EA	Sweep	Provided by Aluminum Supplier		AL	

FREE EGRESS AT ALL TIMES

OPEN HOURS: ACCESS CONTROL SCHEDULE CAN KEEP ELECTRIC STRIKE RELEASED DURING OPEN HOURS.

(HARDWARE SET: 01 TEXT CONTINUED NEXT PAGE)

HARDWARE SCHEDULE

SJC Extension Office

(HARDWARE SET: 01 TEXT CONTINUED FROM PREVIOUS PAGE)

CLOSED HOURS: AUTHORIZED CREDENTIAL OR SIGNAL FROM REMOTE RELEASE MOMENTARILY RELEASES ELECTRIC STRIKE ALLOWING ENTRY.

MECHANICAL KEY OVERRIDE.

DOOR CONTACT MONITORS WHEN DOOR OPENS OR CLOSES.

ON LOSS OF POWER, ELECTRIFIED HARDWARE IS DISABLED. DOOR IS LATCHED AND REMAINS SECURE

Hardware Set: 02

Door Number:

101 -- SGL LHR

124 -- SGL RHR

1 EA - 3'0" x 7'0" x 1-3/**4**" ALD/ALF

Each To Have:

QTY		Description	Catalog Number		Finish	MFG
1	EA	Pivot Set	Provided by Aluminum Supplier		AL	KAW
1	EA	Exit Device	99-990NL 3'		626	VD
1	EA	Rim Cylinder	20-057		626	SCH
1	EA	FSIC Permanent Core	Provided & Installed by			SCH
1	EA	Surface Closer	4040 XP RW/PA		689	LCN
1	EA	Electric Strike	RS300	ϟ	630	LOC
1	EA	Card Reader	Provided by Security Vendor	ϟ		
1	EA	Low Voltage Power	Provided by Security Vendor	ϟ		
1	EA	Door Position Switch	679-05	ϟ	BLK	SCE
1	EA	Remote Release	Proviced by Security Vendor	ϟ		
1	EA	Threshold	Provided by Aluminum Supplier		AL	KAW
1	EA	Gasketing	Provided by Aluminum Supplier		AL	KAW
1	EA	Sweep	Provided by Aluminum Supplier		AL	

FREE EGRESS AT ALL TIMES

OPEN HOURS: ACCESS CONTROL SCHEDULE CAN KEEP ELECTRIC STRIKE RELEASED DURING OPEN HOURS.

(HARDWARE SET: 02 TEXT CONTINUED NEXT PAGE)

(HARDWARE SET: 02 TEXT CONTINUED FROM PREVIOUS PAGE)

CLOSED HOURS: AUTHORIZED CREDENTIAL OR SIGNAL FROM REMOTE RELEASE MOMENTARILY RELEASES ELECTRIC STRIKE ALLOWING ENTRY.

MECHANICAL KEY OVERRIDE.

DOOR CONTACT MONITORS WHEN DOOR OPENS OR CLOSES.

ON LOSS OF POWER, ELECTRIFIED HARDWARE IS DISABLED. DOOR IS LATCHED AND REMAINS SECURE

Hardware Set: 03

Door Number:

103 -- SGL RHR

1 EA - 3'0" x 7'0" x 1-3/4" ALD/ALF

Each To Have:

QTY		Description	Catalog Number	Finish	MFG
1	EA	Pivot Set	Provided by Aluminum Supplier	AL	KAW
1	EA	Push/Pull Set	Provided by Aluminum Supplier		
1	EA	MS Lock	Provided by Aluminum Supplier	AL	KAW
1	EA	Mortise Cylinder	20-062	626	SCH
1	EA	Mortise Thumb Turn	Provided by Aluminum Supplier	626	
1	EA	Wall Stop	406/407 CCV	626	IVE
1	EA	Surface Closer	4040 XP RW/PA	689	LCN
1	EA	Gasketing	Provided by Aluminum Supplier	GRY	IVE

Hardware Set: 04

Door Number:

104A -- SGL LHR

1 EA - 3'0" x 7'0" x 1-3/4" ALD/ALF

Each To Have:

QTY		Description	Catalog Number	Finish	MFG
1	EA	Pivot Set	Provided by Aluminum Supplier	AL	KAW

(HARDWARE SET: 04 TEXT CONTINUED NEXT PAGE)

(HARDWARE SET: 04 TEXT CONTINUED FROM PREVIOUS PAGE)

1	EA	Exit Device	99-990NL 3'	626	VD
1	EA	Rim Cylinder	20-057	626	SCH
1	EA	FSIC Permanent Core	Provided & Installed by Owner		SCH
1	EA	Surface Closer	4040XP RW/PA	689	LCN
1	EA	Threshold	Provided by Aluminum Supplier	AL	KAW
1	EA	Gasketing	Provided by Aluminum Supplier	AL	KAW
1	EA	Sweep	Provided by Aluminum Supplier	AL	

Hardware Set: 05

Door Number:

128 -- SGL RHR

1 EA - 3'0" x 7'0" x 1-3/4" ALD/ALF

Each To Have:

QTY		Description	Catalog Number	Finish	MFG
1	EA	Pivot Set	Provided by Aluminum Supplier	AL	KAW
1	EA	Storeroom Lock	ND80TD RHO	626	SCH
1	EA	FSIC Permantent Core	Provided & Installed By Owner		SCH
1	EA	Surface Closer	4040XP RW/PA	689	LCN
1	EA	Electric Strike	NC450	630	LOC
1	EA	Card Reader	Provided by Security Vendor		
1	EA	Low Voltage Power	Provided by Security Vendor		
1	EA	Door Position Switch	679-05	BLK	SCE
1	EA	Threshold	Provided by Aluminum Supplier	AL	KAW
1	EA	Gasketing	Provided by Aluminum Supplier	AL	KAW
1	EA	Sweep	Provided by Aluminum Supplier	AL	

FREE EGRESS AT ALL TIMES

OPEN HOURS: AUTHORIZED CREDENTIAL MOMENTARILY RELEASES ELECTRIC STRIKE ALLOWING ENTRY.

(HARDWARE SET: 05 TEXT CONTINUED NEXT PAGE)

(HARDWARE SET: 05 TEXT CONTINUED FROM PREVIOUS PAGE)

CLOSED HOURS: AUTHORIZED CREDENTIAL MOMENTARILY RELEASES ELECTRIC STRIKE ALLOWING ENTRY.

MECHANICAL KEY OVERRIDE.

DOOR CONTACT MONITORS WHEN DOOR OPENS OR CLOSES.

ON LOSS OF POWER, ELECTRIFIED HARDWARE IS DISABLED. DOOR IS LATCHED AND REMAINS SECURE

Hardware Set: 06

Door Number:

115 -- SGL LH

129 -- SGL LH

1 EA - 3'0" x 7'0" x 1-3/4" WDD/HMF

Each To Have:

QTY		Description	Catalog Number	Finish	MFG
3	EA	Hinge	BB5 4.5"x4.5"	652	DH
1	EA	Entry Lockset	ND53TD RHO	626	SCH
1	EA	FSIC Permantent Core	Provided & Installed By Owner		SCH
1	EA	Surface Closer	4040XP RW/PA	689	LCN
1	EA	Protection Plate	8400 -- 10" x 34" B-CS	630	IVE
1	EA	Wall Stop	406/407 CCV	626	IVE
3	EA	Silencer	S64	GRY	IVE

Hardware Set: 07

Door Number:

103A -- SGL LH

104 -- SGL RHR

105 -- SGL RH

106 -- SGL LH

107 -- SGL RH

(HARDWARE SET: 07 TEXT CONTINUED NEXT PAGE)

(HARDWARE SET: 07 TEXT CONTINUED FROM PREVIOUS PAGE)

108 -- SGL RH

109 -- SGL LH

110 -- SGL RH

112 -- SGL LH

113 -- SGL RH

114 -- SGL RH

116 -- SGL LH

114 -- SGL RH

118 -- SGL LH

119 -- SGL RH

119A -- SGL LH

120 -- SGL RHR

123 -- SGL LH

125 -- SGL RH

126 -- SGL LH

130 -- SGL RHR

132 -- SGL RHR

136 -- SGL LH

1 EA - 3'0" x 7'0" x 1-3/4" WDD/HMF

Each To Have:

QTY		Description	Catalog Number	Finish	MFG
3	EA	Hinge	BB5 4.5"x4.5"	652	DH
1	EA	Entry Lockset	ND53TD RHO	626	SCH
1	EA	FSIC Permantent Core	Provided & Installed By Owner		SCH
1	EA	Wall Stop	406/407 CCV	626	IVE
3	EA	Silencer	S64	GRY	IVE

SJC Extension Office

Hardware Set: 08

Door Number:

121 -- SGL LHR

1 EA - 3'0" x 7'0" x 1-3/4" WDD/HMF

Each To Have:

QTY		Description	Catalog Number		Finish	MFG
3	EA	Hinge	BB5 4.5"x4.5" NRP		652	DH
1	EA	Storeroom Lock	ND80TD RHO		626	SCH
1	EA	FSIC Permantent Core	Provided & Installed By Owner			SCH
1	EA	Surface Closer	4040XP RW/PA		689	LCN
1	EA	Electric Strike	NC450	ϟ	630	LOC
1	EA	Card Reader	Provided by Security Vendor	ϟ		
1	EA	Low Voltage Power	Provided by Security Vendor	ϟ		
1	EA	Door Position Switch	679-05	ϟ	BLK	SCE
1	EA	Protection Plate	8400 -- 10" x 34" B-CS		630	IVE
1	EA	Wall Stop	406/407 CVX		626	IVE
3	EA	Silencer	S64		GRY	IVE

FREE EGRESS AT ALL TIMES

DOOR REMAINS LOCK AT ALL TIMES

AUTHORIZED CREDENTIAL MOMENTARILY RELEASES ELECTRIC STRIKE ALLOWING ENTRY.

MECHANICAL KEY OVERRIDE.

DOOR CONTACT MONITORS WHEN DOOR OPENS OR CLOSES.

ON LOSS OF POWER, ELECTRIFIED HARDWARE IS DISABLED. DOOR IS LATCHED AND REMAINS SECURE

SJC Extension Office

Hardware Set: 09

Door Number:

124A -- PR LHR/RHR

2 EA - 3'0" x 7'0" x 1-3/4" WDD/HMF

Each To Have:

QTY		Description	Catalog Number	Finish	MFG
6	EA	Hinge	BB5 4.5"x4.5" NRP	652	DH
1	EA	Exit Device	99-990NL 3'	626	VD
1	EA	Exit Device	99-990DT 3'	626	VD
1	EA	Mullion	KRM7	SP28	DH
1	EA	Mullion Seal	5110	BLK	PEM
1	EA	Rim Cylinder	20-057	626	SCH
1	EA	Mortise Cylinder	20-061	626	SCH
2	EA	FSIC Permanent Core	Provided & Installed by Owner		SCH
2	EA	Surface Closer	4040 XP RW/PA	689	LCN
2	EA	Protection Plate	8400 -- 10" x 35" B-CS	630	IVE
2	EA	Wall Stop	406/407 CVX	626	IVE
2	EA	Silencer	S64	GRY	IVE

Hardware Set: 10

Door Number:

127 -- PR LHR/RHR

2 EA - 3'0" x 7'0" x 1-3/4" WDD/HMF

Each To Have:

QTY		Description	Catalog Number	Finish	MFG
6	EA	Hinge	BB5 4.5"x4.5" NRP	652	DH
1	EA	Entry Lockset	ND53TD RHO	626	SCH
1	EA	FSIC Permantent Core	Provided & Installed By Owner		SCH
2	EA	Flush Bolt	555	626	RW

(HARDWARE SET: 10 TEXT CONTINUED NEXT PAGE)

(HARDWARE SET: 10 TEXT CONTINUED FROM PREVIOUS PAGE)

1	EA	Dust Proof Strike	DP112	626	IVE
2	EA	Wall Stop	406/407 CCV	626	IVE
2	EA	Silencer	S64	GRY	IVE

Hardware Set: 11

Door Number:

134 -- SGL RH

135 -- SGL LH

1 EA - 3'0" x 7'0" x 1-3/4" WDD/HMF

Each To Have:

QTY		Description	Catalog Number	Finish	MFG
3	EA	Hinge	BB5 4.5"x4.5"	652	DH
1	EA	DeadBolt	B663T	626	SCH
1	EA	FSIC Permantent Core	Provided & Installed By Owner		SCH
1	EA	Push Plate	30S 4x16	630	HAG
1	EA	Pull Plate	33E 4x16	630	HAG
1	EA	Surface Closer	4040 XP RW/PA	689	LCN
1	EA	Protection Plate	8400 -- 10" x 34" B-CS	630	IVE
1	EA	Wall Stop	406/407 CVX	626	IVE
3	EA	Silencer	S64	GRY	IVE

Hardware Set: 12

Door Number:

131 -- SGL RH

137 -- SGL LHR

1 EA 3'0" x 7'0" x 1-3/4" HMD/HMF

Each To Have:

QTY		Descri tion	Catalo Number	Finish	MFG
3	EA	Hinge	BB5 4.5"x4.5" NRP	652	DH
1	EA	Entry Lockset	ND53TD RHO	626	SCH
1	EA	FSIC Permantent Core	Provided & Installed By Owner		SCH
1	EA	Surface Closer	4040 XP RW/PA	689	LCN
1	EA	Protection Plate	8400 -- 10" x 34" B-CS	630	IVE
1	SET	Weather Strip	160S	A	NGP
1	EA	Threshold	425E	A	NGP
1	EA	Sweep	200NA	A	NGP

Hardware Set: 13

Door Number:

138 -- PR LHR/RHR

1 EA - 3'0" x 7'0" x 1-3/4" HMD/HMF

Each To Have:

QTY		Descri tion	Catalo Number
6	EA	Hinge	BB5 4.5"x4.5" NRP
1	EA	Storeroom Lock	ND80TD RHO
1	EA	FSIC Permantent Core	Provided & Installed By Owner
2	EA	Flush Bolt	555
1	EA	Dust Proof Strike	DP112
1	SET	Weather Strip	160S
1	EA	Threshold	425E
2	EA	Sweep	200NA

HARDWARE SCHEDULE

SJC Extension Office

Hardware Set: 14

Door Number:

133 -- PR LHR/RHR

2 EA - 3'0" x 7'0" x 1-3/4" HMD/HMF

Each To Have:

QTY		Descri tion	Catalo Number		Finish	MFG
6	EA	Hinge	BB5 4.5"x4.5" NRP		652	DH
1	EA	Exit Device	99-990NL 3'		626	VD
1	EA	Exit Device	99-990DT 3'		626	VD
1	EA	Mullion	KRM7		SP28	DH
1	EA	Mullion Seal	5110		BLK	PEM
1	EA	Rim Cylinder	20-057		626	SCH
1	EA	Mortise Cylinder	20-061		626	SCH
2	EA	FSIC Permanent Core	Provided & Installed by Owner			SCH
2	EA	Surface Closer	4040 XP RW/PA		689	LCN
2	EA	Protection Plate	8400 -- 10" x 35" B-CS		630	IVE
1	EA	Electric Strike	RS300	ϟ	630	LOC
1	EA	Card Reader	Provided by Security Vendor	ϟ		
1	EA	Low Voltage Power	Provided by Security Vendor	ϟ		
1	EA	Door Position Switch	679-05	ϟ	BLK	SCE
1	SET	Weather Strip	160S		A	NGP
1	EA	Threshold	425E		A	NGP
2	EA	Sweep	200NA		A	NGP

FREE EGRESS AT ALL TIMES

DOOR REMAINS LOCK AT ALL TIMES

AUTHORIZED CREDENTIAL MOMENTARILY RELEASES ELECTRIC STRIKE ALLOWING ENTRY.

MECHANICAL KEY OVERRIDE.

DOOR CONTACT MONITORS WHEN DOOR OPENS OR CLOSES.

ON LOSS OF POWER, ELECTRIFIED HARDWARE IS DISABLED. DOOR IS LATCHED AND REMAINS SECURE

SECTION 09 2900

GYPSUM BOARD SYSTEMS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Metal stud wall framing.

B. Metal channel ceiling framing.

C. Gypsum board.

D. Taped and sanded joint treatment.

E. Texture finish.

1.2 RELATED SECTIONS

A. Section 06 1000 - Wood Blocking and Curbing.

B. Section 07 2100 - Thermal Insulation.

C. Section 09 9623 - Painting: Surface Finish.

1.3 REFERENCES

A. ASTM C36 - Gypsum Wallboard.

B. ASTM C79 - Gypsum Sheathing Board.

C. ASTM C475 - Joint Treatment Materials for Gypsum Wallboard Construction.

D. ASTM C630 - Water Resistant Gypsum Backing Board.

E. ASTM C645 - Non-Load (Axial) Bearing Steel Studs, Runners (Track), and Rigid Furring Channels for Screw Application of Gypsum Board.

F. ASTM C754 - Installation of Framing Members to Receive Screw Attached Gypsum Wallboard, Backing Board, or Water Resistant Backing Board.

G. ASTM C840 - Application and Finishing of Gypsum Board.

H. ASTM C1002 - Steel Drill Screws for the Application of Gypsum Board.

I. GA-216 - Recommended Specifications for the Application and Finishing of Gypsum Board.

J. GA-600 - Fire Resistance Design Manual.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 3400.

B. Shop Drawings: Indicate special details associated with fireproofing, and acoustical seals.

C. Product Data: Provide data on metal framing, gypsum board, joint tape and accessories.

D. Samples: Submit two samples of pre-decorated gypsum board, 24 x 24 inch in size illustrating finish and texture.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with GA-216.

B. Maintain one copy of document on site.

1.6 QUALIFICATIONS

A. Applicator: Company specializing in performing the work of this section with minimum five years documented experience.

PART 2 - PRODUCTS

2.1 MANUFACTURERS - GYPSUM BOARD SYSTEM

A. Gypsum Board Products

1. United States Gypsum
2. Centex
3. Georgia-Pacific
4. Gold Bond

B. Metal Framing and Accessories

1. United States Gypsum
2. Dale/Incor
3. Deitrich
4. Gold Bond

2.2 PANEL PRODUCTS

A. Interior Bearing Walls - See Structural.

B. Studs and Tracks: ASTM C645; galvanized sheet steel, 25 gage shape, with knurled faces, or other noted on plans and details.

C. Furring, Framing and Accessories: ASTM C645. and GA-216

D. Fasteners: ASTM C1002. and GA-216.

E. Anchorage to Substrate: Tie wire, screws and other metal supports, of type and size to suit application; to rigidly secure materials in place.

F. Adhesive: GA-216.

2.3 GYPSUM BOARD MATERIALS

A. Fire Rated Gypsum Board: ASTM C36; fire resistive type, UL rated; 5/8 inch thick, maximum permissible length; ends square cut, tapered edges.

B. Water - Resistant (WR): 5/8 inch thick maximum permissible length; ends square cut, tapered edges. Provide at restrooms plumbing fixture wall.

2.4 ACCESSORIES

A. Acoustical Insulation: See Section 07 2100.

B. Corner Beads: Dura-Bead by USG or equal.

C. Edge Trim: 200 A Metal Trim by USG or equal.

D. Joint Materials: ASTM C475; reinforcing tape, joint compound, adhesive, and water.

E. Fasteners: ASTM C1002, Type S and S12.

PART 3 - EXECUTION

3.1 METAL STUD INSTALLATION

A. Install studs in accordance with GA-216. See Specification Section 05 4000.

B. Metal Stud Spacing: 16 or 24 inches on center.

C. Refer to Drawings for indication or partitions extending to finished ceiling only and for partitions extending through the ceiling to the structure above. Maintain clearance under structural building members to avoid deflection transfer to studs. Provide extended leg ceiling runners.

D. Door Opening Framing: Install double studs at door frame jambs. Install stud tracks on each side of opening, at frame head height, and between studs and adjacent studs.

E. Blocking: Screw nail wood blocking to studs. Install blocking for support of plumbing fixtures, toilet partitions, wall cabinets, toilet accessories, hardware, and other surface mounted equipment.

3.2 CEILING FRAMING INSTALLATION

A. Install in accordance with GA-216.

B. Coordinate location of hangers with other work. Provide wire hangers at4'-0" o.c. each way and maximum 6" from the ends.

C. Install ceiling framing independent of walls, columns, and above ceiling work.

D. Reinforce openings in ceiling suspension system which interrupt main carrying channels or furring channels, with lateral channel bracing. Extend bracing minimum 24 inches past each end of openings.

E. Laterally brace entire suspension system.

3.3 GYPSUM BOARD INSTALLATION

A. Install gypsum board in accordance with GA-216.

B. Erect single layer standard gypsum and Fiberbound board horizontal-vertical, with ends and edges occurring over firm bearing.

C. Erect exterior gypsum sheathing horizontally, with edges butted tight and ends occurring over firm bearing.

D. Use screws when fastening gypsum board to metal furring or framing.

3.4 JOINT TREATMENT

A. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.

B. Feather coats onto adjoining surfaces so that camber is maximum 1/32 inch.

C. Taping, filling, and sanding is not required at surfaces behind adhesive applied ceramic tile.

3.5 TEXTURE FINISH

A. Hand apply drywall joint compound to smooth sanded wall with light skip "Mediterranean" texture.

B. Sand texture as required to have minimal relief.

C. Provide 4' x 4' sample of texture for Architect approval prior to starting on walls.

3.6 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

B. Maximum variance under wallcoverings shall be 1/16 inch per foot.

3.7 SCHEDULE

A. Provide Type 'x' gypsum board at all areas not listed below.

B. Water Resistant in all restrooms, at plumbing fixture wall.

END OF SECTION

SECTION 09 5113

SUSPENDED CEILINGS

PART 1 GENERAL

1.1 WORK INCLUDED

A. Non-fire rated suspended metal grid systems complete with wall trim.

B. Lay-in ceiling boards; non-fire rated.

C. Lay-in cleanable kitchen tile.

D. Exterior ceiling support system.

1.2 RELATED WORK

A. Lighting fixtures within ceiling system.

B. Air Diffusers within ceiling system.

1.3 REFERENCE STANDARDS

A. ASTM C-635, Metal Suspension Systems for Acoustical Tile and Lay-in Panel Systems.

B. ASTM C-636, Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.

C. ASTM E-413, Classification for Determination of Sound Transmission Class.

D. FS SS-S-118A, INT AMD 4, Sound Controlling Blocks and Boards (Acoustical Tiles and Panels, Prefabricated).

1.4 ENVIRONMENTAL CONDITIONS

A. DO NOT install acoustical ceilings until building is enclosed, sufficient heat is provided, dust generating activities have terminated and overhead mechanical and electrical work is completed, tested and approved.

B. Permit wet work to dry prior to commencement of installation.

C. Maintain uniform temperatures of minimum 60 degrees F. and humidity of 20% to 40% prior to, during and after installation.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Manufacturers:

1. USG Interiors, Inc.
2. Armstrong Cork Co.
3. The Celotex Corp.

B. Substitutions: Items of same function and performance are acceptable in conformance with Section 01 6300.

2.2 SUSPENSION SYSTEM

A. Type and Manufacturer: Non-fire rated 200 Snap-Grid Systems manufactured by Chicago Metallic Corporation, conforming to ASTM C-635 intermediate duty system. Color as selected. Donn and Armstrong are approved substitutes.

B. Accessories: Stabilizer bars, splices, edge moldings, and hold down clips as required to complete and complement suspended ceiling grid system.

C. Materials/Finish: Commercial quality cold rolled steel with galvanized coating; finish on exposed surfaces.

D. Carrying Channels and Hangers: Galvanized steel, size and type to suit application and to rigidly secure the complete acoustic unit ceiling system, with maximum deflection of 1/360.

E. Exterior Ceiling System: USG Suspension Grid, Type APC-1.

1. Grid - DGLW 1½" concealed suspension. Install in accordance with manufacturer's specifications. Provide steel studs compression post as detailed.

2.3 LAY-IN PANELS

A. Type I - 24" x 48" by 5/8" thick; Lay-in fire-retardant mineral fiber; factory applied washable white vinyl latex paint finish, NRC .55. Armstrong Cortega, second look II, No. 2767.

B. Kitchen Tile: Vinyl covered, 2 x 4 x ⅝". USG Climaplus performance or Armstrong Kitchen Zone.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install acoustical ceiling systems in accordance with ASTM C-636 to produce finished ceiling true to lines and levels and free from warped, soiled or damaged grid or lay-in panels.

B. Do not install any tile less than half a tile without approval of the architect. Center tile in room unless directed otherwise.

C. Install acoustical ceiling systems in accordance to U.B.C. Standards. Section 47.1812, 47.1813, and 47.1814. These sections are included herein;

1. Installation - Sec. 47.1812.

a. Vertical Hangers: Suspension wires shall be not smaller than No. 12 gage spaced at 4 feet on center along each main runner unless calculations justifying the increased spacing are provided.

Each vertical wire shall be attached to the ceiling suspension member and to the support above with a minimum of three turns. Any connection device at

the supporting construction shall be capable of carrying not less than 100 pounds.

Suspension wires shall not hang more than 1 in 6 out-of-plumb unless counter sloping wires are provided.

Wires shall not attach to or bend around interfering material or equipment. A trapeze or equivalent device shall be used where obstructions preclude direct suspension. Trapeze suspensions shall be a minimum of back-to-back 1-1/4 inch cold-rolled channels for spans exceeding 48 inches.

b. Perimeter Hangers: The terminal ends of each cross runner and main runner shall be supported independently a maximum of 8 inches from each wall or ceiling discontinuity with No. 12 gage wire or approved wall support.

c. Lateral Force Bracing: Where substantiating design calculations are not provided, horizontal restraints shall be effected by four No. 12 age wires secured to the main runner within 2 inches of the cross runner intersection and splayed 90 degrees from each other at an angle not exceeding 45 degrees from the plan of the ceiling. These horizontal restraint points shall be placed 12 feet on center in both directions with the first point within 4 feet from each wall. Attachment of the restraint wires to the structure above shall be adequate for the load imposed.

d. Perimeter Members: Unless perimeter members are a structural part of the approved system, wall angles or channels shall be considered as aesthetic closers and shall have no structural value assessed to themselves or their method of attachment to the walls. For tile ceilings, ends of main runners and cross members shall be tied together to prevent their spreading.

e. Attachment of Members to the Perimeter: To facilitate installation, main runners and cross runners may be attached to the perimeter member at two adjacent walls with clearance between the wall and the runners maintained at the other two walls or as otherwise shown or described for the approved system.

2. Lighting Fixtures - Sec. 47.1813: Only "intermediate" and "heavy duty" ceiling systems as defined in Section 47.1802 may be used for the supporting of lighting fixtures.

All lighting fixtures shall be positively attached to the suspended ceiling system. The attachment device shall have a capacity of 100 percent of the lighting fixture weight acting in any direction.

When "intermediate" systems are used, No. 12 gage hangers shall be attached to the grid members within 3 inches of each corner of each fixture. Tandem fixtures may utilize common wires.

Where "heavy-duty" systems are used, supplemental hangers are not required if a 48-inch modular hanger pattern is followed. When cross runners are used without supplemental hangers to support lighting fixtures, these cross runners must provide the same carrying capacity as the main runner.

Lighting fixtures weighing more than 20 pounds but less than 56 pounds shall have, in addition to the requirements outlined above, two No. 12 gage hangers connected from the fixture housing to the ceiling system hangers or to the structure above. These wires may be slack.

Lighting fixtures weighing 56 pounds or more shall be supported directly from the structure above by approved hangers.

Pendant-hung lighting fixtures shall be supported directly from the structure above using No. 9 gage wire or approved alternate support without using the ceiling suspension system for direct support.

3. Mechanical Services - Sec. 47-1814: Ceiling mounted air terminals or services weighing less than 20 pounds shall be positively attached to the ceiling suspension main runners or to cross runners with the same carrying capacity as the main runners.

   Terminals or services weighing more than 20 pounds but less than 56 pounds, in addition to the above, shall have two No. 12 gage hangers connected from the terminal or service to the ceiling system hangers or to the structure above. These wires may be slack.

   Terminals or services weighing more than 56 pounds shall be supported directly from the structure above by approved hangers.

D. Install ceiling systems in a manner capable of supporting all superimposed loads, with maximum permissible deflection of 1/360 of span and maximum surface deviation of 1/8 inch in 10 ft. (1/960).

E. Install after all above-ceiling work is complete. Coordinate the location of hangers with other work. Ensure the layout of hangers and carrying channels is located to accommodate fittings and units of equipment which are to be placed after the installation of ceiling grid systems.

F. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest adjacent hangers and related carrying channels as required to span the required distance.

G. Supply hangers or inserts for installation to the respective section in ample time and with clear instructions for their correct placement. If steel deck is not supplied with hanger tabs, coordinate the installation of hanger clips during steel deck erection. Provide additional hangers and inserts as required.

H. Hang independently of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of the longitudinal axis or face plans of adjacent members.

I. Lay-out according to drawings.

J. Do not install fixtures so that main runners and cross runners will be eccentrically loaded. Where fixture installation would produce rotation of runners, provide stabilizer bars.

K. Install edge moldings at intersection of ceiling and vertical surfaces, using maximum lengths, straight, true to line and level. Miter corners. Provide edge moldings at junctions with other ceiling finishes.

L. Fit acoustic lay-in panels in place, free from damaged edges or other defects detrimental to appearance and function. Fit border units neatly against abutting surfaces.

M. Install lay-in panels level, in uniform plane and free from twist, warp and dents.

N. Install hold-down clips on all lay-in panels to hold such panels tight to grid system where within 20 ft. of an exterior door.

3.2 ADJUSTMENTS

A. Adjust any sags or twists which develop in the ceiling systems and replace any part which is damaged or faulty.

3.3 EXTRA TILE

A. Provide Owner with two cartons of extra tile of each type installed.

END OF SECTION

SECTION 09 6519

LVT FLOORING/BASE

PART 1 GENERAL

1.1 WORK INCLUDED

A. Preparation of substrate surfaces.

B. Application of Vinyl-Plank Floor.

C. Application of Vinyl Base.

D. Cleaning of all surfaces of areas of work.

1.2 RELATED WORK

A. Section 03 3000: Finish troweling of floor slab.

1.3 REFERENCES

A. FS SS-T-312 - Tile, Floor: Asphalt, Rubber, Vinyl, Vinyl-Asbestos, Vinyl Composition.

B. FS L-F-450 - Flooring, Vinyl Plastic.

C. FS SS-W-40 - Wall Base: Rubber and Vinyl Plastic.

1.4 SAMPLES

A. Submit samples in accordance with Section 01 3400.

B. Include duplicate 3 inch x 3 inch sized samples of each flooring material, color and pattern to be selected by Architect/Engineer.

C. Include duplicated 1-1/2 inch long samples of base.

1.5 EXTRA MATERIAL

A. Deliver two boxes of each color and pattern of floor material required for project, for maintenance use.

B. Clearly identify each box/roll.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Aladdin, Grass Valley or Mekong Delta

B. Earthwerks

C. EF Contract, Milange 2.5mm or Facet

D. Substitutions in accordance to Section 01 6300.

2.2 FLOOR COVERING MATERIALS

A. Flooring Type 1: Vinyl Plank Floor: Conforming to ASTM 1700-04 Class III; 7 x 48 inch x .12 inch thick; Earthworks, Chassis Pro, color selected by Architect/Engineer. 20 mil wear layer minimum.

2.3 BASE MATERIALS

A. Base: Conforming to Type TS, Group 1, rubber, 4 inches by 1/8 thick, color selected by Owner, manufactured by Flexco, Roppe Rubber or Johnsonite.

2.4 ACCESSORIES/ADHESIVES/SEALERS

A. Edge Strips: 2 part, Snap in Reducer type; smooth finish; color selected by Owner. 1" width. Provide at LVT to carpet transitions

B. Primers and Adhesives: Waterproof; of types recommended by resilient flooring manufacturer for specific material.

C. Sealer and Wax: Type recommended by resilient flooring manufacturer for type and location.

PART 3 EXECUTION

3.1 SITE AND SUBSTRATE CONDITIONS

A. Ensure floor surfaces are smooth and flat with maximum variation of 1/8 inch in 10 feet (1/960).

B. Ensure concrete floors are dry and exhibit negative alkalinity, carbonization or dusting.

C. Maintain minimum 70 deg. F. air temperature at flooring installation area for 3 days prior to, during, and for 24 hours after installation.

D. Store flooring materials in area of application. Allow 3 days for material to reach equal temperature as area.

3.2 LEVELING

A. Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler.

B. Clean floor and apply, trowel and float filler to leave smooth, flat hard surface. Prohibit traffic until filler is cured.

3.3 INSTALLATION - FLOORING

A. Open floor tile cartons, enough to cover each area, and mix tile to ensure shade variations do not occur within any one area.

B. Clean substrate. Spread cement evenly in quantity recommended by manufacturer to ensure adhesion over entire area of installation. Spread only enough adhesive to permit installation of flooring before initial set.

C. Set flooring in place, press with heavy roller to ensure full adhesion.

D. Lay flooring with joints and seams parallel to building lines to produce minimum number of seams.

E. Install with minimum tile width 1/2 full size at room or area perimeter, to square grid pattern with all joints aligned.

F. Terminate resilient flooring as shown on drawings. If not indicated at centerline of door openings where adjacent floor finish is dissimilar.

G. Install edge strips at unprotected or exposed edges where flooring terminates.

H. Scribe flooring to walls, columns, cabinets, floor outlets and other appurtenances to produce tight joints. Gaps greater than 1/16" around door frames will be rejected and replaced.

3.4 INSTALLATION - BASE

A. Fit joints tight and vertical. Maintain minimum measurement of 18 inches between joints.

B. Miter internal corners. Use pre-molded sections for external corners and exposed ends.

C. Install base on solid backing. Adhere tightly to wall and floor surfaces.

D. Scribe and fit to door frames and other obstructions.

E. Provide base at all cabinet work.

F. Install straight and level to variation of plus or minus 1/8 inch over 10 feet.

3.5 PROTECTION

A. Prohibit traffic from floor finish for 48 hours after installation.

3.6 CLEAN-UP

A. Remove excess adhesive from floor, base and wall surfaces without damage.

B. Clean floor and base surfaces in accordance with manufacturer's recommendations.

END OF SECTION

SECTION 09 6816

CARPET TILE

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data and Samples.

B. Extra Materials: Deliver to Owner full-width carpet equal to 5 percent of each type and color installed, packaged with protective covering for storage.

PART 2 - PRODUCTS

2.1 CARPET - is based upon the following product. Substitutions per Specification Section 01 6300.

A. Manufacturer: Philadelphia Commercial, Change in Altitude TL.
Fiber: 100% Eco*solution 100 Nylon
Width: 24" x 24"
Gauge: 1/10
Yarn Weight: 26 oz./yd.
Color: Get a Grip. Lay in ¼ turn pattern

2.2 INSTALLATION ACCESSORIES

A. Carpet Adhesives: Product that complies with flammability requirements for installed carpet and is recommended by carpet manufacturer for conditions indicated.

1. Low-Emitting Materials: Adhesives shall have a VOC content of 50 g/L or less.

B. Seam Adhesive: Hot-melt adhesive tape or similar product recommended by carpet manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with CRI 104.

B. Carpet Installation Method: Direct glue down.

1. Maintain uniformity of carpet direction and lay of pile. At doorways, center seams under door in closed position. Bind or seal cut edges as recommended by carpet manufacturer.
2. Install pattern parallel to walls and borders.

END OF SECTION

SECTION 09 7720

DECORATIVE FIBERGLASS REINFORCED WALL PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Prefinished polyester glass reinforced plastic sheets and adhered to unfinished gypsum.

B. Products Not Furnished or Installed under This Section: Gypsum substrate board.

1.2 RELATED SECTIONS

A. Section 09 2900 - Gypsum substrate board.

B. Section 05 4000 - Metal Stud Framing.

C. Section 09 9623 - Painting.

D. Section 09 6519 - Resilient Base.

1.3 REFERENCES

A. American Society for Testing and Materials:
Standard Specifications (ASTM)
ASTM D 790 - Flexural Strengths (psi)
ASTM D 790 - Flexural Modulus (psi)
ASTM D 638 - Tensile Strengths (psi)
ASTM D 638 - Tensile Modulus (psi)
ASTM D 2583 - Barcol Hardness
ASTM D 256 - Izod Impact Strengths (ft #/in)
ASTM D 696 - Thermal Coefficient of Lineal Expansion (in/in/F)
ASTM D 570 - Water Absorption (%)
ASTM D 792 - Specific Gravity
ASTM D 3359 - Cross-cut Adhesion
ASTM D 3273 - Mold & Mildew
ASTM D 5319 - Standard Specification for Glass-Fiber Reinforced Polyester Wall and Ceiling Panels.
ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's data to indicate compliance with these specifications, including: Storage, handling and preparation instructions and recommendations. Installation instructions.

B. Shop Drawings: Submit elevations of each wall showing location of paneling and trim members with respect to all discontinuities in the wall elevation.

C. Selection Samples: Submit manufacturer's standard color pattern selection samples representing manufacturer's full range of available colors and patterns.

D. Samples for Verification: Submit appropriate section of panel for each finish selected indicating the color, texture, and pattern required. Submit complete with specified applied finish. For selected patterns show complete pattern repeat. Exposed Trim Molding: Provide samples of each type, finish, and color.

1.5 QUALITY ASSURANCE

A. Conform to building code requirements for interior finish for smoke and flame spread requirements as tested in accordance with: ASTM E 84 (Method of test for surface burning characteristics of building Materials)

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver materials factory packaged on strong pallets.

B. Store panels and trim lying flat, under cover and protected from the elements. Allow panels and adhesive to acclimate to room temperature (range of 60 to 75°F) for 48 hours prior to installation.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Building are to be fully enclosed prior to installation with heat (70° or similar room temperature) and ventilation consistent with good working conditions for finish work.

B. During installation and for not less than 48 hours before, maintain an ambient temperature and relative humidity within limits required by type of adhesive used and recommendation of adhesive manufacturer. Provide ventilation to disperse fumes during application of adhesive as recommended by the adhesive manufacturer.

1.8 WARRANTY

A. Furnish one-year guarantee against defects in material.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURER

A. Marlite; 1 Marlite Drive, Dover, OH 44622. 800-377-1221 FAX (330) 343-4668 Email: info@marlite.com www.marlite.com.

B. Product: Symmetrix™ SmartSeam FRP Panels with Sani-coat Sealer

2.2 PANELS

A. Fiberglass reinforced thermosetting polyester resin panel sheets complying with ASTM D 5319. Finishing: BlueSky™ Advanced Finishing System: Spray-applied Sani-coat Sealer covers entire panel including grooves and features water-based coatings and controlled, low-temperature inline curing.

Dimensions:

Thickness – 0.090" (2.29mm) nominal
Width – [4'-0" (1.22m)] nominal
Length – [4'-0" (1.22m)] [8'0" (2.44m)] [As indicated on the drawings] nominal

Tolerance:
Length and Width: +/-1/8" (3.175mm)
Square - Not to exceed 1/8" for 4' (1.2m) panels, 8' (2.4m) panels or 5/32" (3.96mm) for 10' (3.0m) panels

B. Back Surface: Smooth. Imperfections which do not affect functional properties are not cause for rejection.

C. Front Surface: Smooth in accordance with pre-approved sample. Marlite Symmetrix SmartSeam FRP Panels with Sani-coat Sealer are available in a variety of panel colors, groove colors, finishes, tile patterns, groove directions, tile sizes and panel sizes.

D. Panel Color and Groove Color:

1. To be selected from full standard line.

E. Finish Gloss Level:

1. Satin

F. Tile Pattern, Groove Direction, Tile Size & Panel Size:

1. Subway Horizontal Direction

a) 6" x 3" tiles, panel size 4' x 4' nominal

2.3 TRIM MOLDING

A. PVC Trim: Thin-wall semi-rigid extruded PVC. Use only as needed.
M 350 Inside Corner, 8' length.

2.4 ACCESSORIES

A. Adhesive: Either of the following construction adhesives complying with ASTM C 557. Marlite C-551 FRP Adhesive - Water- resistant, non-flammable adhesive. [3.5 gallon can]. Use over porous subwall only, such as unfinished drywall.

PART 3 - EXECUTION

3.1 PREPARATION

A. Examine sub wall to determine that corners are plumb and straight, surfaces are smooth, uniform, clean and free from foreign matter, nails countersunk, joints and cracks filled flush and smooth with the adjoining surface. Verify that stud spacing does not exceed 24" (61cm) on-center.

B. Repair defects prior to installation. Level wall surfaces to panel manufacturer's requirements. Remove protrusions and fill indentations.

3.2 INSTALLATION

A. Comply with manufacturer's recommended procedures and installation sequence.

B. Cut panels to meet supports allowing 1/8" (3 mm) clearance for every 8 feet (2.4m) of panel. Cut and drill with carbide tipped saw blades or drill bits or cut with shears.

C. Apply panels to board substrate, above base, vertically oriented with seams plumb and pattern aligned with adjoining panels. Install panels with manufacturer's recommended gap for panel field and corner joints. Adhesive trowel and application method to conform to adhesive manufacturer's recommendations. For interlocking SmartSeam Panels (non-continuous vertical joints, i.e. subway groove configuration), apply Marlite C-109 Low VOC Cartridge adhesive using swirl technique at jagged panel edges.

D. Apply panel moldings to all panel edges using silicone sealant providing for required clearances. All moldings must provide for a minimum 1/8" (3mm) of panel expansion at joints and edges, to insure proper installation. Apply sealant to all moldings, channels and joints between the system and different materials to assure watertight installation.

3.3 CLEANING

A. Remove excess sealant from panels and moldings. Wipe panel down using a damp cloth and mild soap solution or cleaner.

B. Refer to manufacturer's specific cleaning recommendations Do not use abrasive cleaners.

END OF SECTION

SECTION 09 9623

PAINTING

PART 1 GENERAL

1.1 RELATED DOCUMENT

A. The Drawings and General Conditions of the Contract, including General Conditions and Supplementary General Conditions, apply tot he work specified in this Section.

1.2 DESCRIPTION OF WORK

A. Extent of Painting: Gypsum board, H.M. frames/doors. Sealing of CMU. Pipe Bollards. Paint striping.

B. Miscellaneous Surfaces: Paint doors and frames, and similar items with gloss enamel in decorator colors as selected.

C. Excluded Items: The following items and surfaces are specifically excluded from painting requirements.

1. Materials with factory-applied finish coats, except for matching touch-up requirements and roof-mounted units.
2. Materials which have integral color finish, such as aluminum, glass, floor coverings, acoustical tile and integral color plaster.

1.3 QUALITY ASSURANCE

A. Single Source Responsibility: Provide primers and other undercoat paint produced by same manufacturer, and use only within recommended limits.

1.4 SUBMITTALS

A. Submit a complete list of all paints and coatings proposed for use on the project, along with all manufacturer's data required to establish equality and conformance with the Specifications. Substitutions are not permitted after approval of submittal data.

B. Colors: Colors as selected by the Architect from the manufacturer's standard color line. Use only factory mixed colors, except that minor tinting may be performed on the job as required.

1.5 DELIVERY AND STORAGE

A. Deliver and store materials in the manufacturer's original containers with labels intact and seals unbroken. Labels shall bear the manufacturer's name, product name, product identification number or formula, date of manufacture and pot life (or use deadline date) and printed directions for the use of the material.

B. Storage: Store paint materials only in well ventilated areas set aside for the purpose. Protect the floors and walls from paint stains. Keep spaces clean and orderly. Store rags, paint solvents, and similar items in closed metal containers at all times.

1.6 JOB CONDITIONS

A. Acceptance of Surface: The application of any paint or coating shall constitute acceptance of that surface as suitable. Correct surface defects as required. In the event of incompatibility of materials, the problem shall be resolved prior to any application.

B. Lighting: Provide not less than twenty (20) foot candles illumination for all surfaces to be painted or coated.

1.7 ACCEPTABLE MANUFACTURERS

A. Available Manufacturers: Products by the following manufacturing companies are acceptable when the specific products are certified by an independent testing laboratory as meeting the requirements in paragraph 8.2.

Diamond Vogel
Dunn Edwards Mfg. Company
PPG Industries, Pittsburgh Paints
The Sherwin-Williams Company

PART 2 PRODUCTS

2.1 MATERIALS

A. Unless specifically approved as required under submittals paragraph in this Section, the paints shall be the first quality manufactured line and shall meet all requirements of this Specification and shall be manufactured by companies specified herein, or an acceptable substitution. Use only oils, thinners and driers as recommended by the paint products.

B. The paint must meet or exceed the following standards as determined by these test methods: Opacity (TT-P-141 #4121), Reflectance (TT-P-141 #6121), and Scrubbability (ASTM D2486-70).

LATEX	SCRUB CYCLES	OPACITY	REFLECTANCE
Interior Flat	350	0.975	89.0
Interior Semi-Gloss	800	0.978	89.0
Exterior Flat	550	0.966	89.0
Exterior Semi-Gloss	800	0.978	89.0
ALKYD			
Interior Semi-Gloss	1000	0.970	87.0
Interior Gloss	1000	0.970	89.0
Exterior Semi-Gloss	1000	0.970	87.0
Exterior Gloss	1000	0.970	89.0

PART 3 EXECUTION

3.1 SURFACE PREPARATION

A. General: Perform preparation and cleaning procedures in accordance with paint manufacturer's instructions and as herein specified, for each particular substrate condition.

B. Wood: Clean wood surfaces to be painted of dirt, oil, or other foreign substances with scrapers, and sandpaper, as required. Sandpaper smooth those finished surfaces exposed to view, and dust off. Scrape and clean small, dry, seasoned knots and apply a thin coat of white shellac or other recommended knot sealer, before application of priming coat. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sandpaper smooth when dried.

1. When transparent finish is required, use spar varnish for backpriming.

C. Ferrous Metals: Clean ferrous surfaces, which are not galvanized or shop-coated, of oil, grease, dirt, loose mill scale and other foreign substances by solvent or mechanical cleaning.

1. Touch-up shop-applied prime coats wherever damaged or bare, where required by other sections of these specifications. Hard glossy prime coats must be sanded to provide profile for finish coat.

3.2 MATERIALS PREPARATION

A. Mix and prepare painting materials in accordance with manufacturer's directions.

B. Maintain containers used in mixing and application of paint in a clean condition, free of foreign materials and residue.

3.3 APPLICATION OF TEXTURE FINISH

A. Finish Application. Mix and apply finish to drywall and other surfaces indicated to receive finish in strict accordance with manufacturer's instructions to produce a uniform texture without starved spots or other evidence of thin application, and free of application patterns.

B. Remove any texture dropping or overspray from door frames, windows and other adjoining work.

3.4 APPLICATION OF PAINT

A. General: Apply paint in accordance with manufacturer's directions. Use applicators and techniques best suited for substrate and type of material being applied. Do not paint in direct hot sun or when temperature of surface and material is below 40 decrees F. Allow each coat to dry at least 48 hours, unless time is specifically permitted by paint manufacturer, before application of succeeding coats. Remove accessories, plates, hardware, lighting fixtures and similar devices, or provide masking during painting operations. Finish work shall be uniform, proper color, free of runs, sags or flooding. For high gloss enamel finishes, lightly sand each undercoat. At completion, touch-up and restore damaged finishes or spots.

B. Assure that surfaces are properly prepared to receive paint. Application of paint shall constitute acceptance of surface condition by painter. Thin paints only as recommended by the manufacturer of the paint. Do not use solvents for thinning which have been previously used to clean brushes and equipment.

C. Minimal Coating Thickness: Apply each material at manufacturer's recommended spreading rate and sufficient to provide a total dry film thickness for the completed system of prime and finish coats of not less than 5.0 mil for 3-coat work and/or 3.5 mil for 2-coat work. Enamel shall be at least one mil thicker than prescribed above.

D. Methods: Use only paint methods appropriate for the particular painting application, use care to protect adjacent finishes from overspray, paint smears or other defacement.

E. Back priming: Required on all wood trim.

3.5 FIELD QUALITY CONTROL

A. Corrective Measures: As required by the Architect at no cost to the owner.

3.6 CLEAN-UP AND PROTECTION

A. Clean-Up: During progress of work, remove from site discarded paint materials, rubbish, cans and rags at end of each work day.

B. Upon completion of painting work, clean window glass and other paint-spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finish surfaces.

C. Protection: Protect work of other trades, whether to be painted or not, against damage by painting and refinishing work. Correct any damage by cleaning, repairing or replacing, and repainting, as acceptable to Architect.

D. Provide "Wet Paint" signs as required to protect newly painted finishes. Remove temporary protective wrappings provided by others for protection of their work, after completion of painting operations.

E. At completion of work of other trades, touch-up and restore all damage or defaced painted surfaces.

3.7 PAINT SCHEDULE

A. INTERIOR SURFACES

1. Hollow Metal Doors and Frames (All Pre-Primed Metal to be cleaned with Low-Residue Solvent to remove Oils and other Contamination. Prime Metal, Finish with Alkyd Semi-Gloss Enamel):

   Two Coats: Sherwin Williams ProMar 200 Interior Alkyd Semi-Gloss. (Dry Mil Thickness not less than 1.5 mils per Coat)

2. Gypsum Board, Provide Interior Drywall Basecoat **Prior** to application of Decorative Texture (Level 5 Drywall Finish required).

   Prime Coat: Sherwin Williams ProMar 200 Zero Voc Interior Latex Primer. (Back rolling recommended). Applied at a Wet Mil Thickness of not less than 5.7 mils.

   Two Coats: Sherwin Williams ProMar 200 Interior Alkyd Semi-Gloss. (Dry Mil Thickness not less than 1.73 mils per Coat. NOTE: Second Coat is to be rolled).

3. Gypsum Board, Restrooms. Provide Interior Drywall Basecoat **Prior** to application of Decorative Texture (Level 5 Drywall Finish require).

4. Exposed Metal Decking and Steel Joists. Room 116.

   Remove dust, dirt and construction debris from joists.

   Approved products include:

   - Sherwin Williams Pro Industrial Waterborne Acrylic Dryfall

   - Diamond Vogal, Luminance 300 Dri-Mist Latex

B. EXTERIOR SURFACES

1. Hollow Metal Doors and Frames (All Pre-Primed Metal to be cleaned with Low-Residue Solvent to remove Oils and other Contamination. Prime Metal, Finish with Alkyd Semi-Gloss)

   Two Coats: Sherwin Williams ProMar A100 Exterior Latex Flat.
   (Dry Mil Thickness not less than 1.5 mils per Coat)

2. Miscellaneous Steel, Pipe Ballards (Rust Inhibitive Primer. Finish with Alkyd Semi-Gloss)

   Two Coats: Sherwin Williams ProMar A100 Exterior Latex Flat.
   (Dry Mil Thickness not less than 1.5 mils per Coat)

END OF SECTION

SECTION 10 2116

SOLID PLASTIC TOILET COMPARTMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid plastic toilet compartments and urinal screens.

B. Related Sections:

1. Division 01: Administrative, procedural, and temporary work requirements.

1.2 REFERENCES

A. ASTM International (ASTM):

1. A167 - Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
2. B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
3. E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

B. National Fire Protection Association (NFPA) 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth.

1.3 SYSTEM DESCRIPTION

A. Compartment Configurations:

1. Toilet partitions: Floor mounted overhead braced
2. Urinal screens: Wall mounted.

1.4 SUBMITTALS

A. Submittals for Review:

1. Shop Drawings: Include dimensioned layout, elevations, trim, closures, and accessories.
2. Product Data: Manufacturer's descriptive data for panels, hardware, and accessories.
3. Samples: 2 x 3 inch samples showing available colors.

B. Sustainable Design Submittals:

1. Recycled Content: Certify percentages of post-consumer and pre-consumer recycled content.
2. Regional Materials: Certify distance between manufacturer and Project and between manufacturer and extraction or harvest point in miles.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum 5 years, experience in manufacture of solid plastic toilet compartments with products in satisfactory use under similar service conditions.

B. Installer Qualifications: Minimum 5 years, experience in work of this Section.

1.6 WARRANTIES

A. Provide manufacturer's 25 year warranty against breakage, corrosion, and delamination under normal conditions.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Scranton Products. (www.scrantonproducts.com)

B. AJW Architectural Products

C. Comtec Industries

D. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. Doors, Panels and Pilasters:

1. High density polyethylene (HDPE), fabricated from polymer resins compounded under high pressure, forming single thickness panel.
2. Waterproof and nonabsorbent, with self-lubricating surface, resistant to marks by pens, pencils, markers, and other writing instruments.
3. 1 inch thick with edges rounded to 1/4 inch radius.
4. Recycled content: Minimum 25 percent.
5. Fire hazard classification: Class B flame spread/smoke developed rating, tested to ASTM E84.
6. Color: To be selected from manufacturer's full color range.

B. Aluminum Extrusions: ASTM B221, 6463-T5 alloy and temper.

C. Stainless Steel: ASTM A167, Type 304.

2.3 HARDWARE

A. Hinges:

1. 8 inches long, fabricated from heavy-duty extruded aluminum with bright dip anodized finish, wrap-around flanges, adjustable on 30-degree increments, through bolted to doors and pilasters with stainless steel, Torx head sex bolts.
2. Hinges operate on field-adjustable nylon cams, field adjustable in 30 degree increments.

B. Door Strike and Keeper:

1. 6 inches long, fabricate from heavy-duty extruded aluminum with bright dip anodized finish, with wrap-around flanges secured to pilasters with stainless steel tamper resistant Torx head sex bolts.
2. Bumper: Extruded black vinyl.

C. Latch and Housing:

1. Heavy-duty extruded aluminum.

2. Latch housing: Bright dip anodized finish.
3. Slide bolt and button: Black anodized finish.

D. Coat Hook/Bumper:

1. Combination type, chrome plated Zamak.
2. Equip outswing handicapped doors with second door pull and door stop.

E. Door Pulls: Chrome plated Zamak.

2.4 COMPONENTS

A. Doors and Dividing Panels: 55 inches high, mounted 14 inches above finished floor, with aluminum heat-sinc fastened to bottom edges.

B. Pilasters: 82 inches high, fastened to pilaster sleeves with stainless steel tamper resistant Torx head sex bolt, with stainless steel angle attachment to floor and ceiling.

C. Pilaster Sleeves: 4 inches high, 20 gage stainless steel, secured to pilaster with stainless steel tamper resistant Torx head sex bolt.

D. Wall Brackets: 54 inches long, Extruded PVC, heavy-duty aluminum, bright dip anodized finish, fastened to pilasters and panels with stainless steel tamper resistant Torx head sex bolts.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install compartments in accordance with manufacturer's instructions and approved Shop Drawings.

B. Install rigid, straight, plumb, and level.

C. Locate bottom edge of doors and panels 14 inches above finished floor.

D. Provide uniform, maximum 3/8 inch vertical clearance at doors.

E. Not Acceptable: Evidence of cutting, drilling, or patching.

3.2 ADJUSTING

A. Adjust doors and latches to operate correctly.

END OF SECTION

SECTION 10 2226

PAIRED PANEL PARTITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Manually operated, paired panel operable partitions.

B. Related Sections include the following:

1. Division 5 Sections for primary structural support, including pre-punching of support members by structural steel supplier per operable partition supplier's template.
2. Division 6 Sections for wood framing and supports, and all blocking at head and jambs as required.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who is certified in writing by the operable partition manufacturer, as qualified to install the manufacturer's partition systems for work similar in material, design, and extent to that indicated for this Project.

B. Acoustical Performance: Test operable partitions in an independent acoustical laboratory in accordance with ASTM E90 test procedure and classified in accordance with ASTM E413 to attain no less than the STC rating specified. Provide a complete and unedited written test report by the testing laboratory upon request.

C. Preparation of the opening shall conform to the criteria set forth per ASTM E557 *Standard Practice for Architectural Application and Installation of Operable Partitions.*

1.4 REFERENCE STANDARDS

A. ASTM International

1. ASTM E557 Standard Practice for Architectural Application and Installation of Operable Partitions.
2. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
3. ASTM C1036 - Standard Specification for Flat Glass.

B. Other Standards

1. ADA – Americans with Disabilities Act.
2. ANSI Z97.1 - Safety Glazing Materials Used in Buildings.
3. CPSC 16 CFR 1201 - Safety Standard for Architectural Glazing Materials.
4. NEMA LD3 - High Pressure Decorative Laminates.

1.5 SUBMITTALS

A. Product Data: Material descriptions, construction details, finishes, installation details, and operating instructions for each type of operable partition, component, and accessory specified.

B. Shop Drawings: Show location and extent of operable partitions. Include plans, elevations, sections, details, attachments to other construction, and accessories. Indicate dimensions, weights, conditions at openings, and at storage areas, and required installation, storage, and operating clearances. Indicate location and installation requirements for hardware and track, including floor tolerances required and direction of travel. Indicate blocking to be provided by others.

C. Setting Drawings: Show imbedded items and cutouts required in other work, including support beam punching template.

D. Samples: Color samples demonstrating full range of finishes available by architect. Verification samples will be available in same thickness and material indicated for the work.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Clearly mark packages and panels with numbering systems used on Shop Drawings. Do not use permanent markings on panels.

B. Protect panels during delivery, storage, and handling to comply with manufacturer's direction and as required to prevent damage.

1.7 WARRANTY

A. Provide written warranty by manufacturer of operable partitions agreeing to repair or replace any components with manufacturing defects.
B. Warranty period: Two (2) years.

PART 2 – PRODUCTS

2.1 MANUFACTURERS, PRODUCTS, AND OPERATION

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Modernfold, Inc.
2. Substitution may be submitted per section 01 6300.

B. Panels to be manufactured in the U.S.A.

C. Products: Subject to compliance with the requirements, provide the following product:

1. Acousti-Seal Legacy – Paired Panel (932) manually operated paired panel operable partition.

2.2 OPERATION

A. Acousti-Seal Legacy – Paired Panel (932): Series of paired flat panels hinged together in pairs, manually operated, top supported with operable floor seals.

B. Final Closure (select one):

1. Hinged panel closure

2.3 PANEL CONSTRUCTION

A. Nominal 3-inch (76mm) thick panels in manufacturer's standard 48-inch (1220mm) widths. All panel horizontal and vertical framing members fabricated from minimum 16-gage formed steel with overlapped and welded corners for rigidity. Top channel is reinforced to support suspension system components. Frame is designed so that full vertical edges of panels are of formed steel and provide concealed protection of the edges of the panel skin.

B. Panel Skin Options

1. Roll-formed 21-gage steel wrapping around panel edge. Panel skins shall be lock formed and welded directly to the frame for unitized construction. Acoustical ratings of panels with this construction.
   a. 50 STC
2. Full leaf butt hinges, attached directly to panel frame with welded hinge anchor plates within panel to further support hinge mounting to frame. Lifetime warranty on hinges. Hinges mounted into panel edge or vertical astragal are not acceptable.

C. Panel Trim: No vertical trim required or allowed on edges of panels; minimal groove appearance at panel joints.

D. Panel Weights:

1. 50 STC - 8 lbs./square foot

2.4 PANEL FINISHES

A. Panel face finish shall be (select as required):

1. Reinforced vinyl with woven backing weighing not less than 20 ounces (567 g) per lineal yard.

B. Panel trim: Exposed panel trim of one consistent color from manufacturer's standard offering (select one):

1. Dark Bronze

2.5 SOUND SEALS

A. Vertical Interlocking Sound Seals between panels: Roll-formed steel astragals, with reversible tongue and groove configuration in each panel edge for universal panel operation. Rigid plastic or aluminum astragals or astragals in only one panel edge are not acceptable.

B. Horizontal Top Seals: Continuous contact extruded vinyl bulb shape with pairs of non-contacting vinyl fingers to prevent distortion without the need for mechanically operated parts.

C. Horizontal Bottom Seals:

1. A2 - Automatic operable seals providing nominal 2-inch (51 mm) operating clearance with an operating range of +1/2-inch (13mm) to –1-1/2 inch (38 mm) which automatically drop as panels are positioned, without the need for tools or cranks.

2.6 SUSPENSION SYSTEM

A. #17 Suspension System

1. Suspension Tracks: Minimum 11-gage, 0.12-inch (3 mm) roll-formed steel track, suitable for either direct mounting to a wood header or supported by adjustable steel hanger brackets, supporting the load-bearing surface of the track, connected to structural support by pairs of 3/8-inch (9.5mm) diameter threaded rods. Aluminum track is not acceptable.

   a. Exposed track soffit: Steel, integral to track, and pre-painted off-white.

2. Carriers: One all-steel trolley with steel-tired ball bearing wheels per panel (except hinged panels). Non-steel tires are not acceptable.
3. Warranty period: Five (5) years.

PART 3 – EXECUTION

3.1 INSTALLATION

A. General: Comply with ASTM E557, operable partition manufacturer's written installation instructions, Drawings and approved Shop Drawings.

B. Install operable partitions and accessories after other finishing operations, including painting have been completed.

C. Match operable partitions by installing panels from marked packages in numbered sequence indicated on Shop Drawings.

D. Broken, cracked, chipped, deformed, or unmatched panels are not acceptable.

3.2 CLEANING AND PROTECTION

A. Clean partition surfaces upon completing installation of operable partitions to remove dust, dirt, adhesives, and other foreign materials according to manufacturer's written instructions.

B. Provide final protection and maintain conditions in a manner acceptable to the manufacturer and Installer that ensure operable partitions are without damage or deterioration at time of Substantial Completion.

3.3 ADJUSTING

A. Adjust operable partitions to operate smoothly, easily, and quietly, free from binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Lubricate hardware and other moving parts.

3.4 EXAMINATION

A. Examine flooring, structural support, and opening, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of operable partitions. Proceed with installation only after unsatisfactory conditions have been corrected.

3.5 DEMONSTRATION

A. Demonstrate proper operation and maintenance procedures to Owner's representative.

B. Provide Operation and Maintenance Manual to Owner's representative.

END OF SECTION

SECTION 10 2800

TOILET AND BATH ACCESSORIES

PART 1 GENERAL

1.1_ SECTION INCLUDES

1. Toilet and washroom accessories.
2. Section 06 1000 - Rough Carpentry: Placement of concealed anchor devices and blocking.

1.2 SYSTEM DESCRIPTION

A. Installing work in conformance with ANSI A117.1.

1.3 SUBMITTALS

A. Product Data: Provide data on accessories describing size, finish, details of function, and attachment methods.

B. Supply two keys for each accessory to Owner.

PART 2 PRODUCTS

2.1 MATERIALS

A. Acceptable Manufacturers:

1. Bobrick
2. ASI
3. Bradley
4. Parker
5. AJ Washroom Accessories

B. Sheet Steel: ANSI/ASTM A366.

C. Stainless Steel Sheet: ASTM A167, Type 304.

D. Tubing: ASTM A269 stainless steel.

E. Adhesive: Two component epoxy type, waterproof.

F. Fasteners, Screws, and Bolts: Hot-dipped galvanized steel, tamper-proof type.

2.2 FABRICATION

A. From surfaces flat without distortion. Weld and grind joints smooth.

B. Shop assemble components and package with anchors and fittings.

C. Back paint components to prevent electrolysis.

D. Provide steel anchor plates, adapters, and anchor components for installation.

E. Hot dip galvanize exposed and painted ferrous metal and fastening devices.

2.3 FINISHES

A. Anchors: Galvanize to 1.25 oz./sq. yd.

B. Ferrous Metals - Shop Primed: Pretreat and clean, spray apply one coat primer and bake.

C. Enamel: Pretreat and clean, apply one coat primer and two coats epoxy electrostatic baked enamel.

D. Chrome/Nickel Plating: ASTM B456, Type SC 2; satin finish.

E. Stainless Steel: No. 4 satin luster finish.

PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Verify exact location of accessories for installation.

B. Deliver inserts and rough-in frames to site. Provide templates and rough-in measurements as required.

3.2 INSTALLATION

A. Install fixtures, accessories and items in accordance with manufacturer's instructions.

B. Install plumb and level, securely and rigidly anchored to substrate.

3.3 SCHEDULE:

A. All product numbers are based on Bobrick models unless noted otherwise. See Equipment Schedule on Sheet A11.

END OF SECTION

SECTION 10 4400

FIRE EXTINGUISHERS, CABINETS AND ACCESSORIES

PART 1 GENERAL

1.1_ WORK INCLUDED

A. Portable hand fire extinguishers

B. Recessed metal cabinets

1.2 SHOP DRAWINGS

A. Submit shop drawings in accordance with Section 01 3400.

B. Provide product cut sheets of extinguishers, hangers and cabinets.

C. Indicate extinguishers and cabinet types (including recess required), and installation locations.

1.3 PROTECTION

A. Protect cabinet finishes and adjacent surfaces and materials from damage or marring during installation.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. J.L. Industries.

B. Larson's Manufacturing Co.

C. Potter-Roemer.

D. Substitutions: Items of same function and performance are acceptable in conformance with Section 01 6300.

2.2 FIRE EXTINGUISHERS

A. Provide in all locations, unless noted otherwise.

B. Multi-Purpose Dry Chemical Type: Steel tank, with pressure gage, UL rating 2A-10B: C 10lbs. Proved with wall hook mounting.

PART 3 EXECUTION

3.1 INSPECTION

A. Verify rough openings for cabinet are correctly sized and located.

B. Beginning of installation means acceptance of existing conditions.

3.2 INSTALLATION

A. Install extinguishers so that top of extinguisher is 54 inches from finished floor. This shall be verified with Architect prior to setting units.

B. Secure rigidly in place in accordance with manufacturer's instructions.

END OF SECTION

SECTION 12 2413

ROLLER WINDOW SHADES

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. Manually operated roller shades with single rollers.

B. Related Requirements:

1. Section 06 1053 "Miscellaneous Rough Carpentry" for wood blocking and grounds for mounting roller shades and accessories.
2. Section 07 9200 "Joint Sealants" for sealing the perimeters of installation accessories for light-blocking shades with a sealant.
3. Section 09 2900 "Gypsum Board" for coordination with installation of shade pockets, closure, and related accessories.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: Fabricator of products.

1. Installer shall be qualified to install specified products by prior experience and approved by Springs Window Fashions, LLC.
2. Installer shall be responsible for acceptable installation in accordance with instructions published by Springs Window Fashions, LLC.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver roller shades in factory packages, marked with manufacturer, product name, and location of installation using same designations indicated on drawings.

1.5 FIELD CONDITIONS

A. Environmental Limitations: Do not install roller shades until construction and finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for project when occupied for its intended use.

B. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on shop drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify architect of installation conditions that

vary from drawings. Coordinate fabrication schedule with construction progress to avoid delaying the work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Springs Window Fashions.

B. Source Limitations: Obtain roller shades from single source from single manufacturer.

2.2 MANUALLY OPERATED SHADES WITH SINGLE ROLLERS

A. Chain-and-Clutch Operating Mechanisms: With continuous-loop bead chain and clutch that stops shade movement when bead chain is released; permanently adjusted and lubricated.

1. Bead Chains: #10 Stainless steel.

a. Loop Length: As required to operate full height of window shade.
b. Limit Stops: Provide upper and lower round nickel-plated steel ball stops
c. Chain-Retainer Type: Locking-style chain retainer restricts the operation of the chain unless the chain retainer is properly mounted to a fixed surface such as a window frame, sill, or wall. Compliant with American National Standard for Safety of Corded Window Covering Products ANSI A100.1. Non-locking P-Clip is not acceptable.

B. Roller tube shall be extruded aluminum with the shade fabric adhered securely to tube with 2-sided tape. The tube size shall be determined by the manufacturer based on window size and fabric selection.

1. Clutch System: Consists of fiberglass filled nylon for wear resistance, smooth operation and corrosion resistance. The clutch is comprised Velvetrol™ internal spring arrangement for a smooth pulling force that locks the shade in any position when operating the control loop. The clutch mechanism is bi-directional and does not require adjustment or lubrication. Clutch to be inserted in roller tube at manufacturing. Clutch size to be selected by manufacturer based on fabric selection and shade size. Clutch size and spring assist upgrade available R8 and R16 for shades over 96"
2. Roller Drive-End Location: Right side of shade or Left side of shade. As indicated on drawings
3. Direction of Shade Roll: Regular, from back of roller.
4. Idler End: Constructed of high strength, fiberglass filled nylon with spring-loaded pin-end technology for wear resistance, smooth operation, and corrosion resistance.

C. Mounting Hardware: Brackets, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.

1. Thickness; 16 gauge.
2. Material: Stamped steel.

E. Description: Fascia bracket color as indicated by architect.

F. Fabric Bands:

1. Fabric Band Material: Russell Light-filtering fabric. Natura BO Light-blocking fabric.
2. Bar: Extruded aluminum.

a. Type: Hem bars to be extruded aluminum in weight sufficient for proper shade operation. [Enclosed in heat sealed pocket of fabric band material] [Fabric wrapped with end caps] <Insert description>.
b. Color and Finish: As selected by architect from manufacturer's full range.

G. Installation Accessories:

1. Front Fascia: Aluminum extrusion that conceals front and underside of roller and operating mechanism and attaches to roller brackets without exposed fasteners.

a. Shape: L-shaped.
b. Height: Manufacturer's standard height required to conceal roller and shade when shade is fully open, but not less than 3.75 inches
c. Color and Finish: As indicated by architect.

2. Fascia End Caps: Flat steel plate, adhered to fascia bracket using double-sided tape.

a. Shape: 3.75 inches
b. Color and Finish: As indicated by architect.

2.3 ROLLER SHADE FABRICATION

A. Product Safety Standard: Fabricate roller shades to comply with ANSI - WCMA A 100.1, including requirements for flexible, chain-loop devices; lead content of components; and warning labels.

B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg F (23 deg C):

1. Between (Inside) Jamb Installation: Width equal to jamb-to-jamb dimension of opening in which shade is installed, plus or minus 1/8 inch (3.1 mm). Length equal to head-to-sill or -floor dimension of opening in which shade is installed less 1/4 inch (6 mm), plus or minus 1/8 inch (3.1 mm).
2. Outside of Jamb Installation: Width and length as indicated, with terminations between shades of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.

C. Fabric Band Fabrication: Fabricate fabric bands without battens or seams to extent possible except as follows:

1. Railroaded Materials: Railroad material where material roll width is less than the required width of fabric band and where indicated. Provide seams as required by

railroaded material to produce fabric bands with full roll-width panel(s) plus, if required, one partial roll-width panel located at top of fabric band.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with installer present, for compliance with requirements for installation tolerances, operational clearances, [accurate locations of connections to building electrical system,] and other conditions affecting performance of the work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ROLLER SHADE INSTALLATION

A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions.

1. Opaque Fabric Bands: Located so fabric band is not closer than [2 inches (51 mm)] <Insert dimension> to interior face of glass. Allow clearances for window operation hardware.

3.3 ADJUSTING

A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.4 CLEANING AND PROTECTION

A. Clean roller shade surfaces after installation, according to manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and installer, ensuring that roller shades are without damage or deterioration at time of Substantial Completion.

C. Replace damaged roller shades that cannot be repaired, in a manner approved by architect, before time of Substantial Completion.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train owner's maintenance personnel to adjust, operate, and maintain motor-operated roller shades.

END OF SECTION

SECTION 12 2500

WALK-IN COOLER

PART 1 GENERAL

1.1 Work Included

A. Knock down cooler box

B. Condensing Unit

C. Evaporator Coil

D. 1 Year Refrigeration Service Agreement

PART 2 PRODUCTS

2.1 Acceptable Manufacturers

A. Thermalrite by Everidge

B. Artic Industries

C. American Walk-in Coolers

D. Polar King

2.2 Cooler Systems

A. Refrigeration

1. Walk-in Refrigerator Construction

a. General: Each panel shall consist of inner and outer metal skins, a 4" insulation core, and be equipped with cam-action locking devices. The locking devices shall be operable from inside the walk-in. Cam plug buttons are provided to cover the holes after assembly is complete. Construction shall be as approved by the NSF International and shall bear the NSF® Seal of Approval. All panels shall be connected to one another by placing the tongue of the insulation core of one panel into the groove of the core insulation of the adjacent panel. The resultant tongue and groove joint shall be sealed at both sides by double barreled NSF® approved gaskets. In order to avoid future swelling and mold formation, no wood shall be permitted in the manufacture of the tongue and groove panel profile. 11'-0" x 8'-0" x 8'-0" foam rail walk-in.

1) Wall Panels: Panel insulation shall be 4" thick, high quality, extruded polystyrene or foamed-in-place polyurethane, modular panels joined by not less than three (3) cam-lock devices; gasket to seal between panels; R-28 or greater for refrigerators and R-32 or greater for freezers.

a) Refrigerators:

(1.) Extruded Polystyrene: All wall insulation shall be 4" thick, high quality rigid extruded polystyrene, 1.6 lb density. K factor of not more than .139 and an R-factor of not less than 7.2 per inch, initial fresh R-28.8 minimum total wall R factor. Vapor transmission shall be less than 1 perm and foam core material must meet UL 5 flame spread rating with average smoke rating less than 165 (UL 723 test).

b. Ceiling: Panel insulation shall be 4" thick, high quality, extruded polystyrene or foamed-in-place polyurethane, modular panels joined by not less than three (3) cam-lock devices; gasket to seal between panels; R-28 or greater for refrigerators.

1) Refrigerators:

a) Extruded Polystyrene: All ceiling insulation shall be 4" thick, high quality rigid extruded polystyrene, 1.6 lb density. K factor of not more than .139 and an R-factor of not less than 7.2 per inch, initial fresh R-28.8 minimum total wall R factor. Vapor transmission shall be less than 1 perm and foam core material must meet UL 5 flame spread rating with average smoke rating less than 165 (UL 723 test).

c. Finishes:

1) Exterior Finishes:

a) 26 gauge stucco embossed galvalume

d. Interior Finishes

1) Wall Panels:

a) 26 gauge stucco embossed galvalume

e. Ceiling Panels:

a) 26 gauge stucco embossed galvalume

2. Panel Dimensions:

a. Wall Panels:

1) Maximum panel height - 20' (maximum enclosure height is 8' including the 4" ceiling panel)
2) Maximum panel width - 47"

b. Ceiling Panels:

1) Maximum ceiling panel length - 8'
2) Maximum ceiling panel width - 47"

3. Floorless:

a. Floor Screeds: Floor screeds shall be provided for all floorless walk-ins. The screeds shall be vinyl, and have NSF® approved cove both inside and out.

4. Doors: R-25 or greater for refrigerators; R-32 or greater for freezers. Door shall be flush mounted, positioned and hinged; provided with suitable sweep and magnetic gaskets, door closer, one pre-wired vapor proof light fixture, light switch with pilot light, dial thermometer, manual internal lock override, chrome plated cam lift hinges, chrome plated door latches with strike. 34"x78" hinged flush with magnetic gasket.

a. Hinges: One cam-lift spring assisted self-closing hinge and one cam-lift hinge.
b. Handle: Kason or Component equivalent with steel reinforced plate inside door panel, pull door handle with cylinder lock, padlock hole and interior safety release; provide common key for all walk-in doors.
c. Door Closer: Kason or spring assisted comparable

5. Installation: Dealer to install walk-in units.

a. Drawings and Instructions: Manufacturer shall supply a set of installation instructions and lay-out drawing. All panels shall have panel identification corresponding with the lay-out drawing to facilitate rapid and accurate field erection.

B. Refrigeration System: Complete operating system consisting of a condensing unit and an evaporator coil. LCH0008MCACZA000 with 35°F R448.208-230/3/60.

1. Condensing Unit:

a. General: Condenser fan motors of under 1 h.p. must use electronically commutated (EC) motors or permanent split capacitator-type (PSP) motors; splash lubrication system using Mobil EAL Arctic 22 polyester synthetic refrigeration oil; oil sight glass; removable oil drain plug; label indicating oil used; high/low pressure control; suction line filter; suction and discharge service valves and copper/brass vibration isolators; receiver with fusible plug or relief valve; liquid line shut-off valve; sight glass; molecular sieve filter dryer; main power supply fused disconnect switch
b. Warranty: 5 years on motor

2. Evaporator Coil: Forced convection style; match to condensing unit and suspend with air discharged parallel to the ceiling; lifetime sealed motors with inherent motor protection; evaporator fan motors of under 1 hp and less than 460 volts must use electronically commutated (EC) motors; enclose coil section and fans within aluminum housing. LEL0060AS6AMAB0200 coil 35° F R448/R449.115/1/60.

    a. Refrigerator: Air defrost
    b. Installation: Hang using plastic or nylon fasteners; spread coil weight evenly over ceiling panels; support long span ceiling panels as required.

END OF SECTION

SECTION 15 3000

FIRE PROTECTION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including General and Supplementary Conditions and Division 1, apply to the work specified in this section.

B. Refer to "General Mechanical Requirements" and "Basic Materials and Methods" Sections in Division 15 for basic requirements for all mechanical work.

1.2 SCOPE

A. The design/build of the fire protection system shall be complete with all necessary accessories for proper operation and shall be accomplished by a firm or organization regularly engaged in this type of work, and in strict accordance with the requirements of the Nation Fire Protection Association. The contract drawings indicate the location of the facilities and the general location of the utilities to be incorporated into the system.

B. The installation shall include extending a six inch or as calculated water line from the existing hydrant. Also, provide and install a fire riser and complete wet pipe sprinkler system in all areas. Design for Light Hazard Occupancy.

1.3 APPLICABLE CODES AND ORDINANCES

A. The installation of the fire protection system shall be in accordance with all mandatory and advisory provisions of the latest editions of NFPA 13 and UL Publications as well as state and local codes.

B. The design and installation of the fire alarm system shall be in accordance with NFPA 72 and IBC requirements.

1.4 SUBMITTALS

A. Submit a complete list of all items to be installed (3 copies) including: pipe, fittings, Siamese connection, ball check and any other items required. Shop drawings showing piping layout, sprinkler head location and connection to existing water piping shall be submitted and approved prior to installation. All equipment (particularly the Siamese connection: shall be compatible with existing fire protection equipment used by the local Fire Department; and subject to the approval of the Building and Inspection Department of the city.

PART 2 PRODUCTS

2.1 PIPING

A. Overhead piping shall be standard schedule 40 black steel piping with 125 psi black cast iron fittings for pipe sizes thru 2"; Pipe sizes 2½" and above shall be schedule 10 steel with roll grooved type pipe and fittings.

B. Underground piping shall be class 200 cast iron mechanical joint pipe and shall be used from a point 3'-0" above the floor line to the point of connection as shown on the site plan. Block all fire protection lines with thrust blocks.

2.2 SPRINKLER HEADS

A. Provide sprinklers in accordance with NFPA Standard 13. Rooms with suspended ceilings shall be protected with chrome plated pendant sprinklers and chrome-plated escutcheon plates. Areas without ceiling shall be protected with upright sprinkler heads. In the event that conditions prohibit upright heads, pendant heads may be installed provided they are equipped with guard cages.

PART 3 EXECUTION

3.1 INSTALLATION

A. The Contractor shall install a fire-protection water supply main complete with connection to existing main. The trenching and backfill of these lines shall be as defined elsewhere in these specifications. No installation will be permitted prior to approval of complete shop drawings.

3.2 CONSTRUCTION

A. Contractor shall be responsible for taking the following fire precautions during the construction of the building, prior to the sprinkler system being in operation:

1. General good housekeeping procedures should be followed so that accumulations of debris and rubbish will not become a hazard.
2. All temporary heating equipment and open flame devices shall be properly supervised.
3. Smoking should be controlled and permitted only in specified areas.

3.3 COORDINATION WITH OTHER TRADES

A. The Contractor shall carefully lay-out piping and sprinklers to avoid air conditioning equipment, ducts, lights and structure. Offset drops as required for coordination.

3.4 TESTS

A. Upon completion, and prior to the acceptance of the installation, the Contractor in the presence of the Architect or his duly-appointed representative, shall subject the system to the tests required by NFPA Pamphlet No. 13A, and shall furnish the Owner with a certificate as thereby required.

3.5 STERILIZATION

A. All new lines shall be flushed and sterilized with chlorine before acceptance for service. Calcium hypochlorite powder, containing not less than 70% available chlorine, shall be used for sterilization. The amount of chlorine applied shall be such as to provide a dosage of 40-60 PPM for at least twenty-four hours. At the conclusion of the twenty-four hour contact time, CL2 residual should be at least 20 PPM. The chlorinating material shall be mixed with treated water in an acceptable container and injected directly into the system, the process being repeated until the system is filled. All valves in the system shall be opened and closed three times during the procedure to insure that the sterilizing mixture is thoroughly and evenly distributed throughout the system.

3.6 FINAL FLUSHING

A. After the application retention period, the Architect-Engineer shall determine the chlorine content of the source of supply. The heavily chlorinated water in the new system shall be flushed until the chlorine concentration is not higher than that of the source.

3.7 AS-BUILTS

A. The Contractor shall furnish "As-Built" drawings on a Windows formatted Compact Disk (CD). The drawing shall be produced utilizing AutoCAD 2015 or above. A base sheet with the title block and building floor plan will be supplied to the fire protection contractor. The drawing file will be a product of current AutoCAD release.

END OF SECTION

SJC EXTENSION OFFICE

SECTION 210000

FIRE SUPPRESSION INDEX

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including General Special Conditions and the General Requirements, apply to the work specified in this section.

1.2 DESCRIPTION OF WORK

A. Furnish all service tools, equipment, etc., which are required for the complete installation of all Fire Suppression Work, as indicated on the Drawings and specified herein. Fire Suppression work indicated on the Drawings and/or specifications covering other trades shall conform to Division 21 of these Specifications.

B. Work or equipment not indicated or specified, which is necessary for the complete and proper operation of the Fire Suppression systems, shall be accomplished without additional cost to the Owner.

C. Furnish all labor and materials required for fire suppression service and control connections to all the various items of equipment requiring fire suppression service throughout the project shown on the Contract Drawings (even if not shown on the Fire Suppression Drawings). Coordinate with other trades for the installation of required connections and service.

1.3 FIRE SUPPRESSION DIVISION INDEX

210500	GENERAL FIRE SUPPRESSION REQUIREMENTS
211300	AUTOMATIC SPRINKLER SYSTEMS

PART 2 – PRODUCTS (Not used).

PART 3 – EXECUTION (Not used).

END OF SECTION 210000

SJC EXTENSION OFFICE

SECTION 210500

GENERAL FIRE SUPPRESSION REQUIREMENTS

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes: General Mechanical Requirements specifically applicable to Division 21 sections in addition to Division 1 - General Requirements.

B. Scope:

1. The work covered by this division consists of performing all operations in connection with the installation of fire protection systems including site utility work as indicated under this section. This entire section applies to all fire protection systems work and shall be coordinated with all mechanical sections of these specifications. This Contractor shall read and comply with all sections of these specifications including all General and Special Conditions.

2. The contract documents, including all mechanical, electrical, and plumbing drawings and specifications, are part of this specification by reference.

1.2 REFERENCES

A. Standard Requirements:

1. For products or 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. All work shall be executed in accordance with the 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. In the event of a conflict between the various codes and standards, the more stringent shall govern. Where these specifications and accompanying drawings conflict with these requirements, the Contractor shall report the matter to the Architect/Engineer. The Architect/Engineer shall prepare any supplementary drawings required, illustrating how the work may be installed so as to comply. On approval of the change by the Architect/Engineer, the Contractor shall install the work in a satisfactory manner without additional cost to the Owner. On completion of the various parts of the work, the installation shall be tested by the constituted authorities and approved, and on completion of the work, this Contractor shall obtain and deliver to the Owner final certificates of acceptance. This Contractor shall furnish copies of each certificate to the Architect/Engineer.

C. The Contractor shall secure all permits and licenses for his work and shall pay all fees in connection with such permits and licenses.

D. The contractor shall hold and save the Owner free and harmless from liability of any nature or kind arising from his failure to comply with codes and ordinances.

E. Any and all meter deposits and all utility extension costs shall be paid by the Contractor whose work is done in connection with the service that the meter is connected to.

F. Schedule of Referenced Organizations: The following is a list of the acronyms of organizations referenced in these Specifications:

1.	AABC	Associated Air Balance Council
2.	ADC	Air Diffusion Council 435 North Michigan Ave. Chicago, IL 60611
3.	AGA	American Gas Association 1515 Wilson Boulevard Arlington, VA 22209
4.	AMCA	Air Movement and Control Association 30 West University Drive Arlington Heights, IL 60004
5.	ANSI	American National Standards Institute 1430 Broadway New York, NY 10018
6.	ASHRAE	American Society of Heating Refrigerating and Air Conditioning Engineers 345 East 47th Street New York, NY 10017
7.	ASME	American Society of Mechanical Engineers 345 East 45th Street New York, NY 10017
8.	ASPE	American Society of Plumbing Engineers 960 Illuminating Building Cleveland, OH 44113
9.	ASTM	American Society for Testing and Materials 1916 Race Street Philadelphia, PA 19103
10.	AWWA	American Water Works Association 6666 West Quincy Avenue Denver, CO 80235
11.	AWS	American Welding Society 2501 NW 7th Street Miami, FL 33125

12.	CISPI	Cast Iron Soil Pipe Institute 1499 Chain Bridge Road McLean, VA 22101
13.	FM	Factory Mutual System 1151 Boston-Providence Turnpike Norwood, MA 02062
14.	FS	Federal Specification General Services Administration Specifications and Consumer Information Distribution Section (WFSIS) Washington Navy Yard, Building 197 Washington, DC 20407
15.	NBFU	National Board of Fire Underwriters 5530 Wisconsin Avenue, Suite 750 Chevy Chase, MD 20815
16.	NEC	National Electric Code (of NFPA)
17.	NEBB	National Environmental Balancing Bureau 8224 Old Courthouse Road Vienna, VA 22180
18.	NEMA	National Electrical Manufacturer's Association 2101 L Street, NW Washington, DC 20037
19.	NFPA	National Fire Protection Association Battery March Park Quincy, MA 02269
20.	NSF	National Sanitation Foundation Box 1468 Ann Arbor, MI 48106
21.	OSHA	Occupational Safety and Health Administration U.S. Department of Labor
22.	PDI	Plumbing and Drainage Institute 5342 Boulevard Place Indianapolis, IN 46208
23.	SMACNA	Sheet Metal and Air Conditioning Contractor's National Association 8224 Old Courthouse Road Vienna, VA 22180
24.	TIMA	Thermal Insulation Manufacturers Association Technical Services 1420 King Street Alexandria, VA 22314

25. UL Underwriters Laboratories, Inc.
333 Pfingston Road
Northbrook, IL 60062

G. Underwriters Laboratories Inc. (UL): All materials, appliances, equipment, devices, or appurtenances shall conform to the applicable standards of Underwriters Laboratories Inc., where such standards have been established.

1.3 DRAWINGS

A. Drawings and specifications shall be considered as cooperative, and work or materials called for by one and not mentioned in the other, or vice versa, shall be done and furnished as though treated by both.

B. In the cases of discrepancies in figures, drawings, or specifications, the Architect/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 save only at his expense, and, in case of any settlement or any complication arising from such adjustment to the Contractor, he 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 Architect/Engineer for such further drawings or explanations as may be necessary, allowing a reasonable time for the Architect/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, reference shall be made to the Architect\Engineer whose decision shall be final and conclusive. No alleged oral admission, condonation, or inadvertent neglect on the part of the Architect/Engineer will be accepted as an excuse for inferior work.

E. The fire protection plans do not give exact details as to elevations of any ceilings, ductwork and 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 the structural conditions, provide proper grading of lines, to avoid all obstructions, to conform to details of installation supplied by the manufacturer of the equipment to be installed, and thereby to provide an integrated, satisfactory operational installation.

F. Should the particular equipment which any Bidder proposes to install, require other space conditions than those indicated on the drawings, the Bidder shall arrange for such space with the Architect/Engineer before submitting his bid. Should changes become necessary on account of failure to comply with these details, the Contractor shall make such necessary changes at his (the Contractor's own expense).

G. The Contractor shall submit working scale drawings of all his apparatus and equipment which in any way varies from these specifications and plans which shall be checked by the Architect/Engineer and approved before the work is

started. Interference with structural conditions shall be corrected by the Contractor.

H. All equipment shall be installed in accordance with the manufacturer's recommendations. Provide all accessories and components for optimum operation as recommended by the manufacturer.

I. Utilities: The location, size, and pressure of utility lines are shown in accordance with the data given this office by others. As Architect/Engineers, we cannot and do not guarantee the accuracy of this data. Each Bidder shall check and verify this data. The points of connection to utility lines are approximate only and shall be verified by each Bidder prior to submitting his Bid.

J. Site visit: The Contractor shall visit the site prior to bidding and satisfy himself as the conditions under which the mechanical systems are to be installed. No subsequent allowance shall be made in his behalf for failure to make such a visit. Contractor shall examine all work noted under the demolition drawings and all new work and shall satisfy himself as to the extent of work required to be completed.

1.4 SYSTEM DESCRIPTIONS

A. Not Used.

1.5 PRIOR APPROVALS

A. Each equipment item for which the Contractor desires to install equipment other than the specific item identified in the equipment schedule or equivalent equipment by manufacturers specifically named in the schedule, the Contractor shall bear full responsibility to prove to the Engineer that the furnished equipment is equivalent to or better than the specified item. Failure to provide such proof will result in rejection of the shop drawing submittal by the Engineer. Prior written or verbal approval by the Engineer of equipment by other manufacturers will not relieve the Contractor of responsibility to provide equivalence. Prior approval is required, however, any prior approval given is intended only to provide preliminary agreement that the alternate manufacturer may make equipment that complies with the specification requirements and not that all equipment manufactured by him is acceptable.

1.6 SHOP DRAWINGS

A. Shop drawings and/or fully descriptive catalog data shall be submitted by the Contractor for all items of material and equipment furnished and installed under this Contract. This shall include piping, valves, fire protection equipment, plumbing equipment, control items, etc. The Contractor shall submit to the Architect/Engineer a sufficient number of copies of all such shop drawings or catalog data to provide him with as many review copies as he may need, plus three (3) copies for retention by the Architect/Engineer. No materials or equipment shall be installed until officially approved by the Architect/Engineer.

B. Before submitting Shop Drawings to the Architect/Engineer for review, the Contractor shall examine them and satisfy himself that they are correctly

representative of the material or equipment to which they pertain. The Contractor shall so note these Drawings before submitting them. The Contractor's review of Shop Drawings is not intended to take the place in any way of the official review of the Architect/Engineer, and the Shop Drawings which have not been reviewed by the Architect/Engineer shall not be used in fabrication or installing any work.

C. The review of Shop Drawings or catalog data by the Architect/Engineer shall not relieve the Contractor from responsibility for deviations from the plans and Specifications unless he has, in writing, specifically called attention to such deviations as the time of submission and has obtained the permission of the Architect/Engineer thereon, nor shall it relieve him from the responsibility for error of any kind in Shop Drawings. When the Contractor does call such deviations to the attention of the Architect/Engineer, he shall state in his letter whether or not such deviations involve any extra cost. If this is not mentioned, it will be assumed that no extra cost is involved for making the change.

D. After receiving approval on the make and type of materials, the Contractor shall order such materials in sufficient time so that no delay or changes will be caused. This is done to facilitate progress on the job and failure on the part of the Contractor shall render him liable to stand the expense of any and all delays occasioned by failure on this part to provide necessary details. All shop drawings shall be delivered to the Architect/Engineer's office within thirty (30) days from the date of the contract.

E. Shop drawings will be returned unchecked unless the following information is included: installation drawings, hydraulic calculations, complete details, and all pertinent data in the Specifications or on the drawings, size and characteristics of the equipment, name of the project and a space large enough to accept an approval stamp. The data submitted shall reflect the actual equipment performance under the specified conditions and shall not be a copy of the scheduled data on the drawings.

1.7 SUBMITTALS

A. Submittal data shall be organized in commercial quality, three ring binders with durable and cleanable covers. Product information for each piece of equipment shall be separated by an indexing leaf with clear tabs. The product name and symbol (i.e., control valves) shall be typed on white paper inserts and placed in appropriate tab. Complete data must be furnished showing performance, quality, and dimensions. A signed review by the Architect/Engineer must be obtained before purchasing any equipment.

B. No review of the fire protection system shall be completed without all shop drawings, equipment, hydraulics, etc. being delivered as one package. No exceptions.

C. The following items shall be submitted for review by the Architect/Engineer but are not limited to:

1. Utilities Piping & Materials whether furnishes by the contractor or others.

2. Fire Protection Drawings & Hydraulic Calculations

3. Cross Connection Control Devices

4. Piping Material

5. Fire Protection Equipment – including alarm valve, tamper switch, etc.

6. Ductwork Shop Drawings – as part of fire protection drawings.

1.8 QUALITY ASSURANCE

A. General: Comply with Division 1.

B. Welder Qualifications: Welders shall be certified by the American Society of Mechanical Engineers (ASME) National Certified Pipe for the type of work being performed. Current operators' certificates in accordance with ASME standards shall be on file at the site and shall be available to the Architect/Engineer for examination. Coupons shall be available for review by the Architect and Engineer.

C. Locations of all pipes, ducts, outlets, appliance, etc., as shown on the drawings, are approximate only and are understood to be subject to such revisions as may prove necessary or desirable at the time the work is installed. Each Contractor will be required to install his work with relation to existing building conditions and shall be entirely responsible for the correctness of his work with reference to finished elevations, etc. Piping shown on the drawings is diagrammatic only and their exact locations, depths, and invert elevations shall be as required for proper flow and coordination with other trades.

D. The contract drawing depicts graphically the arrangement of piping. Should local conditions necessitate a rearrangement, or if any of the piping or ductwork can be installed to better advantage in a different manner, the Contractor shall, before proceeding with the work, prepare and submit three (3) copies of Drawings of the proposed arrangement for the Architect/Engineer's review.

E. If the Contractor proposes to install equipment, including piping and ductwork, requiring space conditions other than those shown, or to rearrange the equipment, he shall assume full responsibility for the rearrangement of the space and shall have the Architect/Engineer review the change before proceeding with the work. The request for such change shall be accompanied by Shop Drawings of the space in question.

F. Each Contractor is responsible for the proper location and size of all slots, holes, or openings in the building structure pertaining to his work, and for the correct location of pipe sleeves.

G. Each Contractor shall coordinate his work with that of all other trades that it may be installed in the most direct and workmanlike manner without hindering or handicapping the other trades. Piping interferences shall be handled by giving precedence to pipelines which require a stated grade for proper operation. Drainage lines shall take precedence over water lines in determination of

elevations. In all cases, lines requiring a stated grade for their proper operation shall have precedence over electrical conduit and ductwork.

H. All oiling devices and all parts of equipment requiring adjustment shall be easily accessible. Lubricate all equipment properly in accordance with manufacturer's instructions. Furnish zerk grease fittings on all greaseable bearings.

I. Equipment and Materials: The materials and equipment shall be new and shall be the standard products of the manufacturers regularly engaged in the production of Plumbing and Fire Protection Equipment, and shall be the manufacturer's latest standard design. Where two or more units of the same class of equipment are required, these units shall be the products of the same manufacturer. However, the component parts of the systems need not be the products of the same manufacturer. Specific equipment specified hereinafter is to be considered a standard of quality and operation. In general, all capacities of equipment, and motor and starter characteristics are shown in schedules on the drawings. Reference shall be made to the schedules for specific information. The capacities shown are minimum capacities. Variations in the characteristics will be permitted only on written approval of the Architect/Engineer. All equipment shall be shipped to the job with not less than a prime coat of paint or as specified hereinafter. Insofar as is possible all items of the same type (i.e., pumps, fans, etc.) shall be by the same manufacturer. Where installation instructions are not included in these specifications or on the plans, the manufacturer's instructions shall be followed. All equipment affected by altitude shall be rated to operate at the altitude where it is to be installed.

J. Excavation and Backfilling: This Contractor shall do all necessary excavation and backfill for the installation of the Mechanical systems as may be required. Curb cuts, asphalt, and concrete patching, cutting, and patching existing floor, etc., shall be part of this Contractor's responsibility. No extra payment will be made for rock excavation. Trenches for all underground piping shall be excavated to the required depths. The bottoms of trenches shall be tamped hard and graded to secure maximum fall. Bell holes shall be excavated to assure the pipe resting for its entire length on solid ground. Should rock be encountered, it shall be excavated to a depth of 6 inches below the bottom of the pipe, and before laying the pipe, the space between the bottom of the pipe and the rock surface shall be filled with gravel, thoroughly tamped. Pipe laid in trenches dug in fill shall be supported down in the trenches and shall be filled. No roots, rocks or foreign materials of any description shall be used in backfilling the trenches. The backfill material shall be identical to the surrounding fill material and shall be placed in 6-inch layer, wetted, and compacted to the density of the adjacent soil. See Division 2 for additional information for site utilities. All surplus materials shall be hauled from the project by the Contractor at his expense.

K. Cutting and Repairing:

1. Responsibility of the Contractor whose work is involved. Coordinate with others to prevent unnecessary cutting and repairing.

2. Lay out and locate equipment, openings, and chases. Install sleeves, inserts, and supports. Arrange with those whose work is involved to do cutting and replacing caused by negligence or error with costs reimbursed

by the Contractor at fault. Cutting and replacing of existing work shall be the responsibility of the Contractor whose work is being installed.

3. Removal or terminating connections of existing work which is abandoned or replaced shall also be done hereunder to provide correct and finished work.

L. Foundations: All equipment shall be provided with suitable foundations and supports. It shall be the responsibility of the Contractor to provide for the proper locations of these foundations and supports. This applies to all rooftop equipment also.

1. All concrete foundations required by equipment furnished by the Mechanical Contractor shall be constructed by them (except where otherwise noted) the conformity with the recommendations of the manufacturer of the respective equipment, and with the approval of the Architect/Engineer. All corners of the foundations shall be neatly chamfered. Foundation bolts shall be placed in the forms when the concrete is poured. Allow 1 inch below the equipment base for alignment, leveling and grouting with nonshrinking grout. Grouting shall be done after the equipment is leveled in place. After the grout has hardened, the foundation bolts shall be pulled up tight and the equipment shimmed, if necessary. After removal of the forms, the surface of the foundation shall be rubbed.

2. Unless otherwise noted, foundations shall be a minimum of 6-inch high. All concrete work performed by these Contractors shall conform entirely to the requirements of the Concrete Specifications which describe this class of work.

M. Code Requirements: Comply with state and local code requirements and ordinances. Call for inspections required by responsible building inspection authority.

N. Applicable Building Codes and Ordinances: Including the latest edition of each code, but not limited to the following:

1. International Building Code.

2. Uniform Mechanical Code.

3. Uniform Plumbing Code.

4. Governing Fire Department Requirements

5. Utility Company Requirements

6. National Fire Protection Association Standards
7. NFPA 70 - National Electrical Code

8. NFPA 90A - Installation of Air Conditioning and Ventilating Systems

9. NEPA 90B - Installation of Warm Air Heating and Air Conditioning Systems

10. NFPA 13 - Sprinkler Systems

11. NFPA 101 - Life Safety

12. NFPA 96 - Installation of Equipment for the Removal of Smoke and Grease Laden Vapors from Commercial Cooking Equipment

13. NFPA 25 – Standard for the Inspection, Testing & Maintenance of Water Based Fire Protection System

14. NFPA 24 – Stand for Installation of Private Fire Service Main and Their Appurtenances

O. Access Panels

1. Similar to Milcor, or as noted on the drawings, size as required for concealed expansion joints, valving, gauges, balancing dampers, valves, traps, pitot stations, equipment and similar items requiring accessibility. Notify the General Contractor 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.

1.9 DELIVERY, STORAGE AND HANDLING

A. General: Comply with Division 1

B. Large Items: Make arrangements with other trades on the job for introduction into the building of equipment too large to pass through finished openings.

C. Acceptance: Check and sign for materials to be furnished by others for installation under Division 15 upon delivery. Contractor shall be responsible for the storage and safekeeping of such materials from time of delivery until final acceptance.

D. Protection: Close ends of pipe and ductwork at the close of each working day during construction to prevent entry of foreign material. Protect insulation against dirt, water, chemical or mechanical damage before, during and after installation. Protect fixtures and equipment against damage during mechanical work with heavy paper or plastic until final clean-up.

E. Storage: Store equipment in covered enclosure or wrap with weather tight 6 mil Visqeen.

F. Shipping Protection: Protective casings, crating, and coverings to remain in place until start-up of equipment.

1.10 PROJECT CONDITIONS

A. Performance: All systems are to be rated at [5,500 ft.] elevation.

1.11 SEQUENCING AND SCHEDULING

A. General: Comply with Division 1.

B. Schedule: Coordinate and order the progress of mechanical work to conform to the progress of the work of the other trades. Complete the entire installation as soon as the condition of the building will permit.

C. Utility Interruptions: Schedule mechanical utility interruptions with the Architect/Engineer/Owner minimum of seven (7) days prior to the requested outage. Plan work so that duration of the interruptions a maximum of one day.

1.12 CONTROLS WIRING AND ELECTRICAL EQUIPMENT

A. All fire protection equipment wiring, conduit, relays, interlocks, and all accessories required for a completely operational fire protection system shall be the complete responsibility of the fire protection contractor. The fire protection contractor has the option to hire the project electrical contractor to install wiring and conduit.

B. All electrical equipment characteristics (voltage, etc.) must be verified by the Contractor prior to ordering.

1.13 PROTECTION AGAINST HAZARDOUS CONDITIONS

A. The Contractor shall take precautions against hazardous construction conditions at all times during construction. The final condition of the facilities shall be safe, and where safety to operating personnel is jeopardized, suitable signage shall be posted.

B. Protruding metal (bolts, steel angles, etc.) potentially hazardous to maintenance and operating personnel, shall be cut back and/or protected to reduce the risk of injury. All openings between floors shall be protected with barriers around the openings, gratings across the openings, or steel bars through the openings to avoid and protect against injury.

1.14 HAZARDOUS SIGNS

A. Equipment room contains moving or rotating parts, floor openings, or other potentially hazardous environments and shall include a sign on the door entering it that shall read similar to the following: **Hazardous Area - Authorized Personnel Only.**

1.15 OPERATING AND MAINTENANCE INSTRUCTIONS

A. The Fire Protection Contractor shall furnish to the Owner a bound manual in triplicate, containing complete repair parts lists, and operating, service, and maintenance instructions on all mechanical equipment, fixtures, and systems.

B. The Fire Protection Contractor shall also provide training as required by Section 230100 to the Owner's operation and maintenance personnel.

1.16 OPERATION PRIOR TO ACCEPTANCE

A. The Owner shall have the right to operate any and all apparatus as soon as and as long as it is in operating condition, after Owner personnel have received operational training, whether or not such apparatus has been accepted as complete and satisfactory, except that this shall not be construed to mean operations before any required alterations or repairs have been made. This operation does not indicate acceptance of the equipment by the Owner. When the Contractor enters into a contract with the Owner, he agrees to the above.

1.17 WARRANTY AND SERVICE PROGRAM

A. Due to the critical performance requirements and to clearly establish warranty responsibility for this project, the Contractor shall provide a full-service maintenance and warranty program to the Owner for one full year after beneficial occupancy (substantial completion).

B. This service program shall be included as part of the base bid and shall include service, maintenance, repair, replacement, lubrication, temperature control calibration and repairs, and documenting proof for all service and maintenance work on all equipment and system furnished by the Contractor.

C. A single representative in the employment of the Contractor shall be responsible for coordination and follow through of this program. This representative's name and phone number shall be submitted to the Owner as part of the maintenance manuals and supportive data. The Contractor shall respond to a request for service with 24 hours if so requested.

1.18 FLUSHING AND DRAINING

A. It shall be the responsibility of this Contractor to properly drain and flush all pipes before use or acceptance to ensure that all debris is completely removed. Damage caused by such debris remaining in the ducts or pipes shall be repaired by this Contractor at his expense. This Contractor shall demonstrate to the Architect/Engineer's representative that all piping is clean.

1.19 CLEANING

A. This Contractor shall remove from the building construction site all rubbish and dirt as it accumulates under the contract. At completion, all areas shall be broom cleaned and all obstructions, surplus materials, etc., removed.

1.20 GUARANTEE

A. The Contractor shall guarantee all materials, equipment, and workmanship furnished and installed by him under this Contract, to be free from all defects of workmanship and materials, and shall agree to replace at his expense, without expense to the Owner, at any time within one year after installation is accepted by the Architect/Engineer, any and all defective equipment, parts, etc., that may

be found. (This excludes normal maintenance and daily servicing of equipment which is the Owner's responsibility.)

1.21 FLOOR, WALL, AND CEILING PLATES

A. Where exposed pipes pass through floors, finished walls, or finished ceiling, they shall be fitted with chromium-plated escutcheons of an approved pattern. Escutcheons and plates in Mechanical Rooms do not require chrome finish.

B. This Contractor shall be responsible for providing and installing all counter flashing. All openings in the roof shall be flashed and counterflashed. Use four-pound lead flashing materials for all vent lines and welded flashing in steel lines passing through roof. The Mechanical Contractor shall notify the General Contractor where each roof penetration is and the size of the opening.

1.22 PIPE SLEEVES

A. Schedule 40 steel pipe sleeves or pipe sleeves made of No. 20 gauge galvanized steel, properly secured in place with approximately 1/4" space between each sleeve and the surface of the pipe and/or insulation passing through it, shall be provided for all pipes passing through concrete floors, roofs, and masonry walls. All pipe sleeves shall be fixed in place as the walls and floors are built up. The Contractor shall furnish and locate all sleeves and pipes passing through concrete floors, exterior masonry walls, and roofs shall be made watertight with approved non-hardening plastic material. Sleeves through pipe chase or equipment room floors shall project a minimum of 2-inch above the floor and shall be of black steel pipe with waterproof flange at center of floor thickness. Each sleeve through a fireproof wall shall be packed with approved fireproof rope in the annular space.

1.23 PIPE HANGERS

A. Pipe hangers shall be Fee and Mason of a type suitable for each use. Perforated straps shall not be used in any work. For ferrous pipes up to and including 4 inch in size, use Fee and Mason Fig. 199 malleable iron, adjustable, split ring, swivel hanger. For plumbing piping larger than 4 inches, use Fee and Mason Fig 239 steel clevis hanger. Where several pipes are parallel at the same elevation, trapeze hangers may be used. Where trapeze hangers are used, the pipes shall be supported on rollers where indicated on the Drawings. For copper pipes up to and including 3 inch in size, use Fee and Mason Fig. 360 malleable iron, copper plated hangers. For copper pipes larger than 3 inches, use Fee and Mason Fig. 364 copper plated clevis hanger.

B. Hanger rod sizes shall conform to the following schedule:

1.	Pipe up to and including 2"	3/8" rods
2.	Pipe 2-1/2", 3" and 3-1/2"	1/2" rods
3.	Pipe 4" and 5"	5/8" rods
4.	Pipe 6"	3/4" rods

C. Unless shown otherwise on the Plans, all horizontal runs of ferrous piping shall be suspended from the floor or roof construction, as the case may be, by means of hangers with the following spacing:

1.	Pipe up to and including 1-1/4"	8'
2.	Pipe 1-1/2" and 2"	10'
3.	Pipe 2-1/2" and 3"	12'
4.	Pipe 3 1/2" and 4"	14'
5.	Pipe 5" and 6"	16'

D. Unless shown otherwise on the Plans, all horizontal runs of copper piping shall be suspended from the floor or roof construction as the case may be, by means of hangers with the following maximum spacing:

1.	Pipe up to 3/4" in size	5'
2.	Pipe 1" and 1-1/4"	6'
3.	Pipe 1-1/2" and larger	10'

E. There shall be a hanger within 2 inches of each elbow or tee. Additional supports shall be provided for valves, strainers, etc. Cast iron pipe shall have not less than one hanger per length of pipe. Vertical risers shall be supported by approved riser clamps at each floor. Vertical pipes within a space shall have not less than two supports.

F. Supports and hangers shall be installed to permit free expansion and contraction in the piping systems. Hangers shall permit vertical adjustment to maintain proper pitch. Where necessary to control expansion and contraction, the piping shall be guided and firmly anchored. No piping shall be self-supporting, nor shall it be supported from equipment connection.

G. Expansion bolts shall be Ackerman-Johnson or Hilti.

H. Beam clamps suitable for use with this type of steel construction involved shall be Grinnell.

1.24 PRESSURE VESSEL CERTIFICATION

A. Not used.

1.25 ISOLATION

A. Excessive vibration or objectionable noise created in any part of the building by the operation of any equipment furnished and/or installed under the Mechanical Contract will be extremely objectionable and the Contractor shall take all precautions against the same by isolating the various items of equipment from the building structure and by such other means as may be necessary to eliminate all excessive vibration and objectionable noise produced by any equipment installed by them, and consequently, they shall design all foundations, supports, etc., for their equipment, and all piping with this end in view. In addition, these Contractors shall supervise the construction of all foundations and supports, whether they build them or not, in order that they may be constructed in such a

manner as to prevent the transmission of objectionable noise and/or excessive vibration. Submit calculations on all vibration isolation equipment.

B. All equipment having moving parts shall be isolated from the building structure by means of Korfund isolation materials, unless specifically noted otherwise. All isolators shall be the same brand and shall be supplied from the same source. Equipment manufacturer's recommendations shall be followed in the isolation of equipment.

C. Vibration isolators shall have sufficient resilience to meet the following minimum efficiencies:

Motor HP	Equipment Room
Up to 5	90%
7-1/2 to 15	93%
20 to 40	95%
50 to 100	97.5%

D. Spring isolators shall be of the housed type with ribbed pads bonded to the underside of the baseplate, or may be unhoused stable springs. Isolators shall be furnished with snubbers and limit stops where so recommended by the equipment manufacturer.

E. The Supplier of the isolating equipment shall, upon completion of the job, check all isolating materials and verify that they are installed properly, and submit a report in writing to the Architect/Engineer.

1.26 TESTING

A. Before completion of this project, the Contractor shall test all materials and equipment which normally require testing. All piping, etc., shall be tested to meet code requirements or the Specification requirements, whichever is more stringent.

B. All equipment shall be operated sufficiently long enough to prove to the Architect/Engineer that the equipment performs satisfactorily and meets the requirements set forth on the Plans or in these Specifications.

1.27 CERTIFICATIONS

A. Before receiving final payment, the contractor shall verify that all equipment furnished and all work done is in compliance with all applicable codes mentioned in these Specifications. Submit certifications and acceptable certificates to the Architect/Engineer.

1.28 GENERAL PIPING INSTALLATION REQUIREMENTS

A. Provisions for Drainage: All piping systems shall be installed so that they may be easily drained. Drain caps, plugs, or hose bibbs shall be installed at low points. Grade piping toward drain locations.

B. Alignment: All installed pipelines shall be straight and shall remain straight against strains. Proper allowance shall be made for expansion and contraction.

C. Clean as Installed: All piping shall be kept 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. All detergents, solvents and other cleaning agents shall be compatible with the materials of fabrication of the system in which they are used. They shall not adversely affect the materials of mechanisms in the systems and they shall be acceptable to equipment manufacturers. All detergents, solvents, and other cleaning agents shall also be compatible with the process streams to be handled by the systems in which they are used.

D. Insulated Fittings: Install between any dissimilar metals such as steel and copper.

E. Expansion and Contraction: The Contractor shall make all necessary provisions for expansion and contraction with proper fittings, anchors, dresser couplings, loops, etc. Install flexible connectors on each pipe at each building expansion joint.

F. Welding: Refer to Paragraph 1.29 of this section of these specifications.

G. Bending: No bending of pipe will be permitted.

H. General: The installation shall be coordinated with respect to space available with heating, cooling, ventilating, and electrical installation. In every instance where there is a conflict in the routing of the piping and the ducting, the routing of the ducting shall govern. Installed piping shall not interfere with the operation or accessibility of doors or windows, shall not encroach on aisles, passageways, and equipment, and shall not interfere with the servicing or maintenance of equipment. Pipe shall be cut accurately to measurements established at the construction site and shall be worked into place without springing or forcing, properly clearing all openings and equipment. Cutting or weakening of structural members to facilitate piping, installation is not permitted. Pipes shall have burrs removed by reaming and shall be so installed as to permit free expansion and contraction without damage to joints or hangers. Piping above ground shall be run parallel with the lines of the building unless otherwise noted on the drawings. Unless otherwise shown on the drawings, horizontal piping shall pitch down in the direction of flow with grade of not less than 1 inch in 40 feet. Piping connections to equipment shall be in accordance with details shown on the drawings or as recommended by the equipment manufacturer. Service pipe valves and fittings shall be kept a sufficient distance from other work to permit finished covering not less than 1/2 inch from such other work, and not less than 1/2 inch between finished covering on the different services.

I. Installation of Valves: Valves shall be installed at the locations shown on the drawings and where specified and where directed at site. Gate valves shall be used unless otherwise shown, specified, or directed. All valves shall be installed with their stems horizontal or above. Where tight shutoff is required, a composition seat globe valve or resilient seat ball valve shall be used.

J. All valves which must be used during operation, all control valve assemblies, instrument control cases, liquid level controls, gage glasses, orifices, relief valves, and other equipment which must be observed, adjusted, or serviced during operation shall be located conveniently accessible from an operating platform or grade.

K. In general, relief valves within processing unit limits shall be located conveniently accessible from an operating platform or grade.

1. Those in non-hazardous service, such as water, shall discharge directly to outside.

2. Relief valves should have no piping between the vessel or line and the valve inlet, except as shown on the drawings.

3. Relief valves shall be installed in a vertical position. Vent piping shall be braced and supported in a manner that will not produce excessive stresses in the relief valve and will permit removal of the relief valve without necessary temporary supports for the vent lines.

L. Equipment Connections: All piping connections to pumps and other equipment shall be installed without strain at the pipe connection of the equipment. The contractor shall be required as directed to remove the bolts in flanged connections or disconnect piping to demonstrate that the piping has been so connected. Pipe connections to equipment shall be made with unions or flanged fittings. Provide removable headers for large equipment for service access.

M. Joints

1. Flanged Joints: All flanged joints shall be face matched. Raised face flanges shall not be mated to flat-faced cast-iron flanges on valves or equipment. The raised face must be turned off. All flanged bolt holes shall straddle the horizontal and vertical center line unless otherwise noted.

2. Screwed Joints: Screwed pipe joints shall have American Standard Taper Pipe Threads ANSI-B2.1 Latest Edition. Burrs formed when cutting pipe shall be removed by reaming. Care shall be taken that the inside of pipe is thoroughly clean and free of cutting oil and foreign matter before installation. Joints shall be made perfectly tight by the use of Teflon tape or approved Teflon thread sealing and lubricating compound.

3. Solder-Joints: Tubing shall be cut square and burrs removed. Both inside of fittings and outside of tubing shall be well cleaned with steel wool or wire brush before seating. Care shall be taken to prevent annealing of fittings and hard drawn tubing when making connections. Joints for serrated fittings on water, compressed air below 60 psig, and vacuum lines shall be made with a 95 percent tin and 5 percent antimony. Cored solder or solder containing lead will not be permitted.

N. Reducers: Reduction in pipe size shall be made with one piece reducing fittings. Bushings reducing at least two pipe sizes will be acceptable only when there is no room for reducing couplings or swaged nipples.

O. Unions: All piping unions shall be of the ground joint type constructed from materials equivalent in alloy composition and strength to other fittings specified with which they are used. Union Pressure classes and end connections shall be the same as the fittings used in the lines with the unions. Steel unions shall have hardened stainless steel seating surfaces on both faces.

1.29 WELDING

A. All welding of piping covered by this specification, regardless of condition of service shall be accompanied as follows:

1. The welding shall be in accordance with the recommendations of the American Welding Society. Mitering of pipe to form elbows, notching to form these, or any similar construction will not be permitted. Welding fittings shall be installed on all welded lines. Joints to be welded shall be properly aligned and spaced, using special welding clamps where necessary. All welders to be employed shall have passed qualification tests prescribed by the National Certified Pipe Welding bureau (or by another reputable testing laboratory or agency) using procedures approved by the American Society of Mechanical Engineers or the American Welding Society. The welders will be required to pass qualification tests when the work of the welder creates a reasonable doubt as to his proficiency. Tests shall be conducted at no additional expense to the Owner.

2. Each welder shall, in addition to having passed the prescribed qualification tests (as noted in Paragraph 1.30.A.1), prepare sample coupons at the job site on a portion of pipe that is cut such that the cross section of the weld is open to view. The sample weld should be prepared using a 6-inch diameter pipe. The sample shall reflect a continuous weld with perpendicular cut out to show the weld in cross sectional view. This sample, when accepted and approved by a certified welding inspector, shall be used as a standard of quality to compare to other welds that this welder will be performing on the job. This same sample weld will also be a basis for accepting or rejecting the welder for working on this project. The sample weld shall be identified with a date and the welder's name and shall be kept at the site throughout the project.

3. All welding on pressure piping shall conform to all of the requirements of the American Society of Mechanical Engineers Code for Pressure Piping - B31.1 (An American National Standards Institute publication), as defined in the latest edition of the ANSI Power Piping B31.1 Manual. All welding shall also conform to all of the requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code. All chapters, current addenda and supplements of these manuals shall apply. This code shall be used to establish standards of performance and quality of welds. However, the Owner reserves the right to perform radiographic testing of all welds, to compare any of the welds to the approved

"standard" sample welds of each welder, and to compare the welds to the welding diagrams and sketches of those recommended in the ANSI B31.1 Power Piping Manual. The intent is to obtain the highest quality welding job possible. The cost of any initial radiographic testing, for random inspection, shall be paid for by the Owner. If radiographic random testing reveals that a weld is defective, the Contractor shall bear the cost of all repairs and re-testing necessary to be made to subject weld until conformance with radiographic tests is reached. The potential for random radiographic testing and welding quality control applies to all pressure piping systems in this project, including systems below 100 psig. If a question should arise regarding the possibility of faulty welding or if there are obvious visual defects in the welding, the Contractor shall be required to correct such deficiencies to a quality level consistent with the recommendations, welding diagrams and sketches in the ANSI B31.1 Manual. The quality level shall also reflect that of the approved sample welds accomplished by each welder for this particular project.

1.30 TESTING FOR PIPING SYSTEMS

A. General: Before insulation is applied, all piping, equipment, and accessories installed under this contract shall be inspected and tested by the Contractor. All labor, material, and equipment required for testing shall be furnished by the Contractor. The Contractor shall be responsible for all repairs and retesting as required. All instruments and other equipment whose safe pressure range is below that of the test pressure shall be removed from the line or blanked off before applying tests. Prior to performing tests, all lines shall be "blown" free of all loose dirt and foreign particles. The lines shall then be thoroughly flushed with water (liquid lines only) at a sufficient flow rate and period of time, to ensure complete cleaning of the lines of all dirt, scale, and foreign matter. Satisfactory flushing of the lines shall be subject to approval. After testing and flushing lines, all filters and strainers shall be cleaned.

B. Safety: Since the Risk of failure, with the attendant possibility of injury, is appreciable greater with further testing, all safety measures required by codes or ordinance or reasonable applicable to the situation shall be taken.

C. Concealment: Equipment or piping to be pressure tested shall not be insulated, covered, or concealed prior to that test. Compression joint underground piping may be backfilled prior to pressure test except that joints shall remain exposed until after the test, but tie rods, clamps, etc., shall be in place and fastened.

D. Pressure Ratings: These tests shall not be used to establish pressure ratings.

E. System Protection: Protect all piping and equipment against overpressure, collapse from vacuum, and hydraulic shock during the filling, testing, and draining procedures. Seats of iron valves shall not be subjected to a pressure in excess of the maximum cold working pressure of the valve. Pressure tests against other closed valves shall not exceed twice the normal rating. Note that where significant differences in elevation exists, there is a risk of overpressure in the lower portions of the system in order to attain test pressure in the upper portion of the system

F. Sectionalizing: Systems may be separated into sub-systems for testing if such action will expedite or simplify the testing.

G. Temporary Supports: During hydrostatic testing of lines provide temporary supports to prevent overstressing supports or hangers. When tests are completed, remove all temporary supports, locks, stops, etc., and adjust supports for their cold load and alignment.

H. Testing: Fire protection water piping shall be tested hydrostatically at the test pressures specified and duration required by NFPA. Leaks shall be located by soap testing.

I. Test Report

1. A detailed report of pressure tests on piping and equipment shall be forwarded in duplicate to the Architect/Engineer. This report shall show date of test, lines tested, test medium, length of time test pressure was held, pressure drop or rise, and extent of venting or repressurizing.

1.31 COOPERATION WITH OTHER TRADES

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 harm to the Owner from interference, delay, or absence of coordination.

1.32 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. He shall examine the adjoining work on which 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.

1.33 SAFETY GUARDS

A. The Fire Protection Contractor shall furnish and install safety guards required in order to obtain certificates of inspection from all authorities having jurisdiction. All belt driven equipment, projecting shafts, and other rotating parts shall be enclosed or adequately guarded. Provide coupling guards on all rotating shafts.

1.34 PROTECTION

A. All work, equipment, and materials shall be protected at all times to prevent obstruction, damage, or breakage. All pipe openings shall be closed with caps or plugs during installation. All equipment shall be covered and protected against dirt, water, chemical, or mechanical injury. At the completion of the work, all equipment shall be thoroughly cleaned, and the entire system shall be delivered in a perfect, unblemished condition.

1.35 PAINTING AND IDENTIFICATION

A. All equipment shall be delivered to the job with suitable factory finish. Should the finish be marred in transit or during installation, it shall be finished to present a neat, workmanlike appearance.

B. Except as elsewhere hereinafter specifically required, any painting of equipment, piping, ductwork, grilles, insulation, etc., furnished and installed under this Section of the Specifications will be done by the Painting Contractor. However, the Mechanical Contractor shall leave his equipment clean and free from any grease, dirt, rust, etc., and in suitable condition for painting.

C. No nameplates on equipment shall be painted, and suitable protection shall be afforded to the plates to prevent their being rendered illegible during the painting operation.

D. The piping shall be painted the basic color as indicated in other sections of these specifications and shall be marked every 10 feet on centers with Brady pipe markers. Arrows, approximately 6 inch in length and spaced about 10 feet on centers shall indicate the direction of the flow pipe. Locate additional labels as required in Mechanical Rooms. Staple in place, brush with clear lacquer. Markers shall state pipe size, flow direction, and pipe usage (such as "cold water," etc.).

1.36 RECORD DRAWINGS

A. The Contractor shall, during the execution of the work, maintain a complete set of drawings upon which all dimensional locations of equipment piping and all deviations and/or changes in the work shall be recorded. Water, storm, and drainage mains shall be delivered to the Architect/Engineer in good condition upon the completion and acceptance of the work and before final payment is made.

1.37 SUPPLIER RESPONSIBILITY

A. Each supplier, whether furnishing equipment as specified or as a substitution shall be responsible for certifying that the equipment is properly installed and that the warranty is valid. Submit written reports on the installation and the equipment performance when requested to do so by the Architect/Engineer (or his representative). Each supplier shall be responsible for furnishing qualified personnel at the job site at anytime requested by the Architect/Engineer (or his representative) during the construction or warranty periods.

END OF SECTION 210500

SJC EXTENSION OFFICE

SECTION 211300

AUTOMATIC SPRINKLER SYSTEMS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. This specification, in conjunction with the contract drawings and all other specifications indicate materials and operations required for the installation of automatic sprinkler systems, including design, shop drawings, equipment, underground supply system, pipe and fittings above ground, fire department connections, sprinkler systems, guard rail, operating instructions, identification, tests, and sterilization of piping and system.

B. Any variation of the specification's intent or apparent conflict from this specification shall be submitted to the ARCHITECT/ENGINEER for written response. The response shall be incorporated into the drawings and shall be the final word on the item. The Contractor shall incorporate any change at no charge to the Owner.

1.2 REFERENCES

A. This specification section is not limited to the following specification:

210000 – PIPE AND PIPE FITTINGS
210500 – GENERAL FIRE SUPPRESSION REQUIREMENTS
210513 – COMMON MOTOR REQUIREMENTS FOR FIRE SUPPRESSION EQUIPMENT
221000 – PIPE AND PIPE FITTINGS

B. The current editions of the following standards are a part of this specification.

1. National Fire Protection Association (NFPA) Standards.

a) 13 Standard for the Installation of Sprinkler Systems.
b) 14 Standard for the Installation of Standpipes and Hose Systems.
c) 24 Private Fire Service Mains.
d) 70 National Electrical Code.
e) 72 National Fire Alarm Code.
f) 25 Standard for Inspection, Testing and Maintenance of Water Based Fire Protection Systems.

2. American Water Works Association Standard Specifications.

a) C600 Standard for the Installation of Ductile-Iron Water Mains and Their Appurtenances.
b) C150 Ductile-Iron Pipe
c) C110 Ductile-Iron and Gray Iron Fittings.
d) C111 Rubber Gasket Joints for Ductile-Iron and Gray IronPressure Pipe and Fittings.

e) C151 Ductile Iron Pipe Centrifugally Cast for Water
f) C104 Cement-Mortar Lining for Ductile-Iron and Gray Iron Pipe and Fittings.
g) C500 Metal Seated Gate Valves for Water Supply Service.
h) C601 Standard for Disinfecting Water Mains.

C. Underwriters' Laboratories, Inc. (UL), Publication: Fire Protection Equipment List.

D. Factory Mutual System Publication: Approval Guide.

E. American Insurance Association Publication: Internal cleaning of sprinkler piping (GP-4).

1.3 SYSTEM DESCRIPTION

A. Design

1. The designer of the fire protection systems shall meet one of the requirements below.

a) A registered Professional Fire Protection Engineer in the State of New Mexico.

2. The contractor is responsible for the design and installation of the fire protection system in accordance with these specifications and the contract drawings. The Contractor shall coordinate with architectural, civil, mechanical, and electrical, design and construction documents, to ascertain the required information, to affect a properly designed fire protection system for the building construction and occupancy classification.

a) The contractor is responsible to design the automatic sprinkler system in accordance with these specifications and the contract drawings. The contractor shall refer to all architectural, mechanical, and electrical drawings, to ascertain the required information, to affect a properly designed sprinkler system for the building construction and occupancy classification.

3. The design of fire protection systems shall be complete with all necessary accessories for proper operation and shall include seismic support details.

4. The fire protection water supply lines, controlling devices, protective devices, alarm systems, supervisory devices, and related equipment shall be compatible so that all equipment will function together as specified.

5. The design shall comply with all mandatory, advisory interpretations, and recommended applicable rules of the latest editions of the referenced codes and standards in Section 1.3, "References," except where otherwise noted on the drawings or specified herein.

6. The Contractor shall produce design drawings that indicate the extent and arrangement of the fire protection system.

7. The contract drawings indicate the extent and general arrangement of the automatic sprinkler systems.

B. Spacing and Pipe Sizing

1. Unless otherwise specified or shown on the drawings, the sprinkler system shall be a wet pipe system, utilizing a Light Hazard hydraulic design.

2. Hydraulically system shall be designed on the contract drawings having the following characteristics:

a) The design area shall be the hydraulically most demanding "rectangular area" having a dimension parallel to the branch lines equal to 1.4 times the square root of the area of sprinkler operation.
b) Where the design area includes a corridor or tunnel protected by a single row of sprinklers, the maximum number of sprinklers that need be calculated is 10, unless openings into the corridor are unprotected by fire rated construction.
c) Maximum water flow velocity shall not exceed 20 feet per second in any sprinkler system piping of hydraulically designed systems.
d) Hydraulic design shall be based upon the water supply data shown on the drawings or obtained from the local Municipal Water Department.
e) Hydraulic calculation methods shall be used as a minimum for Light Hazard, wet-pipe systems, unless otherwise specified. The minimum operating area allowed shall be either 1500 feet^2 or the entire area for smaller systems. No allowances or reductions shall be permitted without written approval from the ARCHITECT/ENGINEER.
f) Extend all (regardless of job size, new installations, etc.) hydraulic calculations back to the effective point of connection (ring-main) of the sprinkler lead-in to the fire water main supplying the building, unless indicated on the contract drawings.
g) The distance between sprinklers either on branch lines or between branch lines shall not be less than 6 feet distance apart.

C. Seismic Protection

1. Seismic protection for automatic sprinkler systems is required for all new systems.

a) Seismic separation joints are required in areas separating the modified area of the sprinkler system and that area which is not to be upgraded for seismic protection.
b) The installation guidelines for seismic protection in NFPA 13 shall be used. Where an alternative method (other than NFPA 13) of

providing seismic protection of a sprinkler system is to be used, only UL Listed or FM Approved material shall be permitted. The alternative method shall have a design based on a dynamic seismic analysis certified by a registered Professional Engineer in the State of New Mexico and the registered PE shall stamp all drawings.

D. Protection of Areas Subject to Freezing

1. All anti-freeze systems require the installation of a reduced pressure backflow prevention (RPBFP) device. If a RPBFP is installed on the entire sprinkler system, then no additional RPBFP is required for the anti-freeze system.

2. Gridded or looped dry pipe or preaction systems are not allowed. The design for these systems shall be of the conventional tree design.

3. All dry-pipe systems, regardless of the volume, are required to deliver sustained waterflow to the inspector's test connection within 60 seconds of the opening of the inspector's test valve. All dry pipe systems in excess of 500 gallons shall be provided with a UL listed or FM approved quick opening device, exceptions to NFPA 13 in this instance do not apply.

E. Manifolding of sprinkler risers to one single sprinkler lead-in shall not be permitted.

F. Fire Department connections shall be as follows:

1. Install Fire Department connections, where shown on the drawings.

2. When the sprinkler system hydraulic demand (not including exterior hose demand) exceeds 1000 gpm, a 6-inch 3-way Fire Department connection shall be provided.

3. A single fire department connection shall be provided to supply all fire protection systems for a building that has greater than 5 sprinkler risers.

1.4 SUBMITTALS

A. Shop Drawing Submittals

1. Provide as required by Division 1, Descriptive Submittals, to the ARCHITECT/ENGINEER.

2. As soon as practicable after award of contract and prior to fabrication, contractor shall submit to the ARCHITECT/ENGINEER for approval, complete shop drawings, manufacturers' catalog data, system and component operating instructions and hydraulic calculations for the sprinkler system and underground piping shown on plot plans.

3. NO INSTALLATION WILL BE PERMITTED prior to the ARCHITECT/ENGINEER approval of complete shop drawings.

B. Presentation:

1. New Sprinkler Systems

a) New drawings shall be identical in size, scale, orientation, and title as the original building construction contract drawings unless otherwise noted.

C. Drawing Details

1. Unless otherwise specified or shown on drawings, new floor plans and full height cross sections shall be drawn at a scale of 1/4" = 1'-0" and arranged such that the north arrow points to the top or to the left of the sheet. Other details shall be drawn to a larger scale, as required. Riser elevation details shall be drawn to a scale of 1/2" = 1'-0"

2. No more than one building or one floor shall be shown on a sheet.

3. Drawings shall show all details required and recommended by NFPA 13, for "Working Plans" in addition to the following:

a) A name or room number shall appear in each room; and a scaled key plan, oriented the same as the floor plan, shall appear on each partial plan sheet.
b) All obstructions to the sprinkler layout shall be shown, including but not limited to, HVAC ducts, lighting, electrical buss ducts.
c) Building column lines shall be labeled.
d) Existing work and new construction shall be clearly differentiated on the drawings (where applicable).
e) All lines and details shall be drawn; "opposite hand" or mirror image IS NOT acceptable -- separate drawings shall be made.
f) All pipe lengths shall be shown, center-to-center of fittings.
g) Where more than one type of pipe is used, each piece of pipe shall be identified as to type on the drawings.
h) The drawings shall be kept neat and well arranged, with legible notes and figures to permit photographic reduction to one half size or smaller.
i) No lettering shall be smaller than 1/8 inch.

D. Plot Plans

1. Plot plans shall be drawn to 1" = 20'-0" unless otherwise shown on the contract drawings.

2. Previous references to orientation, legibility, and lettering shall apply.

3. Plot plans shall show all details required by NFPA 13 and 24.

E. As-Built Drawings

1. Upon completion of the work, the Contractor shall revise all drawings to agree with the construction as actually accomplished. The notation "As-Built" shall be entered in the revision block, dated and initialed.

2. The As-Built drawings shall show the entire sprinkler system as it existed at the completion of the contract work.

3. The original As-Built drawings shall be delivered as directed by the ARCHITECT/ENGINEER.

1.5 ALTERNATES/ALTERNATIVES

A. Where specific manufacturers or model numbers are mentioned in these specifications, proposed substitutions shall be included in the submittal package furnished to the ARCHITECT/ENGINEER for approval after contract award.

B. If UL-listed or FM-approved equipment is commercially available, none other will be approved.

1.6 WARRANTY

A. All sprinkler system components furnished under this contract shall be guaranteed against defective design, materials, and workmanship for the full warranty time, which is standard with the manufacturer and/or supplier, but in no case less than one year from the date of system acceptance.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Materials and equipment used in the installation of the sprinkler system shall be new and listed by the UL Fire Protection Equipment Directory or the FM Approval Guide, latest edition. The standard products and the latest design of the manufacturer shall be used, and installed per their listing, approval, or manufacturer recommendations. All products listed or approved by prior editions of the UL Director of FM Approval Guide will not be acceptable, if not listed or approved in the most recent edition of the directory or approval guide.

B. Where two or more units of the same class of equipment are required, these units shall be products of the same manufacturer (e.g., couplings shall be from one manufacturer.) All materials shall be installed per their listing or approval and per the manufacturer's recommendations and specifications.

C. Tape for screwed joints shall be minimum ½-inch wide.

D. Corrosion protection tape shall be Scotchwrap 51, manufactured by 3M Company or approved equivalent.

2.2 SPRINKLERS

A. Types

1. Unless otherwise specified, allowed per other section of this document, or shown on the drawings, sprinklers shall be nominal, ½-inch orifice, automatic, closed-head sprinklers rated at 155°F (68°C) Quick Response, frangible bulb type fusible element.

2. Higher temperature rated sprinklers shall be installed where heads are exposed to high ambient temperature, exposed to the direct rays of the sun, beneath skylights or windows and installed in the vicinity of heating equipment, or in attics. The sprinkler temperature chosen shall be a minimum of 50°F above the maximum ambient temperature, and no greater than 100°F above the ambient conditions, unless specifically directed by NFPA 13.

3. Rooms containing electrical equipment shall be protected with sprinklers having the following minimum temperature ratings, but no less than 50°F above normal ambient room temperature:

a)	Transformer and Switchgear rooms;	212°F (100°C)
b)	Computer rooms	155°F (68°C) QR
c)	Top of elevator shafts	212°F (100°C)

4. On-Off sprinklers are not allowed. FM approved or UL listed on-off sprinkler systems, like the Viking FireCycle (or approved equal), are allowed.

5. Quick Response (QR) sprinklers, where specified on the drawings, shall have a Response Time Index (RTI) of 50 or less in English units and 28 or less in metric units.

6. Sidewall sprinklers shall be Underwriters' Laboratories listed or Factory Mutual approved for Ordinary Hazard Occupancy.

7. Extended coverage sprinklers are not allowed.

8. Only sprinklers with a "Belleville" type seal shall be used. No O-Ring sealed sprinklers shall be allowed either in "crush" seals or "radial" seal styles. Sprinklers shall be of all brass frame construction with a coated metal to metal seating mechanism.

9. Only sprinklers with integral shields listed by UL as "intermediate level" sprinklers or by FM as "racked storage" sprinklers are acceptable indoor where shield are required over ordinary sprinklers. Shop-made water shields are not allowed, nor are after market attachments designed as water shields. "Heat collection devices" for use with sprinklers shall not be allowed.

10. Sprinklers installed in storage racks shall be equipped with a listed sprinkler head guard with an integral water shield to protect the in-rack sprinklers fusible element from water spray by a sprinkler above it. Roof sprinklers subject to mechanical damage shall be equipped with a listed sprinkler head guard.

B. Protection Against Freezing

1. Horizontal dry sidewall sprinklers shall be used in lieu of antifreeze loops for narrow unheated areas adjacent to heated areas, such as docks, covered loading platforms, vehicular air locks, elevator hoistways, and gas bottle or other storage sheds.

2. The depth of the protected space shall not exceed 10 feet.

3. The dry sprinkler shall extend a minimum of 12 inches into the heated space. For refrigerated spaces, the length dry sprinklers shall extend into the heated space shall be as specified by the ARCHITECT/ENGINEER.

C. Position and Finish

1. Sprinklers installed on exposed piping shall be manufacturer's standard finish pendent sprinklers. Sprinklers and escutcheons installed below dropped ceilings shall have a finish matching the color of the ceiling tile. Only factory applied finishes shall be acceptable. If the factory has a finish that cannot match the ceiling tile color, standard finish sprinklers are allowed.

2. In rooms where sprinkler heads penetrate a suspended ceiling, only quick response, semi-recessed or recessed sprinklers are acceptable. Standard pendant sprinklers with "cup and skirt" escutcheons, one-piece escutcheons, or flush or concealed sprinklers are not allowed.

3. Escutcheons, head guards, and water shield from the supplied sprinkler manufacturer shall be used solely with the installed sprinkler. No after market escutcheons, head guards, or water shields are allowed.

4. Head guards shall be two-piece, universal attachments, bolted in place on the sprinkler. "Snap-on" one-piece units are not allowed.

2.3 PIPE

A. Exterior Water Distribution

1. Ductile Iron: Piping below floor to flange above floor from 5 feet outside building. ANSI C150 A21.51, minimum working pressure 200 psi. Cement mortar lined per ANSI A21.4. Mechanical joint fitting per AWWA C110 or push-on fittings per AWWA C110 and ANSI A21.11. Fittings shall be cement lined per ANSI 21.4, standard thickness.

2. Polyvinylchloride (PVC) PLASTIC: Pipe, couplings and fittings conforming to ASTM D 1784, Class 12454, product standard AWWA/ASNI C900 to outside building.

   a) Pipe 4" through 12" size. Pipe, couplings, and fittings shall conform to AWWA C900, class DR18, CI pipe dimensions only, elastomeric gasket joints. Gaskets per ASTM F477.

B. Pipe for installation above ground shall be metal conforming to the requirements of NFPA 13. No plastic pipe is permitted in any location whether or not permitted by NFPA. Pipe shall be listed by UL and be FM approved, and installed per its listing and approval and meet the following requirements:

1. Mechanical rolled groove pipe or cut groove pipe shall not be used at fire protection risers or for segmented arcs. Use swing jolt at locations of segmented arcs.

2. Unless otherwise specified, the minimum steel pipe wall thickness shall be Schedule 10 for pipe sizes 3 inches or larger. Pipe sizes smaller than 3 inches shall be Schedule 40. Threaded or cut groove steel pipe shall be Schedule 40 for sizes less than 8 inches and a minimum of Schedule 30 in sizes 8 inches and larger for pressures up to 300 psi.

3. Mechanical rolled groove pipe or welded pipe shall be a minimum of Schedule 10 for sizes 3 inches up to 5 inches, 0.134-inch wall thickness for 6 inches, and 0.188-inch wall thickness for 8- and 10-inch pipe for pressures up to 300-psi.

4. Steel pipe, installed for the water motor alarm line, piping from drain line valves and inspector's test valves, dry pipe and preaction sprinkler system piping, and where pipe is exposed to outdoor weather, etc., shall be internally and externally galvanized. Galvanized fittings are required where galvanized piping is used. Any piping leading to a pressure-operated waterflow indication device shall also be galvanized. The starting point is on the alarm connection to the alarm check valve.

C. Mechanical rolled groove pipe or cut groove pipe shall not be used at fire protection risers or for segmented arcs. Use swing jolt at locations of segmented arcs.

D. Braided stainless steel (or other materials) flexible sprinkler drop shall not be used to install sprinklers.

2.4 TRUST BLOCKS

A. All underground water line tees, crosses, bends and valves shall be provided with concrete blocking. Concrete blocking shall be used for cast-iron or vitrified clay tile fittings where a change of flow direction occurs. All fittings at bends in the pipe line shall be firmly wedged against the vertical face of the trench by means of concrete thrust blocks bearing on undisturbed earth, to prevent the fittings from being blown off the line when under pressure. Fittings at vertical

bends downward shall be anchored with concrete anchors as required. Thrusts blocks shall be determined using an allowable soil bearing pressure of 1,500 PSF at 200 psi test pressure in water line. No blocking will be covered or backfilled until inspected and approved by the Architect/Engineer.

B. Mechanically restrained joints shall be permitted in accordance with manufacturer's detail and recommendations.

2.5 PIPE FITTINGS

A. Pipe fittings for installation above ground shall conform to the requirements of NFPA 13 and shall be FM approved or UL listed.

1. Mechanical groove couplings are required on all 4 inches and larger pipe.

2. Plain-end pipe couplings shall not be used in any new installation.

3. Galvanized pipefittings shall be installed where galvanized piping is specified.

4. Welded branch outlet fittings (weld-o-lets, groove-o-lets, etc) shall be minimum Schedule 10 for pipe sizes 3 inches or larger. Pipe sizes smaller than 3 inches shall be Schedule 40 standard wall pipe thickness. Welded outlets shall be UL listed or FM approved, affixed with the UL or FM identification stamps, and pressure rated for 300-PSI maximum.

5. Adjustable, two-piece drop nipples shall not be used. All drop nipples shall be one-piece, non-adjustable units with a minimum 1-inch diameter.

2.6 PIPE HANGERS, SUPPORTS AND SEISMIC BRACING

A. Pipe hangers, and hangar assemblies shall be UL listed of FM approved.

B. C-clamps and beam clamps shall have lock nuts and retaining straps, or clips, and pipe rings shall be of the solid-band adjustable swivel type.

C. Provide rod-ceiling plates at finished ceilings for coach screw rods, expansion shields, and toggle hangers.

D. All seismic bracing devices and flexible couplings shall be specifically UL listed or FM approved and installed per their listing or approval.

E. When fastening hangars to purlins, bolt-through fastening methods shall be used. Beam clamps with restraining straps shall not be used in any circumstance.

F. All seismic brace members shall be continuous. Under no circumstances shall members be spliced or offset.

G. The use of "Sammy" hangers shall not be used through "B-Deck" at the roof level. "Sammy" screws may be used in other locations as appropriate to manufacturer installations requirements and details.

H. Tension-only seismic bracing systems shall meet the following.

1. The tension-only system shall be UL or FM approved for seismic service and installed in accordance with listing limitations and installation instructions.

2. A means to prevent vertical motion due to seismic forces shall be installed at the brace location.

3. Two tension only braces shall be installed in opposing directions at each brace location.

2.7 FIRE PROTECTION CHECK VALVES

A. Check valves in sprinkler system shall be UL listed or FM approved, have hand hole covers to provide adequate access to facilitate inspection and repair, without the removal of the valve from the system, and shall be listed for installation in the vertical or horizontal position. Wafer check valves are unacceptable. All check valves shall have a working water pressure of 250 PSI.

B. Alarm check valves (wet pipe, dry pipe, deluge, preaction, etc.) shall be provided on all sprinkler risers and have the following.

1. The alarm check valve (ACV) shall be equipped with a removable hand hole cover assembly, and shall be listed for installation in the vertical or horizontal position.

2. The ACV shall be equipped with gauge connections on the system side and supply side of the valve clapper.

3. ACV trim piping and fittings shall be internally and externally galvanized.

4. Ported alarm connections on the ACV shall be to a retard chamber to absorb variable pressure surges.

5. Only "Flange x Flange" ACV devices shall be installed.

6. Wet-pipe systems shall use a variable-pressure alarm check valve. Plain-type check valves are not allowed. Sprinkler alarm valve shall be equipped with an external bypass to eliminate false water flow alarms.

C. Backflow prevention devices shall be installed on all sprinkler systems as follows.

1. A reduced pressure backflow prevention assembly (RPBFP) shall be installed to prevent cross-connection contamination between potable water systems and any fire sprinkler system, at the service connection for the fire sprinkler system.

2.8 FIRE PROTECTION INTERIOR CONTROL VALVES

A. Each system shall have interior control valves as follows:

1. A control valve shall be installed for isolation of each floor of multistory buildings.

2. Interstitial spaces, in-rack sprinkler systems, mezzanines, etc., shall have control valves for system isolation at the feed-main.

3. All control valves shall be provided with an electric valve supervision device, connected to the Fire Alarm System.

4. All inside control valves shall be OS&Y. Butterfly valves are not permitted. Valves shall be manufactured in accordance with AWWA Standard C500, and have a clear waterway equal to the full nominal diameter of the valve. Valves shall be provided with a handwheel, with arrow cast in metal to indicate direction of opening.

2.9 SUPERVISORY DEVICES

A. When specified on the contract drawings, supervisory devices shall be compatible with the Fire Alarm System.

B. Provide the equipment listed below.

1. Electric valve supervision switches shall be installed for all internal (inside) and external (outside) fire protection valves 2-1/2 inches or larger. The devices shall be electrical; single-pole, double-throw; with normally closed contacts and include design that signals controlled valve is in other than fully open position.

2. For wet pipe sprinkler systems, install vane-type waterflow alarm initiation devices with 250-psig pressure rating and designed for horizontal or vertical installation. Include two single-pole, double-throw, circuit switches for isolated alarm and auxiliary contacts and complete with tamperproof cover that sends signal if removed.

3. All vane type waterflow alarm initiation devices shall be equipped with an adjustable delay of audible alarm initiation. Adjustment range shall be from 0 to 120 seconds. Vane type waterflow switch shall be Potter Model VSR-F or approved equal.

4. Waterflow vane-type alarm initiation devices shall be labeled as to the correct orientation of flow when mounted on system piping. When drilling of the system riser it is necessary to mount flow switch, the drilled out disc (coupon) shall be retrieved and attached to the mounting u-bolt of the flow switch.

5. Where pressure operated waterflow alarm initiation devices are used, any valve installed upstream of the device on the alarm line shall be electrically supervised, using the Potter Model BVS or approved equal. Pressure operated alarm initiation devices shall be an electrical-supervision type, waterflow switch with retard feature. The device shall

include single-pole, double-throw, normally closed contacts and design that operate on rising pressure and signals waterflow.

a) EXCEPTION: Where the waterflow alarm initiation device is used only for the purpose of an outside electric bell in lieu of the water motor gong device.

6. Any device that is to be installed in a hazardous location defined by NFPA 70 shall be rated for occupancy.

2.10 FIRE DEPARTMENT CONNECTIONS

A. Fire Department connections shall have a minimum of two 2-1/2 inch inlets with National Standard Hose (NWSH) threads, internal double clapper check valve, brass plugs, and attached chains.

B. Fire Department connections shall be installed at each new alarm check valve, dry pipe valve, deluge and preaction valve and standpipe, unless the sprinkler system is supplied by a Fire Department connection in the yard main, or as otherwise noted in NFPA 13

C. The completed installations shall include a metal sign or escutcheon plate, with raised lettering, marked "FIRE DEPARTMENT CONNECTION STANDPIPE-AUTO S0KR," 'AUTOMATIC SPKR," or "STANDPIPE," as appropriate. Additional signs for systems such as foam water sprinkler systems or other alternative designed systems, as required by other NFPA Standards, shall also be provided by the Contractor where required.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Responsibilities

1. The Contractor is responsible for the installation of the automatic sprinkler system in accordance with these specifications and the contract drawings. The Contractor shall coordinate with architectural, mechanical, and electrical, design and construction documents, to ascertain the required information, to affect a properly designed and installed sprinkler system for the building construction and occupancy classification.

2. The installation of the automatic sprinkler system shall be complete with all necessary accessories for proper operation and shall be accomplished by a licensed sprinkler contractor or licensed company regularly engaged in this type of work, and in accordance with requirements of the National Fire Protection Association Standards (NFPA).

3. An individual with a minimum NICET Level II shall supervise the installation.

4. The fire protection system installation shall be coordinated with the other trades (mechanical, electrical and structural, etc.).

5. The installation shall comply with all mandatory, advisory interpretations, and recommended applicable rules of the latest editions of the standards listed in Section 1.3 of this document, except where otherwise noted on the drawings or specified herein.

B. Contamination and Obstruction Prevention

1. Pipe interiors shall be kept free of debris.

C. Pipe and Fittings Aboveground

1. Pipe, fittings, and hangers shall be installed where shown on the drawings and in accordance with the requirements of NFPA 13.

2. Overhead sprinkler piping, drain and test piping, fire department connection piping, etc. installed through exterior walls shall be galvanized. All sprinkler piping shall be substantially supported from building structure and only UL listed or FM approved type hangers shall be used. Sprinkler lines under ducts shall not be supported from ductwork but shall be supported from building structure (with trapeze hangers where necessary).

3. Flanged Fittings or Mechanical Groove Couplings

a) Flanged fittings or mechanical groove couplings shall be used at the base of risers, in the risers of multiple-story sprinkler systems at each floor-system connection, and in feed main. Flanged fitting shall be used for alarm valve assemblies.
b) A flanged tapered reducer shall be installed at the flange and spigot piece when riser is smaller than the underground supply line.
c) Pipe shall be installed straight and true with no greater deflection at mechanical groove pipe couplings than is recommended by the manufacturer.
d) Pipe end couplings are not acceptable.
e) Only rigid-type mechanical couplings shall be used, unless specifically directed by NFPA 13 such as for specific seismic locations. Only in those areas identified by NFPA 13 where flexible type mechanical couplings are specified will the use of flexible couplings be permitted. All other parts of the system shall use rigid-type mechanical groove couplings.

4. Pipe Hangers and Anchors

a) Hanger rods for all equipment, pipes, ducts, trapezes, vibration isolators, etc., shall be installed straight, true and plumb. Do not bend or flex hanger rods to accommodate sloping structures, avoid obstacles, or for any other purpose. Where necessary,

utilize swivel beam clamps, beveled or swivel hardware, angled, swivel or hinged brackets spanning members or other appropriate means of connection.

b) Offsets in hanger rods will not be permitted.

c) Concrete anchors shall be installed by drilling and installing a UL listed or FM approved anchor. Explosive driven fasteners as a method of installing anchors or hangers shall not be permitted.

d) Supports, hangers, braces, etc., shall be attached to the building primary structural members only.

e) When fastening hangers or braces to bar joists, the fastener shall be located within 4 inches of the panel point on the bar joist.

f) All piping larger than 4 inches in diameter shall be supported from a minimum of two-bar joists when run parallel to a bar joist.

5. Welded Joints

a) Welded joints are acceptable when shop fabricated in conformance to provisions of NFPA 13.

6. Screwed Joints

a) Teflon paste and tape shall be used as pipe-joint compound at screwed joints.

7. Bushings

a) Bushings shall not be permitted.

8. Control Valves

a) Control valves shall be provided with identification signs describing the areas protected. Where the valve location is concealed above the ceiling, a sign below the ceiling shall indicate the valve location, and identify the protected area.

9. Wall, Ceiling, and Floor Penetrations

a) Pipe sleeves shall be installed and properly secured in place at all points where sprinkler piping passes through concrete or masonry construction. Sleeves through all walls and floors shall provide adequate clearance for slight movement of the piping. The guidance in NFPA 13 guidance for seismic areas shall be followed.

b) Sleeves for pipes passing through floors of concrete or waterproof construction shall project 3 to 6 inches above floors to prevent leakage. Sleeves through walls shall be cut flush with each surface unless otherwise specified. Sleeves shall be caulked to make penetration watertight.

c) Unless otherwise specified, sleeves shall be of Schedule 40 steel and a minimum of two pipe sizes larger in diameter than the passing pipe.

d) Holes through walls, floors, and ceilings of other than concrete or masonry construction shall be large enough to accommodate pipe expansion. Holes through existing concrete floors and walls shall be core drilled to provide clean, neat holes. Spaces between pipe and sleeve or pipe and opening for floors and exterior walls shall be filled with a non-hardening sealant material and made watertight.

e) Where fire rated barriers are penetrated, a UL listed fire barrier system shall be installed to retain the fire resistance rating of the barrier.

f) Escutcheons shall be provided at wall, ceiling and floor penetrations of piping in occupied areas.

10. The cutting of structural members for the passage of sprinkler piping or for pipe-hanger fastenings is not permitted.

11. Joints

a) Joints shall be made in accordance with the requirements of NFPA 13.

b) Joints shall be left exposed until final inspection and testing have been witnessed.

c) Swing joints are preferred for connecting pendent sprinklers to branch lines.

12. Dielectric unions shall be used to connect dissimilar metals (such as steel to copper) to prevent electrolytic action.

3.2 SPRINKLER SYSTEM ALARM CHECK VALVES

A. Alarm Check Valves (ACV) shall be provided with internally and externally galvanized trim piping and fittings, pressure gages, a retarding chamber, water motor gong, alarm switch, testing bypass, and all necessary pipe, fittings and accessories.

B. The retarding chamber drain line shall be piped independently of the main drain line.

C. The drain line from the water motor gong shall be piped to discharge through the wall as close to the grade line as possible.

D. Piping between the ACV and a pressure actuated alarm-initiating device shall be galvanized piping not less than 3/8-inch nominal pipe size.

E. Piping supplying the retard chamber, water motor gong, and water motor gong drain shall be galvanized. Galvanized fittings are to be used where galvanized piping is required.

3.3 SPRINKLERS

A. Pendent sprinklers below ceiling shall be aligned, and parallel to ceiling features, walls, etc. In areas without a suspended ceiling, install sprinkler piping as high as possible, using necessary fittings and auxiliary drains to maintain maximum clear headroom.

B. Where two sprinkler systems abut the pendent sprinklers shall be aligned in different directions to distinguish the boundaries of each sprinkler system.

C. Sprinklers under open grating shall be intermediate levels.

D. Sprinklers shall not be installed closer than 6 feet apart.

E. Dry pendant and horizontal dry sidewall sprinklers shall only be installed in screwed tee fittings.

F. Ceiling Areas: Where suspended ceilings are installed, the sprinkler contractor shall install pendent sprinklers as shown on the reflected ceiling plans. Where these plans do not specify the location of the pendent sprinklers, the Contractor shall obtain the reflected ceiling plans and design sprinkler locations at least six inches from ceiling tile edges, 2 feet 6 inches from HVAC supply and return louvers, dimension the locations, follow a repetitive pattern, and locate sprinklers along straight lines to the extent possible. Swing joints shall feed pendant sprinklers from 1-inch outlet tees in branch lines.

G. Stairs: Sprinklers shall be installed throughout stairways, and at every landing.

3.4 ELEVATOR SHAFTS AND MACHINE ROOMS

A. Sprinklers at the tops of all elevator shafts and in the elevator equipment rooms shall be protected from freezing.

B. Provide an OS&Y gate valve to shut off all sprinkler water flow into the elevator shaft and into the elevator machine room. Where possible, piping should be arranged such that a single valve can shut off water to both locations, and shall be at a readily accessible location, no more than 7'0" above finished floor, inside a clearly marked wall cabinet.

3.5 DRAINS

A. Two-inch drains shall be installed on all main risers and downstream of any interior sectional valves, and shall be piped to drain.

B. A pressure gage cock and approved gage shall be installed downstream of interior sectional valves of 4-inch size and larger. 3/4-inch valve auxiliary drains with standard hose threads and caps shall be installed at all low points in the system, where more than five sprinklers are trapped. Where the capacity of trapped piping exceeds 20 gallons, the overflow shall be piped to drain.

C. Inspector's test connections shall be installed on each sprinkler system as near the most hydraulically remote end of the system as possible. The orifice shall be sized to discharge a flow equivalent to the smallest orifice sprinkler in the system. The inspector's test valve shall be located not more than seven feet above the floor in a visible, easily accessible location. For antifreeze systems, the orifice shall be replaced by a plugged outlet.

D. Drains shall be piped to discharge to drain, and the discharge shall be visible either by open-end or sight drain fitting.

E. Drains and inspector's test connections through outside walls shall be run through the walls as close to the floor or grade line as possible, terminating with a 45-degree galvanized elbow turned down to splash blocks.

F. Concrete splash blocks, 18" x 18" x 4" minimum in size, shall be installed under each drain or test outlet. The top of the block shall be 1 inch above grade, with a slope of 1/2 inch per foot away from the building wall.

3.6 FIRE DEPARTMENT CONNECTIONS

A. The check valve and normally open automatic ball drip (ABD) shall be located at points where they will not be subject to freezing temperatures, and the discharge from the ball drip shall be piped to drain. The ball drip shall close when the flow of water through the valve is in the range of 4 through 10 gpm. All ball drips shall be rated at 175 psi. Use valve- drains in place of automatic ball drip drains when the static head of water above the ABD will exceed 11'6". Check valves shall be UL or FM approved and shall have bodies with the UL or FM stamp.

B. The Fire Department connection shall be installed between 18 inches and 36 inches above grade.

3.7 FIRE HOSE STATIONS

A. Where hose stations are called for on the contract drawings, they shall be 2-1/2-inch hose valves, with 2-1/2" x 1-1/2" National Standard Hose thread adapters, connected to the sprinkler system in accordance with NFPA 13, or as shown on the contract drawings.

B. The centerline of the hose valve shall be installed between 4' and 5' above finished floor.

C. Unless otherwise specified or shown on the drawings, no hose is required.

D. Where hose cabinets are required, they shall be of the horizontal fold, hump type, with full tempered glass doors.

3.8 IDENTIFICATION

A. Control, drain, test, and alarm valves and zone waterflow switches shall be provided with identification signs of the standard design adopted by the automatic-sprinkler industry, or their equivalent.

B. A hydraulic data information nameplate shall be secured to the riser with durable wire, chain, or equivalent, directly above the controlling alarm check valve and shall include the following design data.

1. Building designation

2. Location of remote area

3. Design density

4. Area of application

5. System demand (gpm and psi at base of riser)

6. Data shall be permanently engraved on the nameplate as follows:

a) Material shall be durable plastic or aluminum; Minimum height of lettering is 1/8".

C. The Contractor shall furnish and place in a plastic envelope attached to each sprinkler alarm check valve riser, one complete set of typed or printed maintenance and operating instructions, a set of prints of the as-built working drawings and hydraulic calculations of the sprinkler system.

D. Contractor shall supply each riser with a cabinet containing maintenance and repair equipment (spare heads, wrench, etc.)

E. Each Contractor shall affix an identification tag on each system riser indicating

Name of the Contractor
Business Address of the Installing Contractor
Phone Number
24-hour emergency contact phone number

3.9 FLUSHING

A. Before connecting sprinkler systems to the main supply, each sprinkler supply line shall be flushed out thoroughly by the Sprinkler Contractor through an unrestricted opening not less than 4 inches in diameter. Minimum flowing quantities are specified in NFPA 13.

B. Failure to comply with this requirement shall necessitate flushing of the entire sprinkler system by the Contractor at no additional cost to the Owner.

C. A 4-inch temporary pipe or two 2-1/2" fire hoses shall be provided by the Contractor to discharge water to a suitable location, as designated by the ARCHITECT/ENGINEER.

3.10 TESTING

A. Aboveground Tests:

1. Prior to acceptance of the installation, the Contractor shall subject the system to the tests required by NFPA 13 for the completion of the Contractor's Material and Test Certificate. In addition, complete operating test of dry pipe, preaction, deluge, water-spray and foam water systems shall be performed.

2. Hydrostatic testing shall be performed before any ceiling is installed below the sprinkler piping. Each water control valve shall be fully opened and closed under water pressure to ensure proper operation.

3. Where sprinkler locations are roughed-in, using plugged drop nipples projecting below the level of the finished ceiling, the hydrostatic testing shall be performed two times.

   a) First, after the system is completed using the plugged drops, and before the ceiling panels are installed.
   b) Second, after the plugged drop nipples are cut to length for the finished ceiling, or replaced with other drop nipples of the correct length, and the sprinklers installed.

4. The addition of sodium silicate (also known as water-glass) and related substances before hydrostatic testing, to stop water leakage, is not permitted.

5. Pipe interiors shall be kept free of debris.

B. Alarm Testing

1. Contractor shall be responsible for testing new alarms and modified alarms installed under this contract. Defective alarms shall be replaced immediately.

3.11 PROTECTION AGAINST FREEZING

A. Sprinkler piping passing through any unheated spaces in, under, or outside buildings exposed to freezing, shall be protected as shown on the plans or in accordance with the methods specified in NFPA 13. Exposed to freezing is defined as any location where the temperature may drop below (40°F) 5°C at any time during the year.

B. Heating shall be provided for sprinkler-protected spaces in lieu of providing anti-freeze systems except where otherwise noted on the drawings or specified herein.

3.12 PROTECTION FOR BACKFLOW PREVENTION

A. A reduced pressure backflow prevention assembly (RPBFP) shall be installed on all new systems and where shown on the drawings for modifications to systems to prevent cross-connection contamination between potable water systems and any fire sprinkler system. Install the RPBFP at the service connection for the fire sprinkler system or as noted on the contract drawings.

B. RPBFP assemblies shall be either FM approved or UL listed and be approved by the Foundation for Cross-Connection Control and Hydraulic Research, University of Southern California (USC-FCCHR) and the International Association of Plumbing and Mechanical Officials (IAPMO).

C. Backflow prevention assemblies used or installed under this contract shall be tested by a "Certified Backflow Control Assembly Tester" who possesses a current (within three (3) years from date of issuance) certificate that confirms successful completion of an approved training course.

D. RDBFP assemblies shall be installed in accordance with AWWA Manual M14 requirements, or as directed by the SDR.

E. If RDBFP devices will be installed outside the building they must be in heated enclosures and with adequate space for inspection, tests and maintenance.

F. Adequate drainage shall be provided for RDBFP and meet the following:

1. Discharge shall be piped full size (of the relief valve) and extended to a drain.

2. Discharge piping shall be sloped 1/8" per foot and be Schedule 40, galvanized.

3. French Drains are not allowed.

G. The Contractor shall perform an operational test on any new backflow prevention assemblies used or installed under this contract.

3.13 PAINTING AND LABELING

A. Contractor shall paint those portions of fire protection as required by Painting Specification 09900. Labeling shall be as follows:

1. Sprinkler system (e.g., inspectors tests, drain valves) shall be labeled with all information required by NFPA Standard 13.

2. Labeling shall be accomplished with the use of permanently marked weatherproof metal or rigid plastic identification signs. The signs shall be secured with corrosion-resistant wire, chain, or other approved means. These signs shall be provided by the manufacturer, manufacturer's representative, or installer of the sprinkler system.

3. Sprinkler riser shall be labeled with building and sprinkler system riser numbers. Labeling shall be accomplished with the use of "Brady" or approved equal self-sticking labels. The color and size shall contrast the surface that it is applied to.

3.14 DISINFECTION

A. Piping installed under this contract shall be disinfected per AWWA C651 before it is placed in operation, by using one of the following methods.

B. Continuous Feed Method

1. Place calcium hypochlorite in pipe sections when installing pipe or inject liquid chlorine into the system via the injection port. Pipe is filled with water and chlorine concentration shall remain at 10 mg/l for a minimum of 24 hours. During this time, all valves in new section will be cycled open and closed to allow for adequate disinfection. Valves connecting the new or repaired line with mains in active service shall remain closed to prevent chlorine pollution.

2. Samples shall be drawn at 1-, 4-, 8-, 12-, 16-, 20-, and 24-hour marks to determine the chlorine concentration. Acceptable tests are the N-diethyl-p-phenylenediamine (DPD) drop dilution method (AWWA C651, Appendix A) or the High Range Test Kit. The tests shall be done by the Contractor.

C. Slug Method

1. Similar to the continuous feed method. Follow AWWA C651. Chlorine concentration to be 100 mg/l for a minimum of 3 hours. During this time, all valves shall be cycled open and closed to allow for adequate disinfection. Valves connecting new or repaired lines with mains in active service shall remain closed to prevent chlorine pollution.

2. Samples shall be drawn every 15 minutes to determine concentration. Acceptable tests are the DPD drop dilution method or the High Range Test Kit. The tests shall be conducted by the Contractor.

D. Repairing or Cutting into Existing Mains

1. New interior piping surfaces shall be swabbed with a one-percent hypochlorite solution. The section being modified shall be subjected to a high chlorine disinfection process per AWWA C651. The concentration shall be a minimum of 300 mg/l for 15 minutes.

2. Samples shall be drawn before the chlorine is injected and every 5 minutes thereafter. Chlorine concentration shall be tested by the Contractor using the High Range Test Kit.

E. Flushing

1. After the lines have been chlorinated using one of the above methods, it becomes necessary to flush the lines with water until test sample indicates that the water is suitable for drinking. The residual chlorine concentration in the water is to be between 0.2 and 2.0 mg/l, as measured using a Low Range Test Kit.

F. Bacteriological Testing

1. All new and modified water lines require testing for coliform organisms per AWWA C651. The testing shall occur after successful chlorination and flushing of the lines. Samples shall be taken from the new line in sodium thiosulfate treated sterile bottles and analyzed as specified by APHA's Standard Methods for the Examination of Water and Wastewater.

2. Results shall be recorded with the original documentation of results attached. These will be used for auditing purposes.

3. Fire protection lines will not be accepted until a negative bacteriological test is performed. Lines will be chlorinated and flushed repeatedly, until such a negative test is accomplished.

END OF SECTION 211300

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SECTION 220000

PLUMBING INDEX

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including General Special Conditions and the General Requirements, apply to the work specified in this section.

1.2 DESCRIPTION OF WORK

A. Furnish all service tools, equipment, etc., which are required for the complete installation of all Plumbing Work, as indicated on the Drawings and specified herein. Plumbing work indicated on the Drawings and/or specifications covering other trades shall conform to Division 22 of these Specifications.

B. Work or equipment not indicated or specified, which is necessary for the complete and proper operation of the Plumbing systems shall be accomplished without additional cost to the Owner.

C. Furnish all labor and materials required for plumbing service connections to all the various items of equipment requiring plumbing or piping throughout the project shown on the Contract Drawings (even if not shown on Plumbing Drawings). Coordinate with other trades for the installation of required connections and service.

1.3 PLUMBING DIVISION INDEX

PART 2 – PRODUCTS (Not used).

PART 3 – EXECUTION (Not used).

END OF SECTION 220000

SJC EXTENSION OFFICE

SECTION 220500

GENERAL PLUMBING REQUIREMENTS

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes: General Plumbing Requirements specifically applicable to Division 22 sections in addition to Division 1 - General Requirements.

B. Scope:

1. The work covered by this division consists of performing all operations in connection with the installation of heating, cooling, ventilating, and plumbing including site utility work as indicated under this section. This entire section applies to all mechanical work and all mechanical sections of these specifications. This Contractor shall read and comply with all sections of these specifications including all General and Special Conditions.

1.2 REFERENCES

A. Standard Requirements:

1. For products or 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. All work shall be executed in accordance with the 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. In the event of a conflict between the various codes and standards, the more stringent shall govern. Where these specifications and accompanying drawings conflict with these requirements, the Contractor shall report the matter to the Architect/Engineer. The Architect/Engineer shall prepare any supplementary drawings required, illustrating how the work may be installed so as to comply. On approval of the change by the Architect/Engineer, the Contractor shall install the work in a satisfactory manner without additional cost to the Owner. On completion of the various parts of the work, the installation shall be tested by the constituted authorities and approved, and on completion of the work, this Contractor shall obtain and deliver to the Owner final certificates of acceptance. This Contractor shall furnish copies of each certificate to the Architect/Engineer.

C. The Contractor shall secure all permits and licenses for his work and shall pay all fees in connection with such permits and licenses.

D. The contractor shall hold and save the Owner free and harmless from liability of any nature or kind arising from his failure to comply with codes and ordinances.

E. Any and all meter deposits and all utility extension costs shall be paid by the Contractor whose work is done in connection with the service that the meter is connected to.

F. Schedule of Referenced Organizations: The following is a list of the acronyms of organizations referenced in these Specifications:

1.	AGA	American Gas Association 1515 Wilson Boulevard Arlington, VA 22209
2.	ANSI	American National Standards Institute 1430 Broadway New York, NY 10018
3.	ASHRAE	American Society of Heating Refrigerating and Air Conditioning Engineers 345 East 47th Street New York, NY 10017
4.	ASME	American Society of Mechanical Engineers 345 East 45th Street New York, NY 10017
5.	ASPE	American Society of Plumbing Engineers 960 Illuminating Building Cleveland, OH 44113
6.	ASTM	American Society for Testing and Materials 1916 Race Street Philadelphia, PA 19103
7.	AWWA	American Water Works Association 6666 West Quincy Avenue Denver, CO 80235
8.	AWS	American Welding Society 2501 NW 7th Street Miami, FL 33125
9.	CISPI	Cast Iron Soil Pipe Institute 1499 Chain Bridge Road McLean, VA 22101
10.	FM	Factory Mutual System 1151 Boston-Providence Turnpike Norwood, MA 02062

11.	FS	Federal Specification General Services Administration Specifications and Consumer Information Distribution Section (WFSIS) Washington Navy Yard, Building 197 Washington, DC 20407
12.	NBFU	National Board of Fire Underwriters 5530 Wisconsin Avenue, Suite 750 Chevy Chase, MD 20815
13.	NEC	National Electric Code (of NFPA)
14.	NEMA	National Electrical Manufacturer's Association 2101 L Street, NW Washington, DC 20037
15.	NFPA	National Fire Protection Association Battery March Park Quincy, MA 02269
16.	NSF	National Sanitation Foundation Box 1468 Ann Arbor, MI 48106
17.	OSHA	Occupational Safety and Health Administration U.S. Department of Labor
18.	PDI	Plumbing and Drainage Institute 5342 Boulevard Place Indianapolis, IN 46208
19.	TIMA	Thermal Insulation Manufacturers Association Technical Services 1420 King Street Alexandria, VA 22314
20.	UL	Underwriters Laboratories, Inc. 333 Pfingston Road Northbrook, IL 60062

G. Underwriters Laboratories Inc. (UL): All materials, appliances, equipment, devices, or appurtenances shall conform to the applicable standards of Underwriters Laboratories Inc., where such standards have been established.

1.3 DRAWINGS

A. Drawings and specifications shall be considered as cooperative, and work or materials called for by one and not mentioned in the other, or vice versa, shall be done and furnished as though treated by both.

B. In the cases of discrepancies in figures, drawings, or specifications, the Architect/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 save only at his expense, and, in case of any settlement or any complication arising from such adjustment to the Contractor, he 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 Architect/Engineer for such further drawings or explanations as may be necessary, allowing a reasonable time for the Architect/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, reference shall be made to the Architect\Engineer whose decision shall be final and conclusive. No alleged oral admission, condonation, or inadvertent neglect on the part of the Architect/Engineer will be accepted as an excuse for inferior work.

E. The plans do not give exact details as to elevations of ductwork and 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 the structural conditions, provide proper grading of lines, to avoid all obstructions, to conform to details of installation supplied by the manufacturer of the equipment to be installed, and thereby to provide an integrated, satisfactory operational installation.

F. Should the particular equipment which any Bidder proposes to install, require other space conditions than those indicated on the drawings, the Bidder shall arrange for such space with the Architect/Engineer before submitting his bid. Should changes become necessary on account of failure to comply with these details, the Contractor shall make such necessary changes at his (the Contractor's own expense).

G. The Contractor shall submit working scale drawings of all his apparatus and equipment which in any way varies from these specifications and plans which shall be checked by the Architect/Engineer and approved before the work is started, Contractor before work proceeds. Interference with structural conditions shall be corrected by the Contractor.

H. All equipment shall be installed in accordance with the manufacturer's recommendations. Provide all accessories and components for optimum operation as recommended by the manufacturer.

I. Utilities: The location, size, and pressure of utility lines are shown in accordance with the data given this office by others. As Architect/Engineers, we cannot and do not guarantee the accuracy of this data. Each Bidder shall check and verify this data. The points of connection to utility lines are approximate only and shall be verified by each Bidder prior to submitting his Bid.

J. Site visit: The Contractor shall visit the site prior to bidding and satisfy himself as the conditions under which the mechanical systems are to be installed. No subsequent allowance shall be made in his behalf for failure to make such a visit. Contractor shall examine all work noted under the demolition drawings and all new work and shall satisfy himself as to the extent of work required to be completed.

1.4 SYSTEM DESCRIPTIONS

A. Not Used.

1.5 PRIOR APPROVALS

A. Each equipment item for which the Contractor desires to install equipment other than the specific item identified in the equipment schedule or equivalent equipment by manufacturers specifically named in the schedule, the Contractor shall bear full responsibility to prove to the Engineer that the furnished equipment is equivalent to or better than the specified item. Failure to provide such proof will result in rejection of the shop drawing submittal by the Engineer. Prior written or verbal approval by the Engineer of equipment by other manufacturers will not relieve the Contractor of responsibility to provide equivalence. Prior approval is required, however, any prior approval given is intended only to provide preliminary agreement that the alternate manufacturer may make equipment that complies with the specification requirements and not that all equipment manufactured by him is acceptable.

1.6 SHOP DRAWINGS

A. Shop drawings or fully descriptive catalog data shall be submitted by the Contractor for all items of material and equipment furnished and installed under this Contract. This shall include piping, ductwork, mechanical equipment, plumbing equipment, control items, etc. The Contractor shall submit to the Architect/Engineer a sufficient number of copies of all such shop drawings or catalog data to provide him with as many review copies as he may need, plus three (3) copies for retention by the Architect/Engineer. No materials or equipment shall be installed until officially approved by the Architect/Engineer.

B. Before submitting Shop Drawings to the Architect/Engineer for review, the Contractor shall examine them and satisfy himself that they are correctly representative of the material or equipment to which they pertain. The Contractor shall so note these Drawings before submitting them. The Contractor's review of Shop Drawings is not intended to take the place in any way of the official review of the Architect/Engineer, and the Shop Drawings which have not been reviewed by the Architect/Engineer shall not be used in fabrication or installing any work.

C. The review of Shop Drawings or catalog data by the Architect/Engineer shall not relieve the Contractor from responsibility for deviations from the plans and Specifications unless he has, in writing, specifically called attention to such deviations as the time of submission and has obtained the permission of the Architect/Engineer thereon, nor shall it relieve him from the responsibility for error of any kind in Shop Drawings. When the Contractor does call such deviations to

the attention of the Architect/Engineer, he shall state in his letter whether or not such deviations involve any extra cost. If this is not mentioned, it will be assumed that no extra cost is involved for making the change.

D. After receiving approval on the make and type of materials, the Contractor shall order such materials in sufficient time so that no delay or changes will be caused. This is done to facilitate progress on the job and failure on the part of the Contractor shall render him liable to stand the expense of any and all delays occasioned by failure on this part to provide necessary details. All shop drawings shall be delivered to the Architect/Engineer's office within thirty (30) days from the date of the contract.

E. Shop drawings will be returned unchecked unless the following information is included: reference to all pertinent data in the Specifications or on the drawings, size and characteristics of the equipment, name of the project and a space large enough to accept an approval stamp. The data submitted shall reflect the actual equipment performance under the specified conditions and shall not be a copy of the scheduled data on the drawings.

1.7 SUBMITTALS

A. Submittal data shall be organized in commercial quality, three ring binders with durable and cleanable covers. Product information for each piece of equipment shall be separated by an indexing leaf with clear tabs. The product name and symbol (i.e., AHU/Air Handling Unit) shall be typed on white paper inserts and placed in appropriate tab. Complete data must be furnished showing performance, quality, and dimensions. A signed review by the Architect/Engineer must be obtained before purchasing any equipment.

B. The following items shall be submitted for review by the Architect/Engineer but are not limited to:

1. Pipe Insulation
2. Coils
3. Plumbing Fixtures and Trim
4. Cross Connection Control Devices
5. Plumbing Piping
6. Plumbing Insulation
7. Plumbing Equipment
8. Flexible Pipe Connections
9. Vibration Equipment and Calculations

1.8 QUALITY ASSURANCE

A. General: Comply with Division 1.

B. Welder Qualifications: Welders shall be certified by the American Society of Mechanical Engineers (ASME) National Certified Pipe for the type of work being performed. Current operators' certificates in accordance with ASME standards shall be on file at the site and shall be available to the Architect/Engineer for examination. Coupons shall be available for review by the Architect and Engineer.

C. Locations of all pipes, ducts, outlets, appliance, etc., as shown on the drawings, are approximate only and are understood to be subject to such revisions as may prove necessary or desirable at the time the work is installed. Each Contractor will be required to install his work with relation to existing building conditions and shall be entirely responsible for the correctness of his work with reference to finished elevations, etc. Piping shown on the drawings is diagrammatic only and their exact locations, depths, and invert elevations shall be as required for proper flow and coordination with other trades.

D. The contract drawing depicts graphically the arrangement of piping and ductwork. Should local conditions necessitate a rearrangement, or if any of the piping or ductwork can be installed to better advantage in a different manner, the Contractor shall, before proceeding with the work, prepare and submit three (3) copies of Drawings of the proposed arrangement for the Architect/Engineer's review.

E. If the Contractor proposes to install equipment, including piping and ductwork, requiring space conditions other than those shown, or to rearrange the equipment, he shall assume full responsibility for the rearrangement of the space and shall have the Architect/Engineer review the change before proceeding with the work. The request for such change shall be accompanied by Shop Drawings of the space in question.

F. Each Contractor is responsible for the proper location and size of all slots, holes, or openings in the building structure pertaining to his work, and for the correct location of pipe sleeves.

G. Each Contractor shall coordinate his work with that of all other trades that it may be installed in the most direct and workmanlike manner without hindering or handicapping the other trades. Piping interferences shall be handled by giving precedence to pipelines which require a stated grade for proper operation. Drainage lines shall take precedence over water lines in determination of elevations. In all cases, lines requiring a stated grade for their proper operation shall have precedence over electrical conduit and ductwork.

H. All oiling devices and all parts of equipment requiring adjustment shall be easily accessible. Lubricate all equipment properly in accordance with manufacturer's instructions. Furnish zerk grease fittings on all greaseable bearings.

I. Equipment and Materials: The materials and equipment shall be new and shall be the standard products of the manufacturers regularly engaged in the production of Plumbing, Heating, Cooling, Ventilation, and Fire Protection Equipment, and shall be the manufacturer's latest standard design. Where two or more units of the same class of equipment are required, these units shall be the products of the same manufacturer. However, the component parts of the systems need not be the products of the same manufacturer. Specific equipment specified hereinafter is to be considered a standard of quality and operation. In general, all capacities of equipment, and motor and starter characteristics are shown in schedules on the drawings. Reference shall be made to the schedules for specific information. The capacities shown are minimum capacities. Variations in the characteristics will be permitted only on written approval of the Architect/Engineer. All equipment shall be shipped to the job with not less than a prime coat of paint or as specified hereinafter. Insofar as is possible all items of the same type (i.e., pumps, fans, etc.) shall be by the same manufacturer. Where installation instructions are not included in these specifications or on the plans, the manufacturer's instructions shall be followed. All equipment affected by altitude shall be rated to operate at the altitude where it is to be installed.

J. Excavation and Backfilling: This Contractor shall do all necessary excavation and backfill for the installation of the Mechanical systems as may be required. Curb cuts, asphalt, and concrete patching, cutting, and patching existing floor, etc., shall be part of this Contractor's responsibility. No extra payment will be made for rock excavation. Trenches for all underground piping shall be excavated to the required depths. The bottoms of trenches shall be tamped hard and graded to secure maximum fall. Bell holes shall be excavated to assure the pipe resting for its entire length on solid ground. Should rock be encountered, it shall be excavated to a depth of 6 inches below the bottom of the pipe, and before laying the pipe, the space between the bottom of the pipe and the rock surface shall be filled with gravel, thoroughly tamped. Pipe laid in trenches dug in fill shall be supported down in the trenches and shall be filled. No roots, rocks or foreign materials of any description shall be used in backfilling the trenches. The backfill material shall be identical to the surrounding fill material and shall be placed in 6-inch layer, wetted, and compacted to the density of the adjacent soil. See Division 2 for additional information for site utilities. All surplus materials shall be hauled from the project by the Contractor at his expense.

K. Cutting and Repairing:

1. Responsibility of the Contractor whose work is involved. Coordinate with others to prevent unnecessary cutting and repairing.

2. Lay out and locate equipment, openings, and chases. Install sleeves, inserts, and supports. Arrange with those whose work is involved to do cutting and replacing caused by negligence or error with costs reimbursed by the Contractor at fault. Cutting and replacing of existing work shall be the responsibility of the Contractor whose work is being installed.

3. Removal or terminating connections of existing work which is abandoned or replaced shall also be done hereunder to provide correct and finished work.

L. Foundations: All equipment shall be provided with suitable foundations and supports. It shall be the responsibility of the Contractor to provide for the proper locations of these foundations and supports. This applies to all rooftop equipment also.

1. All concrete foundations required by equipment furnished by the Mechanical Contractor shall be constructed by them (except where otherwise noted) the conformity with the recommendations of the manufacturer of the respective equipment, and with the approval of the Architect/Engineer. All corners of the foundations shall be neatly chamfered. Foundation bolts shall be placed in the forms when the concrete is poured. Allow 1 inch below the equipment base for alignment, leveling and grouting with nonshrinking grout. Grouting shall be done after the equipment is leveled in place. After the grout has hardened, the foundation bolts shall be pulled up tight and the equipment shimmed, if necessary. After removal of the forms, the surface of the foundation shall be rubbed.

2. Unless otherwise noted, foundations shall be a minimum of 6-inch high. All concrete work performed by these Contractors shall conform entirely to the requirements of the Concrete Specifications which describe this class of work.

M. Code Requirements: Comply with state and local code requirements and ordinances. Call for inspections required by responsible building inspection authority.

N. Applicable Building Codes and Ordinances: Including the latest edition of each code, but not limited to the following:

1. International Building Code.

2. Uniform Mechanical Code.

3. Uniform Plumbing Code.

4. Governing Fire Department Requirements

5. Utility Company Requirements

6. National Fire Protection Association Standards

7. NFPA 70 - National Electrical Code

8. NFPA 90A - Installation of Air Conditioning and Ventilating Systems

9. NEPA 90B - Installation of Warm Air Heating and Air Conditioning Systems

10. NFPA 13 - Sprinkler Systems

11. NFPA 101 - Life Safety

12. NFPA 96 - Installation of Equipment for the Removal of Smoke and Grease Laden Vapors from Commercial Cooking Equipment

13. International Energy Conservation Code 2018

O. Access Panels

1. Similar to Milcor, or as noted on the drawings, size as required for concealed expansion joints, valving, gauges, balancing dampers, valves, traps, pitot stations, equipment and similar items requiring accessibility. Notify the General Contractor 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.

1.9 DELIVERY, STORAGE, AND HANDLING

A. General: Comply with Division 1.

B. Large Items: Make arrangements with other trades on the job for introduction into the building of equipment too large to pass through finished openings.

C. Acceptance: Check and sign for materials to be furnished by others for installation under Division 22 upon delivery. Contractor shall be responsible for the storage and safekeeping of such materials from time of delivery until final acceptance.

D. Protection: Close ends of pipe at the close of each working day during construction to prevent entry of foreign material. Protect insulation against dirt, water, chemical or mechanical damage before, during and after installation. Protect fixtures and equipment against damage during mechanical work with heavy paper or plastic until final clean-up.

E. Storage: Store equipment in covered enclosure or wrap with weather tight 6 mil Visqeen.

F. Shipping Protection: Protective casings, crating, and coverings to remain in place until start-up of equipment.

1.10 PROJECT CONDITIONS

A. Performance: All systems are to be rated at 6,000 ft. elevation.

1.11 SEQUENCING AND SCHEDULING

A. General: Comply with Division 1.

B. Schedule: Coordinate and order the progress of mechanical work to conform to the progress of the work of the other trades. Complete the entire installation as soon as the condition of the building will permit.

C. Utility Interruptions: Schedule mechanical utility interruptions with the Architect/Engineer/Owner minimum of seven (7) days prior to the requested outage. Plan work so that duration of the interruptions a maximum of one day.

1.12 CONTROLS WIRING AND ELECTRICAL EQUIPMENT

A. All mechanical equipment controls wiring, conduit, relays, interlocks, and all accessories required for a completely operational controls system shall be the complete responsibility of the mechanical contractor. The mechanical contractor has the option to hire the project electrical contractor or any qualified controls contractor to install mechanical controls wiring and conduit. Refer to Specification Section 253000 for coordination requirements between mechanical, electrical, and controls subcontractors.

B. Electrical items such as disconnect switches and motor starters associated with equipment provided by Division 22, when specifically mentioned to be furnished by the Mechanical Contractor, whether in these specifications or on the Electrical or Mechanical Drawings, shall be furnished by the Contractor. These items shall be mounted and connected as required for a completely operational system. See Control Systems Specification for further information.

C. All electrical equipment characteristics (voltage, etc.) must be verified by the Contractor prior to ordering. If the Contractor proposes to furnish motors varying in horsepower and/or characteristics from those specified, he shall first inform the Architect/Engineer of the change and shall then coordinate the change with the Electrical Contractor and shall pay all additional charges in connection with the change.

D. All motors shall meet all the requirements of all Electrical Divisions.

1. 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. Totally enclosed fan cooled (TEFC) motors shall be used in all areas of exposure to weather or other environmental contamination. All motors shall have copper windings. All motors to have minimum power factor of 85% or have switched correction to 90%. Unless indicated otherwise, motors shall be NEMA design B with a service factor of 1.15 with 40°C rise and total temperature rise of 65°C ambient and when powered from the system voltage feeding the motor. TEFC motors shall a service factor of 1.00 with total temperature is of 65°C in the above conditions. Motors located in areas exceeding 40°C ambient shall be factory-rated for the ambient temperature of the motor environment. Single phase motors shall generally be NEMA Type N split phase induction motors with built-in thermal protectors. Single phase motors connected on loads requiring high starting torque shall be capacitor-start induction motors. Single phase motors of 1/10 HP or less may be shaded pole induction motors.

1.13 PROTECTION AGAINST HAZARDOUS CONDITIONS

A. The Contractor shall take precautions against hazardous construction conditions at all times during construction. The final condition of the facilities shall be safe, and where safety to operating personnel is jeopardized, suitable signage shall be posted.

B. Protruding metal (bolts, steel angles, etc.) potentially hazardous to maintenance and operating personnel, shall be cut back and/or protected to reduce the risk of injury. All openings between floors shall be protected with barriers around the openings, gratings across the openings, or steel bars through the openings to avoid and protect against injury.

1.14 HAZARDOUS SIGNS

A. Equipment room contains moving or rotating parts, floor openings, or other potentially hazardous environments and shall include a sign on the door entering it that shall read similar to the following: **Hazardous Area - Authorized Personnel Only.**

1.15 OPERATING AND MAINTENANCE INSTRUCTIONS

A. The Mechanical Contractor shall furnish to the Owner a bound (three (3) ring binder) manual in triplicate, containing complete repair parts lists, and operating, service, and maintenance instructions on all mechanical equipment, fixtures, and systems, as noted below:

1. Table of Contents: Provide title of Project; names, addresses, and telephone numbers of Architect/Engineer, Sub-consultants, and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.

2. For Each Product System: List names, addresses and telephone numbers of Sub-contractors and suppliers, including local source of supplies and replacement parts.

3. Product Data: Mark each sheet to clearly identify specific product and component parts, and data applicable to installation. Delete inapplicable information.

4. Warranties and Bonds: Bind in copy of each.

5. Each Item of Equipment and Each System: Include description of unit or system, and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.

6. Include color-coded wiring diagrams as installed for control system.

7. Operating Procedures: Include start-up, break-in and routine normal operating instructions and sequences. Include regulation, control, stopping, shutdown, and emergency instructions. Include summer, winter, and any special operating instructions.

8. Maintenance Requirements: Include routine procedures and guide for troubleshooting, disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

9. Provide servicing and lubrication schedule and list of lubricants required.

10. Include manufacturer's printed operation and maintenance instructions.

11. Include sequence of operation by controls manufacturer.

12. Provide original manufacturer's part list, illustrations, assembly drawings and diagrams required for maintenance.

13. Provide control diagrams by controls manufacturer as installed.

14. Provide charts of valve tag numbers, with locations and functions of each valve, keyed to flow and control diagrams.

15. Provide list of original manufacturer's spare parts and recommended quantities and to be maintained in storage.

16. Include Test and Balance (T&B) Reports as specified in Section 230593.

B. The Mechanical Contractor shall also provide training as required by Section 230100 to the Owner's operation and maintenance personnel.

1.16 OPERATION PRIOR TO ACCEPTANCE

A. The Owner shall have the right to operate any and all apparatus as soon as and as long as it is in operating condition, after Owner personnel have received operational training, whether or not such apparatus has been accepted as complete and satisfactory, except that this shall not be construed to mean operations before any required alterations or repairs have been made. This operation does not indicate acceptance of the equipment by the Owner. When the Contractor enters into a contract with the Owner, he agrees to the above.

1.17 WARRANTY AND SERVICE PROGRAM

A. Due to the critical performance requirements and to clearly establish warranty responsibility for this project, the Contractor shall provide a full-service maintenance and warranty program to the Owner for one full year after beneficial occupancy (substantial completion).

B. This service program shall be included as part of the base bid and shall include service, maintenance, repair, replacement, lubrication, temperature control

calibration and repairs, and documenting proof for all service and maintenance work on all equipment and system furnished by the Contractor.

C. A single representative in the employment of the Contractor shall be responsible for coordination and follow through of this program. This representative's name and phone number shall be submitted to the Owner as part of the maintenance manuals and supportive data. The Contractor shall respond to a request for service with 24 hours if so requested.

D. During this first year of operation, the following sequence of maintenance service shall be performed as a minimum.

1. Clean strainers in piping.

2. Fans be lubricated and oiled once every four (4) months.

3. Controls shall be calibrated throughout the facility at the end of six (6) months (following substantial completion). Any leaks in the piping systems shall be repaired.

4. All equipment manufacturer's service recommendations shall be followed during this period.

1.18 FLUSHING AND DRAINING

A. It shall be the responsibility of this Contractor to properly drain and flush all ducts and pipes before use or acceptance to ensure that all debris is completely removed. Damage caused by such debris remaining in the ducts or pipes shall be repaired by this Contractor at his expense. This Contractor shall demonstrate to the Architect/Engineer's representative that all piping is clean.

1.19 CLEANING

A. This Contractor shall remove from the building construction site all rubbish and dirt as it accumulates under the contract. At completion, all areas shall be broom cleaned and all obstructions, surplus materials, etc., removed.

1.20 GUARANTEE

A. The Contractor shall guarantee all materials, equipment, and workmanship furnished and installed by him under this Contract, to be free from all defects of workmanship and materials, and shall agree to replace at his expense, without expense to the Owner, at any time within one year after installation is accepted by the Architect/Engineer, any and all defective equipment, parts, etc., that may be found. (This excludes normal maintenance and daily servicing of equipment which is the Owner's responsibility.)

1.21 FLOOR, WALL, AND CEILING PLATES

A. Where exposed pipes pass through floors, finished walls, or finished ceiling, they shall be fitted with chromium-plated escutcheons of an approved pattern. Escutcheons and plates in Mechanical Rooms do not require chrome finish.

B. This Contractor shall be responsible for providing and installing all counter flashing. All openings in the roof shall be flashed and counterflashed. Use four-pound lead flashing materials for all vent lines and welded flashing in steel lines passing through roof. The Mechanical Contractor shall notify the General Contractor where each roof penetration is and the size of the opening.

1.22 PIPE SLEEVES

A. Schedule 40 steel pipe sleeves or pipe sleeves made of No. 20 gauge galvanized steel, properly secured in place with approximately 1/4" space between each sleeve and the surface of the pipe and/or insulation passing through it, shall be provided for all pipes passing through concrete floors, roofs, and masonry walls. All pipe sleeves shall be fixed in place as the walls and floors are built up. The Contractor shall furnish and locate all sleeves and pipes passing through concrete floors, exterior masonry walls, and roofs shall be made watertight with approved non-hardening plastic material. Sleeves through pipe chase or equipment room floors shall project a minimum of 2-inch above the floor and shall be of black steel pipe with waterproof flange at center of floor thickness. Each sleeve through a fireproof wall shall be packed with approved fireproof rope in the annular space.

1.23 PIPE HANGERS

A. Pipe hangers shall be Fee and Mason of a type suitable for each use. Perforated straps shall not be used in any work. For ferrous pipes up to and including 4 inch in size, use Fee and Mason Fig. 199 malleable iron, adjustable, split ring, swivel hanger. For plumbing piping larger than 4 inches, use Fee and Mason Fig 239 steel clevis hanger. Where several pipes are parallel at the same elevation, trapeze hangers may be used. Where trapeze hangers are used, the pipes shall be supported on rollers where indicated on the Drawings. For copper pipes up to and including 3 inch in size, use Fee and Mason Fig. 360 malleable iron, copper plated hangers. For copper pipes larger than 3 inches, use Fee and Mason Fig. 364 copper plated clevis hanger.

B. Hanger rod sizes shall conform to the following schedule:

1.	Pipe up to and including 2"	3/8" rods
2.	Pipe 2-1/2", 3" and 3-1/2"	1/2" rods
3.	Pipe 4" and 5"	5/8" rods
4.	Pipe 6"	3/4" rods
5.	Pipe 8", 10", and 12"	7/8" rods

C. Unless shown otherwise on the Plans, all horizontal runs of ferrous piping shall be suspended from the floor or roof construction, as the case may be, by means of hangers with the following spacing:

1.	Pipe up to and including 1-1/4"	8'
2.	Pipe 1-1/2" and 2"	10'
3.	Pipe 2-1/2" and 3"	12'
4.	Pipe 3 1/2" and 4"	14'
5.	Pipe 5" and 6"	16'
6.	Pipe 8" and 10"	20'

D. Unless shown otherwise on the Plans, all horizontal runs of copper piping shall be suspended from the floor or roof construction as the case may be, by means of hangers with the following maximum spacing:

1.	Pipe up to 3/4" in size	5'
2.	Pipe 1" and 1-1/4"	6'
3.	Pipe 1-1/2" and larger	10'

E. There shall be a hanger within 2 inches of each elbow or tee. Additional supports shall be provided for valves, strainers, etc. Cast iron pipe shall have not less than one hanger per length of pipe. Vertical risers shall be supported by approved riser clamps at each floor. Vertical pipes within a space shall have not less than two supports.

F. Supports and hangers shall be installed to permit free expansion and contraction in the piping systems. Hangers shall permit vertical adjustment to maintain proper pitch. Where necessary to control expansion and contraction, the piping shall be guided and firmly anchored. No piping shall be self-supporting, nor shall it be supported from equipment connection.

G. Expansion bolts shall be Ackerman-Johnson or Hilti.

H. Beam clamps suitable for use with this type of steel construction involved shall be Grinnell.

1.24 PRESSURE VESSEL CERTIFICATION

A. Not used.

1.25 ISOLATION

A. Excessive vibration or objectionable noise created in any part of the building by the operation of any equipment furnished and/or installed under the Mechanical Contract will be extremely objectionable and the Contractor shall take all precautions against the same by isolating the various items of equipment from the building structure and by such other means as may be necessary to eliminate all excessive vibration and objectionable noise produced by any equipment installed by them, and consequently, they shall design all foundations, supports, etc., for their equipment, and all piping with this end in view. In addition, these Contractors shall supervise the construction of all foundations and supports, whether they build them or not, in order that they may be constructed in such a manner as to prevent the transmission of objectionable noise and/or excessive vibration. Submit calculations on all vibration isolation equipment.

B. All equipment having moving parts shall be isolated from the building structure by means of Korfund isolation materials, unless specifically noted otherwise. All isolators shall be the same brand and shall be supplied from the same source. Equipment manufacturer's recommendations shall be followed in the isolation of equipment.

C. Vibration isolators shall have sufficient resilience to meet the following minimum efficiencies:

Motor HP	Equipment Room
Up to 5	90%
7-1/2 to 15	93%
20 to 40	95%
50 to 100	97.5%

D. Spring isolators shall be of the housed type with ribbed pads bonded to the underside of the baseplate or may be unhoused stable springs. Isolators shall be furnished with snubbers and limit stops where so recommended by the equipment manufacturer.

E. The Supplier of the isolating equipment shall, upon completion of the job, check all isolating materials and verify that they are installed properly, and submit a report in writing to the Architect/Engineer.

1.26 TESTING

A. Before completion of this project, the Mechanical Contractor shall test all materials and equipment which normally require testing. All piping, etc., shall be tested to meet code requirements or the Specification requirements, whichever is more stringent.

B. All equipment shall be operated sufficiently long enough to prove to the Architect/Engineer that the equipment performs satisfactorily and meets the requirements set forth on the Plans or in these Specifications.

1.27 CERTIFICATIONS

A. Before receiving final payment, the contractor shall verify that all equipment furnished, and all work done is in compliance with all applicable codes mentioned in these Specifications. Submit certifications and acceptable certificates to the Architect/Engineer.

1.28 GENERAL PIPING INSTALLATION REQUIREMENTS

A. Provisions for Drainage: All piping systems shall be installed so that they may be easily drained. Drain caps, plugs, or hose bibbs shall be installed at low points. Grade piping toward drain locations.

B. Alignment: All installed pipelines shall be straight and shall remain straight against strains. Proper allowance shall be made for expansion and contraction.

C. Clean as Installed: All piping shall be kept 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. All detergents, solvents and other cleaning agents shall be compatible with the materials of fabrication of the system in which they are used. They shall not adversely affect the materials of mechanisms in the systems and they shall be acceptable to equipment manufacturers. All detergents, solvents, and other cleaning agents shall also be compatible with the process streams to be handled by the systems in which they are used.

D. Insulated Fittings: Install between any dissimilar metals such as steel and copper.

E. Expansion and Contraction: The Contractor shall make all necessary provisions for expansion and contraction with proper fittings, anchors, dresser couplings, loops, etc. Install flexible connectors on each pipe at each building expansion joint.

F. Welding: Refer to Paragraph 1.29 of this section of these specifications.

G. Bending: No bending of pipe will be permitted.

H. General: The installation shall be coordinated with respect to space available with heating, cooling, ventilating, and electrical installation. In every instance where there is a conflict in the routing of the piping and the ducting, the routing of the ducting shall govern. Installed piping shall not interfere with the operation or accessibility of doors or windows, shall not encroach on aisles, passageways, and equipment, and shall not interfere with the servicing or maintenance of equipment. Pipe shall be cut accurately to measurements established at the construction site and shall be worked into place without springing or forcing, properly clearing all openings and equipment. Cutting or weakening of structural members to facilitate piping, installation is not permitted. Pipes shall have burrs removed by reaming and shall be so installed as to permit free expansion and contraction without damage to joints or hangers. Piping above ground shall be run parallel with the lines of the building unless otherwise noted on the drawings. Unless otherwise shown on the drawings, horizontal piping shall pitch down in the direction of flow with grade of not less than 1 inch in 40 feet. Piping connections to equipment shall be in accordance with details shown on the drawings or as recommended by the equipment manufacturer. Service pipe valves and fittings shall be kept a sufficient distance from other work to permit finished covering not less than 1/2 inch from such other work, and not less than 1/2 inch between finished covering on the different services.

I. Installation of Valves: Valves shall be installed at the locations shown on the drawings and where specified and where directed at site. Gate valves shall be used unless otherwise shown, specified, or directed. All valves shall be installed with their stems horizontal or above. Where tight shutoff is required, a composition seat globe valve or resilient seat ball valve shall be used.

J. All valves which must be used during operation, all control valve assemblies, instrument control cases, liquid level controls, gage glasses, orifices, relief

valves, and other equipment which must be observed, adjusted, or serviced during operation shall be located conveniently accessible from an operating platform or grade.

K. In general, relief valves within processing unit limits shall be located conveniently accessible from an operating platform or grade.

1. Those in non-hazardous service, such as water, shall discharge directly to outside.

2. Relief valves should have no piping between the vessel or line and the valve inlet, except as shown on the drawings.

3. Relief valves shall be installed in a vertical position. Vent piping shall be braced and supported in a manner that will not produce excessive stresses in the relief valve and will permit removal of the relief valve without necessary temporary supports for the vent lines.

L. Equipment Connections: All piping connections to pumps and other equipment shall be installed without strain at the pipe connection of the equipment. The contractor shall be required as directed to remove the bolts in flanged connections or disconnect piping to demonstrate that the piping has been so connected. Pipe connections to equipment shall be made with unions or flanged fittings. Provide removable headers for large equipment for service access.

M. Joints

1. Flanged Joints: All flanged joints shall be face matched. Raised face flanges shall not be mated to flat-faced cast-iron flanges on valves or equipment. The raised face must be turned off. All flanged bolt holes shall straddle the horizontal and vertical center line unless otherwise noted.

2. Screwed Joints: Screwed pipe joints shall have American Standard Taper Pipe Threads ANSI-B2.1 Latest Edition. Burrs formed when cutting pipe shall be removed by reaming. Care shall be taken that the inside of pipe is thoroughly clean and free of cutting oil and foreign matter before installation. Joints shall be made perfectly tight by the use of Teflon tape or approved Teflon thread sealing and lubricating compound.

3. Solder-Joints: Tubing shall be cut square and burrs removed. Both inside of fittings and outside of tubing shall be well cleaned with steel wool or wire brush before seating. Care shall be taken to prevent annealing of fittings and hard drawn tubing when making connections. Joints for serrated fittings on water, compressed air below 60 psig, and vacuum lines shall be made with a 95 percent tin and 5 percent antimony. Cored solder or solder containing lead will not be permitted.

N. Reducers: Reduction in pipe size shall be made with one piece reducing fittings. Bushings reducing at least two pipe sizes will be acceptable only when there is no room for reducing couplings or swaged nipples.

O. Unions: All piping unions shall be of the ground joint type constructed from materials equivalent in alloy composition and strength to other fittings specified with which they are used. Union Pressure classes and end connections shall be the same as the fittings used in the lines with the unions. Steel unions shall have hardened stainless steel seating surfaces on both faces.

P. Hanger Supports:

1. All hanger rods used to support piping, conduit, mechanical units, equipment, trapezes, and other items shall be straight and installed plumb, regardless of length. Do not bend rods to adapt to sloped or rotated structural members, secondary support members or to sloped mounting holes on supported equipment. Contractor shall utilize available swivel, hinged, or rigid mounting techniques designed to accommodate a slope or rotation, or shall design a custom solution. Selected techniques for each application shall be submitted for approval prior to use.

2. Do not bend rods to circumvent an obstruction.

3. Loads on hanger rods shall be applied in direct tension. Do not apply compression, lateral or moment loads to hanger rods. Install bracing or additional supports to prevent hanger rod from incurring non-tension loading.

4. Do not create offsets in rods; use only in-line couplers, and only when length of coupled rod exceeds standard available length (typically 12 feet), or when full lengths cannot be placed in position. Provide additional horizontal bracing to prevent swaying of supported piping or equipment.

5. Do not straighten bent rods for subsequent use. If a rod becomes bent, cut off and discard the bent portion. Remaining straight portion of rod may be used.

1.29 WELDING

A. All welding of piping covered by this specification, regardless of condition of service shall be accompanied as follows:

1. The welding shall be in accordance with the recommendations of the American Welding Society. Mitering of pipe to form elbows, notching to form these, or any similar construction will not be permitted. Welding fittings shall be installed on all welded lines. Joints to be welded shall be properly aligned and spaced, using special welding clamps where necessary. All welders to be employed shall have passed qualification tests prescribed by the National Certified Pipe Welding bureau (or by another reputable testing laboratory or agency) using procedures approved by the American Society of Mechanical Engineers or the American Welding Society. The welders will be required to pass qualification tests when the work of the welder creates a reasonable doubt as to his proficiency. Tests shall be conducted at no additional expense to the Owner.

2. Each welder shall, in addition to having passed the prescribed qualification tests (as noted in Paragraph 1.30.A.1), prepare sample coupons at the job site on a portion of pipe that is cut such that the cross section of the weld is open to view. The sample weld should be prepared using a 6-inch diameter pipe. The sample shall reflect a continuous weld with perpendicular cut out to show the weld in cross sectional view. This sample, when accepted and approved by a certified welding inspector, shall be used as a standard of quality to compare to other welds that this welder will be performing on the job. This same sample weld will also be a basis for accepting or rejecting the welder for working on this project. The sample weld shall be identified with a date and the welder's name and shall be kept at the site throughout the project.

3. All welding on pressure piping shall conform to all of the requirements of the American Society of Mechanical Engineers Code for Pressure Piping - B31.1 (An American National Standards Institute publication), as defined in the latest edition of the ANSI Power Piping B31.1 Manual. All welding shall also conform to all of the requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code. All chapters, current addenda and supplements of these manuals shall apply. This code shall be used to establish standards of performance and quality of welds. However, the Owner reserves the right to perform radiographic testing of all welds, to compare any of the welds to the approved "standard" sample welds of each welder, and to compare the welds to the welding diagrams and sketches of those recommended in the ANSI B31.1 Power Piping Manual. The intent is to obtain the highest quality welding job possible. The cost of any initial radiographic testing, for random inspection, shall be paid for by the Owner. If radiographic random testing reveals that a weld is defective, the Contractor shall bear the cost of all repairs and re-testing necessary to be made to subject weld until conformance with radiographic tests is reached. The potential for random radiographic testing and welding quality control applies to all pressure piping systems in this project, including systems below 100 psig. If a question should arise regarding the possibility of faulty welding or if there are obvious visual defects in the welding, the Contractor shall be required to correct such deficiencies to a quality level consistent with the recommendations, welding diagrams and sketches in the ANSI B31.1 Manual. The quality level shall also reflect that of the approved sample welds accomplished by each welder for this particular project.

1.30 TESTING FOR PIPING SYSTEMS

A. General: Before insulation is applied, all piping, equipment, and accessories installed under this contract shall be inspected and tested by the Contractor. All labor, material, and equipment required for testing shall be furnished by the Contractor. The Contractor shall be responsible for all repairs and retesting as required. All instruments and other equipment whose safe pressure range is below that of the test pressure shall be removed from the line or blanked off before applying tests. Prior to performing tests, all lines shall be "blown" free of all loose dirt and foreign particles. The lines shall then be thoroughly flushed with water (liquid lines only) at a sufficient flow rate and period of time, to ensure

complete cleaning of the lines of all dirt, scale, and foreign matter. Satisfactory flushing of the lines shall be subject to approval. After testing and flushing lines, all filters and strainers shall be cleaned.

B. Safety: Since the Risk of failure, with the attendant possibility of injury, is appreciable greater with further testing, all safety measures required by codes or ordinance or reasonable applicable to the situation shall be taken.

C. Concealment: Equipment or piping to be pressure tested shall not be insulated, covered, or concealed prior to that test. Compression joint underground piping may be backfilled prior to pressure test except that joints shall remain exposed until after the test, but tie rods, clamps, etc., shall be in place and fastened.

D. Pressure Ratings: These tests shall not be used to establish pressure ratings.

E. System Protection: Protect all piping and equipment against overpressure, collapse from vacuum, and hydraulic shock during the filling, testing, and draining procedures. Seats of iron valves shall not be subjected to a pressure in excess of the maximum cold working pressure of the valve. Pressure tests against other closed valves shall not exceed twice the normal rating. Note that where significant differences in elevation exists, there is a risk of overpressure in the lower portions of the system in order to attain test pressure in the upper portion of the system.

F. Test Temperature: Apply test pressure only after the system and test medium are at approximately the same temperature, preferably not less than 60°F. Note that some applicable codes require testing above a specified minimum temperature.

G. Sectionalizing: Systems may be separated into sub-systems for testing if such action will expedite or simplify the testing.

H. Temporary Supports: During hydrostatic testing of lines provide temporary supports to prevent overstressing supports or hangers. When tests are completed, remove all temporary supports, locks, stops, etc., and adjust supports for their cold load and alignment.

I. Testing: Domestic hot and cold water piping and heating water piping shall be tested hydrostatically at the test pressures specified and shall show no drop in pressure in a 2 hour period. Leaks shall be located by soap testing

1. Test Pressures:

a) Natural gas piping: as required by governing code
b) Domestic Hot and Cold Water: 100 psig or 50% more than operating pressure, which ever is greater.

J. Sanitary Waste and Soil System:

1. After all soil and waste pipes and vent stacks have been installed, the outlets shall be plugged, and the piping system filled with water in vertical sections to the highest point of the system and allowed to remain filled for

twenty-four (24) hours and shall prove to be leaktight under such conditions. A one-inch drop will be allowed in water level in standpipe. This test may be conducted in segments as required by the sequence of construction. Contractor shall certify in writing that all tests were satisfactorily completed before piping was concealed and shall submit the certification to the Architect/Engineer for his records and for transmittal to the owner.

K. Test Report

1. A detailed report of pressure tests on piping and equipment shall be forwarded in duplicate to the Architect/Engineer. This report shall show date of test, lines tested, test medium, length of time test pressure was held, pressure drop or rise, and extent of venting or repressurizing.

1.31 COOPERATION WITH OTHER TRADES

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 harm to the Owner from interference, delay, or absence of coordination.

1.32 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. He shall examine the adjoining work on which 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.

1.33 SAFETY GUARDS

A. The Mechanical Contractor shall furnish and install safety guards required in order to obtain certificates of inspection from all authorities having jurisdiction. All belt driven equipment, projecting shafts, and other rotating parts shall be enclosed or adequately guarded. Provide coupling guards on all rotating shafts.

1.34 PROTECTION

A. All work, equipment, and materials shall be protected at all times to prevent obstruction, damage, or breakage. All pipe openings shall be closed with caps or plugs during installation. All equipment shall be covered and protected against dirt, water, chemical, or mechanical injury. At the completion of the work, all equipment shall be thoroughly cleaned, and the entire system shall be delivered in a perfect, unblemished condition.

1.35 PAINTING AND IDENTIFICATION

A. All equipment shall be delivered to the job with suitable factory finish. Should the finish be marred in transit or during installation, it shall be finished to present a neat, workmanlike appearance.

B. Except as elsewhere hereinafter specifically required, any painting of equipment, piping, ductwork, grilles, insulation, etc., furnished and installed under this Section of the Specifications will be done by the Painting Contractor. However, the Mechanical Contractor shall leave his equipment clean and free from any grease, dirt, rust, etc., and in suitable condition for painting.

C. No nameplates on equipment shall be painted, and suitable protection shall be afforded to the plates to prevent their being rendered illegible during the painting operation.

D. The piping shall be painted the basic color as indicated in other sections of these specifications and shall be marked every 10 feet on centers with Brady pipe markers. Arrows, approximately 6 inch in length and spaced about 10 feet on centers shall indicate the direction of the flow pipe. Locate additional labels as required in Mechanical Rooms. Staple in place, brush with clear lacquer. Markers shall state pipe size, flow direction, and pipe usage (such as "cold water," etc.).

1.36 RECORD DRAWINGS

A. The Contractor shall, during the execution of the work, maintain a complete set of drawings upon which all dimensional locations of equipment piping and all deviations and/or changes in the work shall be recorded. Water, storm, and drainage mains shall be delivered to the Architect/Engineer in good condition upon the completion and acceptance of the work and before final payment is made.

1.37 SUPPLIER RESPONSIBILITY

A. Each supplier, whether furnishing equipment as specified or as a substitution shall be responsible for certifying that the equipment is properly installed and that the warranty is valid. Submit written reports on the installation and the equipment performance when requested to do so by the Architect/Engineer (or his representative). Each supplier shall be responsible for furnishing qualified personnel at the job site at anytime requested by the Architect/Engineer (or his representative) during the construction or warranty periods.

END OF SECTION 220500

SJC EXTENSION OFFICE

SECTION 220513

COMMON MOTOR REQUIREMENTS FOR PLUMBING EQUIPMENT

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including General and Special Conditions and the General Requirements, apply to the work specified in this section.

1.2 DESCRIPTION OF WORK

A. It is the intent of this specification to define all motors furnished under all sections of the specifications for this project which will provide efficient operation, reliability, ease of maintenance, and repair along with reduced operation costs.

B. All general-purpose motors shall be open drip-proof machines for installation indoors and/or in protected locations. Totally enclosed fan cooled (TEFC) motors shall be used in all areas of exposure to weather or other environmental contamination. Motors shall be rated explosion-proof when located in hazardous atmospheres.

C. Motors mounted in direct sun shall be provided with a shield to forbid direct radiation from the sun when the sun is 45 degree or greater above the horizon.

D. All supply fan motors mounted in air handling units shall have Class F insulation.

E. Open drip-proof motors shall be NEMA design B with Class B insulation and a 1.15 service factor with 40 degree C ambient and a total temperature rise of 65 degrees C.

F. TEFC motors shall be NEMA design B with Class F insulation and a 1.15 service factor with 40 degree C ambient and a total temperature rise of 65 degrees C.

G. Severe duty motors shall be NEMA design B with Class F insulation and a 1.15 service factor with 40 degree C ambient and a total temperature rise of 65 degrees C.

1.3 GENERAL

A. All motors covered by this specification shall conform to all applicable requirements of NEMA, IEEE, ANSI, and NEC Standards. They shall be free from defective material and workmanship and fully capable of performing in accordance with the manufacturer's nameplate rating.

B. Motors shall be approved by Underwriter's Laboratories (UL) for the service specified.

C. Unless otherwise specified, motors shall be suitable for operation in either direction--(CW or CCW) or rotation.

D. Motors shall be Westinghouse II, Reliance XE, Gould E-PLUS, GE Energy Savery, or approved equal.

E. All fractional H.P. motors shall be permanent split capacitor (P.S.C.) with U.L. listed overload protection. The protector shall be calibrated to trip out when the winding reaches a pre-determined temperature and automatically reset when the temperature returns to a safe limit.

1.4 EFFICIENCY

A. All motors shall be special high efficiency design. These motors shall be different than manufacturers' standard product, in that losses are reduced by incorporation of design features including the use of low loss lamination steel, increase in stator/rotor length, increase in copper windings, utilization of high efficiency ventilating fan, computer optimized slot configuration and air gap.

B. All motors shall be all copper wound, high power factor, high efficiency motors. Motor efficiency shall be as determined by IEEE Standard 112A, test method B. Test results shall be submitted to the Engineer.

C. Manufacturer to furnish % efficiency, % PF, amps at Full Load, 3/4 Load, and 1/2 Load with quotation and be prepared to furnish actual test results on individual ratings if required.

PART 2 – PRODUCTS

2.1 GENERAL

A. Motors shall be 60 Hertz voltage as indicated on drawings, Squirrel Cage induction type suitable for across-the-line starting and continuous duty.

B. Motors shall have copper windings.

C. All motors shall be suitable for application without exceeding Class B rise in ambient temperatures up to and including 65 degree C at 1.15 Service Factor. Motor nameplates shall state suitability for 65 degree C ambient application.

D. All motors shall be suitable for application without exceeding Class B temperature rise at altitudes up to and including 9900 feet at a 1.00 Service Factor.

E. Motors shall operate successfully under running conditions at rated load with +10% of rated voltage or +5% of rated frequency or a combined variation in voltage and frequency of +10% (sum of absolute values).

F. Motors will have at least a nominal 85% power factor rating at full load and rated voltage. Exclusion from this requirement are motors which draw less than 1,000 watts at full load and motors with synchronous speeds less than 1800 RPM. Test verification shall be available upon request.

2.2 INSULATION

A. Motors shall have non-hygroscopic Class B or Class F insulation system as required; however, temperature rise shall not exceed Class B rise at rated load per NEMA Standards.

B. The insulation system shall be provided with sufficient treatment so that the completed insulation system will have a minimum resistance of 1.5 megohms after 168 hours of testing to a humidity chamber maintained at 100% relative humidity and 40 degree C ambient.

2.3 TESTS

A. Each motor shall be given a routine factory test per NEMA and ASA Standards to ensure compliance with this specification.

2.4 BEARINGS

A. Bearings shall be shielded, regreasable, vacuum degassed steel ball bearings, specially selected for electric motor service and long-life expectancy (B-10 MINIMUM).

B. Bearings shall be lubricated with a premium moisture resistant grease formulated to operate over a temperature range of -20 degrees F to +300 degrees F.

C. Bearing identification by AFBMA number shall be shown on motor nameplate.

2.5 ENCLOSURES

A. Construction shall be of rugged corrosion resistant metal including a one-piece frame, brackets, conduit box and fan shroud.

B. Fans shall be bi-directional and constructed of low inertia inert material.

2.6 CONDUIT BOXES

A. Conduit boxes are to be diagonally split, rotatable in 90 degree turns, gasketed cast iron construction with threaded conduit holes.

B. Ground lug suitable for grounding motor frame shall be furnished inside of conduit box.

C. A neoprene lead seal separator gasket shall be mounted between motor frame and conduit box to prevent entry of moisture and dust into the motor.

D. Conduit box size must meet or exceed minimum as shown in NEC Standards based on motor full load current.

2.7 HARDWARE

A. Corrosion-resistant cadmium plated grease plugs shall be provided for relubrication of bearings.

B. An external shaft flinger shall be provided on the shaft to prevent entrance of moisture or dust into the bearings.

C. All motors Frame 182T and larger shall have lifting eyebolts for lifting the entire motor.

D. An easy-to-read nameplate shall be provided on each motor and shall include at least the following information:

1. Horsepower
2. RPM
3. NEMA Design
4. Phase
5. Hertz
6. Service Factor
7. Ambient Temperature
8. Frame Size
9. Duty
10. Class of Insulation
11. Locked KVA Code
12. Full Load Amps
13. Model or Catalog Number
14. Bearing Identification
15. Guaranteed Minimum Efficiency
16. Nominal Efficiency
17. Voltage

2.8 MOTOR CONSTRUCTION

A. Motors shall be dynamically balanced to limits as indicated below:

Speed (Peak-to-Peak)	Maximum Amplitude
3500 & Above	.0010
1700 to 3499	.0015
Less than 1700	.0020

2.9 FINISH

A. All external surfaces shall be prime painted with red oxide zinc chromate primer to prevent corrosion.

B. The finish coat of paint shall be a full-gloss epoxy enamel paint. External finish shall protect against moisture and have superior heat resistance to withstand the effects of sunlight and outdoor weathering without chipping or cracking.

2.10 EFFICIENCY

A. Motors furnished shall meet or exceed the efficiency listed on the following Table.

HIGH EFFICIENCY MOTORS

HP	3600 RPM EFFICIENCY		1800 RPM EFFICIENCY		1200 RPM EFFICIENCY	
	NOMINAL	MINIMUM	NOMINAL	MINIMUM	NOMINAL	MINIMUM
1	81.5	78.5	84.0	81.5	78.5	75.5
1.5	81.5	78.5	84.0	81.5	84.0	75.5
2	84.0	81.5	84.0	81.5	86.5	84.0
3	86.5	84.0	88.5	86.5	88.5	86.5
5	88.5	86.5	90.2	88.5	88.5	86.5
7.5	88.5	86.5	90.2	88.5	88.5	86.5
10	88.5	86.5	90.2	88.5	90.2	88.5
15	90.2	88.5	91.7	90.2	90.2	88.5
20	90.2	88.5	91.7	90.2	91.7	90.2
25	90.2	88.5	93.0	91.7	91.7	90.2
30	91.7	90.2	93.0	91.7	91.7	90.2
40	91.7	90.2	93.0	91.7	93.0	91.7
50	91.7	90.2	94.1	93.0	93.0	91.7
60	93.0	91.7	94.1	93.0	93.0	91.7
75	94.1	93.0	94.1	93.0	94.1	93.0
100	94.1	93.0	95.0	94.1	94.1	93.0
150	94.1	93.0	95.0	94.1	94.1	93.0
200	94.1	93.0	95.0	94.1	95.0	94.1
250	95.0	94.1	95.0	94.5	-	-

END OF SECTION 220513

SJC EXTENSION OFFICE

SECTION 220523

VALVES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including General and Special Conditions and the General Requirements, apply to the work specified in this section.

1.2 DESCRIPTION OF WORK

A. All valves except lubricated plug valves and butterfly valves shall be manufactured by Nibco, Hammond, Lunkenheimer, Kennedy, Stockham, Walworth, Powell, or Milwaukee.

B. Lubricated plug valves shall be as manufactured by Rockwell, Milwaukee, or Walworth.

C. Butterfly valves shall be as manufactured by W.C. Norris, Centerline, Nibco, Demco, Grinell, Milwaukee, or Keystone.

1.3 RELATED WORK IN OTHER SECTIONS

220000	PLUMBING INDEX
220500	GENERAL PLUMBING REQUIREMENTS
220513	COMMON MOTOR REQUIREMENTS FOR PLUMBING EQUIPMENT
220700	PIPING INSULATION
221113	DOMESTIC WATER SYSTEMS
221123	NATURAL GAS PIPING SYSTEMS
221313	SOIL AND WASTE PIPING SYSTEMS
221413	ROOF DRAINAGE SYSTEMS

1.4 IDENTIFICATION OF VALVES

A. Each valve shall be provided with a stamped metal tag secured to the valve with metal chain. Tag shall indicate both the service and function of each valve. The Contractor shall furnish two prints of drawings showing floor plan for each floor with all valves accurately located and labeled. These drawings shall be neat and easily read.

PART 2 – PRODUCTS

2.1 VALVES

A. Domestic water valves:

1. Gate Valves 2" and Under: Nibco No. T134, rising stem, ductile iron hand wheel, union bonnet, solid wedge disc, bronze body, Class 150 psi working pressure.

2. Gate Valves 2-1/2" and Larger: Nibco No. F617-0, bronze trimmed, solid wedge disc, iron body, O.S. & Y., 125 psi working pressure.

3. Swing Check 2" and Under: Nibco No. T433, swing type, Y-pattern, all bronze, renewable seat & disc, regrinding, 200 psi working pressure.

4. Swing Check, 2-1/2" and Larger: Nibco No. F938-31, iron body, bolted bonnet, Class 150, bronze trimmed, check valves installed at discharge of pumps shall be non-slam type.

5. Globe Valves 2" and under: Nibco No. T235, union bonnet, integral seat, Class 150 bronze body with renewable disc.

6. Globe Valves, 2-1/2" and Larger: Nibco No. 718-B, bolted bonnet, cast iron body, 125 psi working pressure 0.S. & Y., pattern bronze trimmed.

7. Gate Valves 3" and Under for Copper Pipe: Nibco No. S134, union bonnet, Class 150 bronze rising stem wedge disc.

8. Globe Valves 2" Under for Copper Pipe: Nibco S-235, Class 150, bronze union bonnet, integral seat, renewable seat and disc.

9. Angle Valves 2" and Under Copper Pipe: Nibco T335, Class 150, Union Bonnet, integral seat, renewable seat & disc.

10. Angle Valves 2 1/2" and Larger: Nibco F8180-B, Class 125, bolted bonnet cast iron, renewable seat & disc., bronze trim.

11. Check Valve for 3" and under for Copper Pipe: Nibco S-433, Y-pattern, swing type, all bronze, renewable seat & disc.

12. Manual Balancing Valves:

    a) 2" and Under: Nibco T-585-70 ball valve or Milwaukee Butterball butterfly valve with calibrated flow set handle.
    b) 2-1/2" and Larger: W.C. Norris butterfly valves with lever with infinite throttling position as specified below.

13. Circuit Balancing Valves: Balance Valves shall be "Circuit Setter" balance valves as manufactured by Bell & Gossett.

14. Automatic Balancing Valves: Shall be spring loaded, variable orifice type capable of maintaining present flow within 5% over an operating pressure differential of at least 14 times the minimum valve pressure requirement. Maximum controlled pressure differential shall be at least 75% of the system pump head. Valve shall be Griswold Automatic Flow Control Valve or approved equal. At Contractor's option, automatic flow control valves may be used in 2" size and above in lieu of manual balancing valves.

15. Ball Valves:

    a) 1/2" to 2": Nibco No. T-585-70, two piece body, bronze, screwed ends, Teflon seats, straight through flow design.

16. Lubricated Plug Valves: Rockwell Mfg. Co. "Permaturn" lubricated plug valves Fig. No. 143. Provide valve handle for each valve. Valves shall have tapered plugs with thermally bonded lubricated film.

17. Drain Valves: Nibco No. T134, 3" and smaller.

PART 3 – EXECUTION

3.1 INSTALLATION

A. All valves shall be installed in locations which will allow easy operation and facilitate maintenance.

B. Gate and globe valves shall be installed with stems up.

END OF SECTION 220523

SJC EXTENSION OFFICE

SECTION 220700

PIPING INSULATION

PART 1 – GENERAL

1.1 SUMMARY

A. Furnish and Install:

1. Piping insulation
2. Jackets and accessories

1.2 RELATED DOCUMENTS:

A. The General Provisions of the Contract, including General and Special Conditions and the General Requirements apply to the work specified in this section.

B. Insulation furnished under this specification shall comply with all requirements of the State Energy Code and the recommendations of the latest edition of ASHRAE 90.1 and these specifications. The more stringent of these shall be the standard for the work provided under these specifications.

C. The work included under this specification consists of furnishing all labor, accessories, equipment, and materials necessary for installation of all piping, and mechanical equipment insulation systems. This includes but is not limited to:

1. Thermal Insulation

a) Domestic hot water piping

2. Condensation Prevention Insulation

a) Domestic cold water piping
b) Roof drain and overflow piping and roof drains
c) Cooling coil condensate piping

1.3 RELATED WORK IN OTHER SECTIONS

220000 PLUMBING INDEX
220500 GENERAL PLUMBING REQUIREMENTS
220513 COMMON MOTOR REQUIREMENTS FOR PLUMBING EQUIPMENT
230500 GENERAL HEATING, VENTILATING AND AIR CONDITIONING REQUIREMENTS

1.4 REFERENCES

A. ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate.

B. ASTM C177 - Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of Guarded Hot Plate Apparatus.

C. ASTM C195 - Mineral Fiber Thermal Insulation Cement.

D. ASTM C449 - Mineral Fiber Hydraulic-setting Thermal Insulating and Finishing Cement.

E. ASTM C518 - Test Methods for Steady-State Heat Flux, Heat Flow Meter Apparatus.

F. ASTM C533 - Calcium Silicate Block and Pipe Thermal Insulation.

G. ASTM C534 - Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form.

H. All preformed Fiberglass pipe insulation with factory applied jackets shall meet the following standards:

ASTM E84 - Surface Burning Characteristics of Building Materials
ASTM E96 – Jacket Permeance
ASTM C335-Steady-State Heat Transfer Properties of Horizontal Pipe Insulation
ASTM C411 - Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation
ASTM C547 - Mineral Fiber Preformed Pipe Insulation
ASTM C585 - Inner and Outer Diameters of Rigid Thermal Insulation for Nominal Sizes of Pipe and Tubing (NPS System).
ASTM C795 – Thermal Insulation for use in Contact with Austenitic Stainless Steel
ASTM C1136 – Flexible Low Permeance Vapor Retarders for Thermal Insulation: Types I-IV.
NRC 1.36 – Nuclear Regulatory Commission Guide 1.36 Non Metallic Thermal Insulation
NFPA 90A
NFPA 255
UL 723 – Composite Surface Burning Characteristic
CAN ULC S102-M
MIL – I – 22344D – Insulation, Pipe, Thermal, Fibrous Glass
MIL – I – 24244C (Ships)
USCG 164.109 – Non Combustible Materials
New York City MEA
GreenGuard Certified for Indoor Air Quality
GreenGuard Certified for Children and Schools

1.5 DEFINITIONS

A. Exposed Location: Exposed in mechanical rooms, rooms with finished walls or ceilings, and pipe chase between toilet rooms and equipment rooms.

B. Concealed Location: Located in furred spaces, attics, crawl spaces, above suspended ceilings in finished or unfinished rooms, or all other locations not exposed to view.

C. Cold Piping: Shall include domestic water and other piping with surface temperatures less than 70°F.

D. Hot Piping: Domestic hot water, supply and return and other piping with surface temperatures greater than 105°F.

E. Exterior Locations: All locations exposed, unexposed above grade or below grade beyond the building floor, wall or roof line of the structure or building

F. Location and Insulation Requirements:

1. Cold Water, including Non-potable Water (NPW): Insulate as follows:

a) All piping above ceilings and in walls.
b) Entire system except for stubouts to fixtures.

2. Domestic Hot: Insulate as follows:

a) Entire system except for stubouts to fixtures.

3. Roof drains and over flows:

a) All piping in building, ceilings, walls

4. K Factors: All K Factors shown in this Specification are expressed in BTU-in/hr.-ft^2-F.

1.6 SUBMITTALS

A. Comply with Section 220500.

B. Product Data: Provide product description, list of materials and thickness for each service and location.

C. Manufacturer's Installation Instructions: Indicate procedures, which ensures acceptable workmanship and installation standards will be achieved.

1.7 QUALITY ASSURANCE

A. Qualifications of Applicator: Company specializing in piping insulation application with five (5) years minimum experience.

B. Regulatory Requirements Fire Hazard Classification: Insulation shall have a composite (insulation, jacket or facing, and adhesive to secure jacket or facing) fire hazard rating as tested by ASTM E-84, NFPA 255, and UL 723 not to exceed

25 flame spread, 50 fuel contribution, and 50 smoke developed. Materials shall be labeled accordingly.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Compliance: Comply with Section 230500. Deliver materials to job site in original non-broken factory packaging, labeled with manufacturer's density and thickness and store in a warm, dry location.

1.9 PROJECT/SITE CONDITIONS

A. Storage Environment: Maintain ambient temperatures and conditions required by manufacturers of adhesive and insulation while in storage.

B. Environmental Requirements: Perform work at ambient and equipment temperatures as recommended by the insulation manufacturer.

C. Protection: Protect insulation against dirt, water, chemical or mechanical damage before, during and after installation. Repair or replace any such insulation or covering damaged prior to final acceptance of work.

D. Application Surfaces: Surface shall be dry, free of dust, oil, construction residues or other foreign materials before insulation is applied. Piping joints shall be dry, leak free and tested before application of insulation occurs.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:

1. Owens-Corning
2. Knauf
3. Johns Manville
4. Industrial Insulation Group

2.2 MATERIALS

A. Glass Fiber:

1. Insulation: ASTM C547; rigid molded, noncombustible.

a) 'K' value: ASTM C335, 0.24 at 75 °F

1) K values shall conform to the following at 75°F

(a) Heating water to 250°F: .28
(b) Heater water and Steam to 350°F or above: .32
(c) Chilled water 40°F to 55°F: .24

(d) Domestic water 105°F or greater: .24

b) Minimum Service Temperature: -20°F
c) Maximum Service Temperature: +450°F
d) Maximum Moisture Absorption: 0.2 percent by volume

2. Vapor Barrier Jacket:

a) All Service Vapor Retarder Jacket
b) Moisture Vapor Transmission: ASTM E96; 0.02 perm inches.
c) Secure with self-sealing longitudinal laps and butt strips.
d) Alternate: Paper Free All Service Vapor Retarder Jacket

2.3 JACKETS

A. A.PVC Plastic

1. Jacket: ASTM C921, one piece molded type fitting covers and sheet material, off white color.

a) Minimum Service Temperature: -40°F
b) Maximum Service Temperature: +150°F
c) Moisture Vapor Transmission: ASTM E96; 0.002 percent by volume
d) Maximum Flame Spread: ASTM E84: 25.
e) Maximum Smoke Developed: ASTM E84; 50
f) Thickness: 20 mil.
g) Connections: Brush on welding adhesive

2. Covering Adhesive Mastic: Compatible with insulation
3. Acceptable Manufacturers

a) Proto
b) Zeston
c) Speedline

B. Canvas Jacket; UL listed.

1. Fabric: ASTM C921, 6 oz/sq yd, plain weave cotton treated with dilute fire retardant lagging adhesive.
2. Lagging Adhesive: Compatible with insulation.
3. Aluminum Jacket: ASTM B209.

a) Thickness: 20 mil inch sheet.
b) Finish: Smooth.
c) Joining: Longitudinal slip joints with 2-inch laps.
d) Fittings: 0.016-inch-thick die shaped covers with factory attached protective liners.
e) Metal Jacket Bands: 3/8-inch wide; 0.015-inch-thick aluminum.

C. Aluminum Jacket: ASTM B209

1. Thickness: 0.016-inch sheet.
2. Finish: Smooth
3. Joining: Longitudinal slip joints and 2-inch laps.
4. Fittings: 0.016-inch-thick die shaped fitting covers with factory attached protective liner.
5. Metal Jacket Bands: 3/8-inch wide; 0.015-inch-thick aluminum.

D. Stainless Steel Jacket: Type 304 stainless steel.

1. Thickness: 0.016-inch
2. Finish: Smooth
3. Metal Jacket Bands: 3/8-inch wide; 0.016-inch-thick stainless steel.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Inspect work in conformance with Section 220500.

3.2 PREPARATION

A. Pipe Testing: Testing of piping shall be completed and leaks repaired prior to application of insulation. Surfaces shall be clean and dry before proceeding.

B. Installation: Install materials after piping has been tested and approved. See Section 220500.

C. Surface Cleaning: Clean surfaces for adhesives.

3.3 INSTALLATION

A. Pipe Insulation:

1. Manufacturer's Instructions: Install materials according to manufacturer's instructions.

2. Finished Surface Temperature: Insulation thickness shall conform to those recommended ASHRAE 90.1, latest edition, unless otherwise specified. Thickness of insulation shall be sufficient to keep surface temperatures below 115°F.

3. Continuity: Apply insulation tightly over clean, dry surfaces with sections or edges firmly butted together. Make insulation continuous through sleeves or openings in walls and floors.

4. Make insulation continuous at pipe hangers, trapezes, and other types of supports. Do not notch insulation to fit over hangers, trapezes, and other supports. Install shields at all supports.

5. Name Plates: Do not insulate over nameplate or ASME stamps. Bevel and seal insulation around such.

6. Supports: Finish insulation neatly at hangers, supports and other protrusions. Locate insulation or cover seams in least visible locations.

7. Inserts: Provide an insert, not less than 6-inches long, of same thickness and contour as adjoining insulation, between support shield and piping, but under the finish jacket, on piping 2-inches diameter or larger, to prevent insulation from compressing at support points. Inserts shall be cork, hardwood or other heavy density insulating material suitable for the planned temperature range. Factory fabricated inserts may be used with field fabricated insulation value equal to insulation approved by the Project Engineer. Do not use calcium silicate inserts or other material that can absorb moisture on any below ambient piping system.

8. Enclosures: Do not insulate hot water heating pipe within radiation enclosures.

9. Flanges: On insulated piping without vapor barrier and piping conveying fluids 140°F or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation at such locations.

10. Equipment Fittings and Valve Coverings: Insulate all equipment, fittings, and valves. Terminate insulation neatly with insulating and finishing cement troweled on bevel.

11. Preformed Fittings Locations: All fittings and valves shall be insulated with preformed fiberglass for fittings, mitered sections of pipe insulation or fiberglass blanket insulation of equal thickness to the adjacent pipe insulation. Cover the fittings, valves, and insulation with preformed PVC jacket. Close jacket with stainless steel tacks and compatible adhesive.

12. Radiation Barrier: When insulating hot pipe fittings, a layer of kitchen-type aluminum foil shall be applied over the first fiber glass insert applied, making sure the aluminum foil is extended over the adjacent pipe insulation. A second fiber glass insert shall then be applied over the foil with a vapor seal at all the aluminum foil edges. Insulation thickness shall be such that the surface temperature shall not exceed 115°F.

13. Expansion Devices: On insulated piping with vapor barrier; insulate all equipment, fittings, valves, unions, flanges, strainers, flexible connections, and expansion joints.

14. Fasteners: Avoid the use of staples on vapor barrier jackets. Seal vapor barrier penetrations with white vapor barrier finish and adhesive.

15. Adhesive Limitations: Apply adhesives to not exceed the coverage recommended by the manufacturer.

16. Wall, Floor and Ceiling Penetrations: Continue insulation with vapor barrier through penetrations including walls, floors, and ceilings.

17. Enclosure: All insulation ends shall be firmly butted and secured with minimum 3-inch-wide butt strips. Exposed end of pipe insulation shall be sealed with vapor barrier mastic.

18. Repairs: Repair separation of joints or cracking of insulation due to thermal movement or poor workmanship.

19. Service Access: When equipment with insulation requires periodical opening for maintenance, repair, or cleaning, install insulation in such a manner that it can be easily removed and replaced without damage.

20. A complete moisture and vapor seal shall be provided on cold surfaces where vapor barrier jackets or coatings are required. Anchors, hangers and other projections shall be insulated and vapor sealed to prevent condensation. For heat traced piping, insulate fittings, joints, and valves with insulation of like material, thickness, and finish as adjoining pipe. Size large enough to enclose pipe and heat tracer. Cover with aluminum jacket with seams located on bottom side of horizontal piping.

21. Insulation shall be installed in a workmanlike manner by workmen regularly engaged in this type of work. Insulation shall not be applied until all surfaces are clean and dry and until inspection and release for insulation application.

    a) Do not notch insulation to fit around trapezes or wall-mounts fabricated from slotted metal framing ("unistrut or equal"), angle iron or other materials. Insulation shall be continuous across the support and an insulation shield shall be installed to prevent crushing the insulation. Pipe clamps shall be sized to fit around insulation and shield.
    b) Insulation may be notched or trimmed around riser clamps. Seal exposed insulation.

B. Jackets:

1. Indoor, Concealed Applications: Insulated pipes conveying fluids above ambient temperature shall have standard jackets, with or without vapor barrier, factory-applied or field-applied. Finish fittings, joints, and valves with premolded PVC jackets secured with stainless steel tacks. The precut insulation shall be held in place by copper wire or hemp twine and

be removable without damage to the insulation or jacket. Leave surfaces clean and ready for painting.

2. Indoor, Concealed Applications: Insulated dual-temperature pipes or pipes conveying fluids below ambient temperature shall have vapor barrier jackets, factory-applied or field-applied. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe, and finish with premolded PVC jackets.

3. Indoor, Exposed Applications: Mechanical Equipment Rooms, all insulated piping to be finished with aluminum jacket secured with metal jacket bands.

4. Indoor, Exposed Applications: Same as Indoor, Concealed Applications except that in addition the insulation shall be covered with an aluminum jacket secured with metal jacket bands.

5. Exterior Applications: Same as Indoor, Exposed Applications plus connect with a modified S lock equal to Premetco "Loc-Jack" Z-Crimp, Factory or Field installed. All seams shall be sealed with silocone caulking and have seams oriented so that the jacketing will shed water & not tend to trap and enter rain water.

3.4 APPLICATION

A. Fittings and Valves Insulation:

1. Premolded Fittings: All insulated pipe fittings shall be insulated with 20 mil PVC Zeston one piece premolded insulated fittings wherever possible. If Zeston fittings are not available for the use required, comply with the following paragraph #2. Insulate fittings with fiberglass tightly wrapped with copper wire or heavy hemp twine to within 1/4 inch of thickness of adjoining copper wire or insulation, finished with 1/4 inch of insulating cement troweled flush with pipe insulation. A tack coat of mastic vapor barrier Foster 60-25 or 26-to-1/16-inch thickness or equal shall be applied to fittings and valves. Apply 6 oz. fiberglass canvas jacket to build-up (not PVC) fitting band valve insulation. Cement laps thoroughly with Foster 81-42 or 30-36 adhesive.

B. Perm Rating Vapor Barrier Mastic Coatings:

1. Perm rating not more than 0.25 when tested in accordance with ASTM E-96, Procedure A Fire Retardant.

C. Adhesives, Sealers, Facings, and Vapor Barrier Coatings:

1. Compatible with materials to which applied, and shall not corrode, soften, or otherwise attach the pipe or insulation materials in either the wet or dry

state. Use only adhesives, sealers, facings, and vapor barrier coatings recommended by the approved manufacturers of insulation materials.

3.5 SCHEDULE

Service	Pipe Size	Thickness
CW, HW, HWC	All sizes CW, 1/2 inch to 2-inch HW, HWC	1 inch
	2-1/2 inch and Larger HW, HWC	1-1/2 inch
NPW & Cooling Condensate	All sizes	1 inch
RD & OF	All sizes	1 inch

END OF SECTION 220700

SJC EXTENSION OFFICE

SECTION 221000

PIPE AND PIPE FITTINGS

PART 1 – GENERAL

RELATED DOCUMENTS

A. The general provisions of the Contract, including General and Special Conditions and the General Requirements, apply to the work specified in this section.

1.2 SCOPE

A. This section of the specifications encompasses the basic materials and methods of the various piping systems covered in Division 25.

B. Standards: The latest edition of each standard referenced shall be used to determine compliance.

1.3 RELATED WORK IN OTHER SECTIONS

220000	PLUMBING INDEX
220500	GENERAL PLUMBING REQUIREMENTS
220513	COMMON MOTOR REQUIREMENTS FOR PLUMBING EQUIPMENT
220523	VALVES
220700	PIPING INSULATION
221113	DOMESTIC WATER SYSTEMS
221123	NATURAL GAS PIPING SYSTEMS
221313	SOIL AND WASTE PIPING SYSTEMS
221413	ROOF DRAINAGE SYSTEMS

1.4 IDENTIFICATION OF PIPING

A. All accessible piping shall be labeled at not more than 10 ft. intervals with labels indicating the service and direction of flow. Pipe labels shall be self-adhesive labels, all-temperature Perma-Code pipe markers No. B-500, manufactured by the W.H. Brady Company. The background color code for all markers shall conform to the American National Standard A13.1 - 1975 "Scheme for the Identification of Piping Systems."

B. The color red shall be for the exclusive use on fire protection service piping and sprinkler piping per OSHA regulations (CFR 1910.144).

PART 2 – PRODUCTS

2.1 PIPING SYSTEMS

A. EXTERIOR WATER DISTRIBUTION

1. Copper: Type K hard, seamless copper tube conforming to ASTM B-88 with silver brazed joint per ASTM B260 Class BAg-1 with wrought copper fittings per ANSI B16-22.

B. Domestic water system

1. Above grade:

a) Copper: Shall be Type K soft drawn, or Type L hard drawn, seamless copper tubing conforming to ASTM B88, with wrought copper and bronze solder joint pressure fittings conforming to ANSI B16.22.

2. Underground:

a) Copper: Type K hard, seamless copper tubing conforming to ASTM B-88 with silver brazed joints (ASTM B-260 Class BAg-1) with wrought copper fittings per ANSI B16.22.

C. Soil and waste system

1. Above ground:

a) Cast Iron: Shall be cast iron hub and spigot soil pipe or hubless cast iron pipe and fittings, (No-Hub Couplings shall conform to CISPI Standard 310 & ASTM A-1277 or latest edition) conforming to ASTM A74 (latest edition) and/or Cast Iron Soil Pipe Institute (CISPI) CS-888 and shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute. The hub and spigot pipe shall use compression gasket joints per ASTM C-564 & ASTM 1563.

2. Underground inside building:

a) Cast Iron: Shall be cast iron hub and spigot soil pipe or hubless cast iron pipe and fittings, (No-Hub Couplings shall conform to CISPI Standard 310 & ASTM A-1277 or latest edition) conforming to ASTM A74 (latest edition) and/or Cast Iron Soil Pipe Institute (CISPI) CS-888 and shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute. The hub and spigot pipe shall use compression gasket joints per ASTM C-564 & ASTM 1563.

3. Underground outside buildings:

a) Under traffic areas and parking lots: Shall be cast iron hub and spigot soil pipe conforming to ASTM A74 and Cast Iron Institute CISPI 301.

b) All other areas: Piping shall be polyvinylchloride (schedule 40 for size 4" and smaller, SDR-35 for sizes 6" and larger), exterior sewer pipe (PVC) ASTM D3034 with gaskets per ASTM D1869.

c) Risers and base fittings for grade cleanouts shall be extra heavy cast iron pipe and fittings with compression joints per ASTM C-564 & ASTM-1563.

D. Sanitary vent system

1. Vent piping 2" and smaller in diameter may be schedule 40 galvanized steel pipe conforming to ASTM A-53 with 150 pound galvanized

malleable iron screwed fittings conforming with ANSI B16.3. Vent piping larger than 2" shall be cast iron as specified for interior soil and waste.

E. Refrigeration piping system

1. COPPER: Shall be "ACR" Type L hard drawn, seamless copper tubing conforming to ASTM B280, with wrought copper and bronze solder joint pressure fittings conforming to ANSI B16.22.

F. Roof drain system

1. The roof drain system shall be the same as the soil and waste system except that for drains 2" and smaller in diameter, Schedule 40 galvanized steel pipe conforming to ASTM A-53 with 150-pound galvanized malleable iron screwed fittings conforming with ANSI B16.3, may be used.

G. Natural gas piping system

1. Black steel: Above grade piping shall be Schedule 40, black steel pipe conforming to ASTM A-53, with 150-pound malleable iron screwed fittings conforming with ANSI B16.3. or seamless carbon steel weld fittings conform to ASTM A-234.

2. Underground piping shall be schedule 40 black steel pipe conforming to ASTM A-53 machine wrapped with Scotchwrap PVC tape using 50% overlap. Fittings and joints shall be double wrapped to a minimum 6 inches beyond the fitting. Pipe shall be primed prior to wrapping per manufacturer's recommendations.

H. Compressed air piping systems

1. Copper: Shall be Type L hard drawn, seamless copper tubing conforming to ASTM B88, with wrought copper, fittings or bronze solder joint pressure fittings conforming to ANSI B16.22-63.

2.2 JOINTS

A. Copper:

1. Silver brazed joints shall use brazing material containing approximately 45% silver, 15% zinc, 25% cadmium and 15% copper. Joints shall conform to ASTM B-260 Class BAg-1. Approved materials include Mueller #122, Lucas Milhaupt "Easy Flo45" and United Wire and Supply "Sil-Bond 45".

B. Black Steel:

1. Screwed joints shall be made with no more than three threads showing using teflon tape or teflon joint sealing compound.

2. Welded joints shall be fusion welded to full metal depth with width at least 2 1/2 times the depth of the metal being joined.

C. Bell and spigot joints shall conform to AWWA C200 with rubber gaskets.

D. Bonded joints shall have metallic bond including joints made with flexible couplings, caulking or rubber gaskets. Metallic bond shall be of ferrous material to effect continuous conductivity. Bond wire shall be type RHW-USE, size 1/0 neoprene gasketed copper conductor. Bond shall be thermal weld type.

E. Insulating joints shall be installed between nonthreaded ferrous and nonferrous metallic pipe. Insulating joints shall consist of a sandwich type flange insulating gasket of the dielectric type, insulating washers, and insulating sleeves for flange bolts. Gaskets shall be full faced. Bolt insulating sleeves shall be full length. Units shall be of a construction to prevent metal to metal contact of dissimilar piping materials.

2.3 FLOOR, WALL, AND CEILING PLATES

A. Where exposed pipes pass through finished floors, finished walls or finished ceilings, they shall be fitted with chromium plated spun brass flanges or flanges to match the type of pipe or pipe finish used. Plates shall be large enough to completely close the hole around the pipe and shall be not less than 1-1/2" or more than 2-1/2" larger than the diameter of the pipes. All plates shall be securely held in place.

2.4 UNIONS

A. Piping 2-1/2" and larger to have bolted flange unions with gaskets of material suitable for the specified service. Ground joint unions with brass to iron seats shall be used in piping 2" and smaller. Unions shall be installed at all valves and equipment connections.

B. Insulating Unions: See Specification Section 230519.

2.5 HANGERS AND ANCHORS

A. To prevent galvanic action between copper pipe and a dissimilar metal, copper pipe shall be isolated to prevent the pipe from contacting the dissimilar metal. This may be accomplished by mounting the pipe in an isolation fitting, or by wrapping the pipe with a 20-mil thickness of UPC-rated isolation tape. The 20-mil thickness can be accomplished by using a single wrap of 20-mil tape or by using 10-mil tape with a 50% overlap.

B. Copper pipe does not need to be isolated from copper plated pipe hangers that are suspended from hanger rods.

C. Copper pipe mounted on slotted metal framing ("unistrut or equal"), angle iron, or other dissimilar metal support shall be isolated as described above, even if pipe clamps used are copper plated. Painted, epoxy or powder-coated finishes on the metal support are not an acceptable means of isolation.

D. All piping shall be rigidly supported from the building structure by means of adjustable ring type hangers. Where pipes run side by side, support on rod and angle trapeze hangers. Hangers shall be spaced not greater than 5 feet on centers for cast iron piping, 6 feet on centers for copper piping and 10 feet on

centers for steel piping. Plastic pipe shall be supported on not more than 3 feet centers. Round rods supporting the pipe hangers shall be of the following dimensions:

1.	1/2 inch to 2 inch pipe	3/8 inch rod
2.	2-1/2" inch to 3 inch pipe	1/2 inch rod
3.	4 inch to 5 inch pipe	5/8 inch rod
4.	6 inch pipe	3/4 inch rod
5.	8 inch pipe	7/8 inch rod

E. Rods for trapeze hangers shall be a minimum of 3/4 inch and shall have the equivalent cross section listed above per pipe supported. The use of pipe hoods, chains, or perforated iron for pipe supports will not be permitted. Insulated piping shall have hangers outside of insulation with 18 ga. protection sleeves 12" long. Anchors and guides shall be as detailed on the drawings. The Contractor shall provide inserts in the building construction at the time the concrete is poured, and the hangers shall be attached to these inserts. Where inserts cannot be used expansion shields may be used provided the hanger is not attached rigidly to the bolt but is supported from an angle held in place by the expansion bolt. The use of expansion shields must be approved by the Architect/Engineer. See drawings and details for support of tunnel piping.

F. Hanger rods for all equipment, pipes, ducts, trapezes, vibration isolators, etc., shall be installed straight, true and plumb. Do not bend or flex hanger rods to accommodate sloping structures, avoid obstacles, or for any other purpose. Where necessary, utilize swivel beam clamps, beveled or swivel hardware, angled, swivel or hinged brackets spanning members or other appropriate means of connection.

2.6 THRUST BLOCKS

A. All underground water line tees, crosses, bends and valves shall be provided with concrete blocking. Concrete blocking shall be used for cast-iron or vitrified clay tile fittings where a change of flow direction occurs. All fittings at bends in the pipe line shall be firmly wedged against the vertical face of the trench by means of concrete thrust blocks bearing on undisturbed earth, to prevent the fittings from being blown off the line when under pressure. Fittings at vertical bends downward shall be anchored with concrete anchors as required. Thrusts blocks shall be determined using an allowable soil bearing pressure of 1,500 PSF at 200 psi test pressure in water line. No blocking will be covered or backfilled until inspected and approved by the Architect/Engineer.

2.7 VALVE BOXES

A. Valve boxes shall be of cast iron extension type with flared base and shall be M & H Valve and Fittings Company, two-piece, 5 1/4" shaft, screw type to fit depth of bury. The minimum thickness of metal shall 3/16" and the nominal diameter of the box shall be at least four inches. The cover shall have the name of the utility service cast in the metal. Boxes shall be installed over each outside gate valve

unless otherwise shown on the drawings. The boxes shall be of such length as will provide without extension a cover of not less than three feet over all water pipes. Valve boxes shall have concrete collars.

PART 3 – EXECUTION

3.1 GENERAL

A. Provide and erect in a workmanlike manner according to the best practices of the trade all piping shown on drawings and required for the complete installation of the systems. The piping shown on the drawings shall be considered as diagrammatic for clarity in indicating the general run and connections, and may or may not in all parts be shown in its true position. The piping may have to be offset, lowered, or raised as required or as directed at the site. This does not relieve the Contractor from responsibility for the proper erection of systems or piping in every respect suitable for the work intended as described in the specifications and approved by the Architect/Engineer.

B. In the erection of all piping, it shall be properly supported and proper provisions shall be made for expansion, contraction and anchoring of piping. All piping shall be cut accurately for fabrication to measurements established at the construction site. Pipe shall be worked into place without springing or forcing, properly clearing equipment and all windows, door, and other openings. Cutting or other weakening of the building structure to facilitate installation will not be permitted. All pipes shall have burrs and/or cutting slag removed by reaming or other cleaning methods. All changes in direction shall be made with fittings.

C. Preinsulated Piping Systems

1. All piping adjoining this system shall be anchored at or near the point of connection to avoid imposing any external forces on the carrier pipe. The Contractor shall pour concrete anchor blocks at every change of direction after testing the pipe. The anchor blocks are to be sized in accordance with forces resulting from thermal stress, existing soil conditions, and shall be in accordance with the manufacturer's recommendations.

2. Immediately after the system is installed in the ditch, a partial backfill of selected earth shall be made in the middle of each unit, leaving the joints exposed for inspection of the hydrostatic test. A hydrostatic test of 200-psig shall be required for a period of four hours. No leakage shall be allowed.

3. After hydrostatic testing, final backfill of selected earth shall be hand placed and hand tamped to 12" minimum over the top of the jacket. Remainder of the backfill shall be free of large boulders, rocks over 6" in diameter, frozen earth, or foreign matter. The backfill operation shall now be completed by any convenient means. Do not use wheeled or tracked vehicles for tamping.

4. The services of a factory-trained Field Service Instructor shall be required, and materials shall be stored, handled, and installed in accordance with Manufacturer's recommendations. The Field Service

Instructor shall be present during critical stages of the installation and testing.

D. All open ends of pipes and equipment shall be properly capped or plugged with plugs manufactured for this purpose to keep dirt and other foreign materials out of the system. Plugs of rags, wool, cotton waste or similar materials may not be used in plugging.

E. All piping shall be arranged avoiding interference with removal and maintenance of equipment, filters, or devices; and not blocking access to manholes, access openings, etc. Flanges or unions as applicable for the type of piping specified shall be provided at the piping connections to all items of equipment.

F. Valves and specialties shall be placed to permit easy operation and access, and valves shall be regulated, packed, and adjusted at the completion of the work before final acceptance.

G. All piping shall be erected to insure proper draining. Steam mains shall be pitched down in the direction of flow, a minimum of one inch per 40 feet or appropriately trapped. Where steam and condensate flow in opposite directions within the same pipe, the pipe shall be 2 sizes larger than shown unless specifically shown on the drawings that counterflow of condensate was intended by the design. Condensate return mains shall be pitched down in the direction of flow, one inch per 20 feet. Domestic water piping may be run level but shall be free from traps.

H. Soil and waste piping and other gravity drains shall be sloped down in direction of flow minimum one inch in 20 feet.

3.2 ACCESS DOORS

A. Furnish all access doors required for access to valves, controls, or other items for which access is required for either operation or servicing. All costs incurred through failure to perform this function as the proper sequence of the work dictates shall be borne by this Mechanical Contractor.

B. The type of access door shall be as required by the room finish schedule. Acoustical tile access doors shall be equal to Krueger Style B, Style A for acoustical plaster, or Style C-CF for sidewall drywall or plaster construction.

3.3 JOINTS

A. Resilient molded gaskets shall be used on hub and spigot piping. For cast iron soil pipe not located under buildings, the Contractor may also use the No-hub sanitary system for pipe 6" and below with neoprene sealing gaskets, stainless steel retaining sleeves and two draw bands. An adequate torque wrench shall be used for system installation in accordance with manufacturer's recommendations.

B. Screwed Joints: Screwed joints shall be American Standard taper pipe threads. Ream pipe ends and remove burrs after threading. Make up joints using an approved compound or teflon tape, applied to the male threads only.

C. Brazed and Soldered Joints: Tubing shall be cut square and burrs removed. Both inside of fittings and outside of tubing shall be well cleaned with steel wool before sweating. Care shall be taken to prevent annealing of fittings and hard drawn tubing when making connections.

D. Welded Joints: On black steel piping 2 inches and above in size, the joints shall be welded. Welding shall be done using either gas or electric welding equipment. Certified welders shall be used. All pipe surfaces shall be thoroughly cleaned before welding. Each joint shall be beveled before being welded. Piping shall be securely aligned and spaced and the width of circumferential welds shall form a gradual increase in thickness from the outside surface to the center of the weld. The Contractor shall use appropriate materials to protect the structure and provide adequate fire protection at all locations where welding is done. All elbows shall be long radius unless otherwise specified. Wherever tee connections are made to piping systems on the main run, welding sockets may be installed for the branch connections up to one half the size of the main run. On connections larger than one half the size of the main run, welding tees shall be used. The use of fittings formed from welded pipe sections will not be permitted.

E. Flanged Joints:

1. Cast iron flanges shall conform to the American Standard for cast iron pipe flanged fittings, Class 125 (B.16.1). Gaskets shall be suitable for the service on which used.

2. Steel flanges shall be 150 lb. raised face type.

3.4 PUMP AND EQUIPMENT CONNECTIONS

A. All piping connecting to pumps or other equipment shall be installed with isolation valves and flexible connections to prevent strain at the connection to equipment. The Contractor shall be required as directed to disconnect piping to demonstrate that piping has been so connected. Provide a suction diffuser at each end suction pump where the inlet piping has a straight run of less than 15 pipe diameters in length. Suction diffusers shall consist of angle type body with inlet vanes and combination diffuser-strainer-orifice cylinder with 3/16 inch diameter openings for pump protection. Strainer free area shall be five times the section area of the pump connection. Provide an adjustable support foot for diffusers installed on end suction pumps.

3.5 PIPE SLEEVES

A. Pipe sleeves shall be furnished and set by the Contractor, and the Contractor shall be responsible for their proper and permanent location. Piping will not be permitted to pass through footings, beams or ribs unless so noted on the drawings or with the consent of the Architect/Engineer. Pipe sleeves shall be installed and properly secured in place at all points where pipes pass through concrete or masonry construction and through all exterior walls, regardless of construction. Pipe sleeves, except sleeves in footings and beams shall be of sufficient diameter to provide approximately 1/4-inch clearance around the pipe, and in cases of insulated pipes, approximately 1/4-inch around the insulation. Pipe sleeves in footings and beams and exterior walls shall be of steel pipe.

Sleeves in footings shall be not less than one inch or more than two inches larger in diameter than the pipe to be installed. Pipe sleeves in floors shall be cut flush with finished floor. Openings between piping and sleeves shall be made watertight with plastic cement to a minimum depth of two inches. Openings between piping and sleeves in all masonry or concrete interior walls and partitions shall be similarly caulked for acoustical reasons.

3.6 EXPANSION AND CONTRACTION

A. The Contractor shall make all necessary provisions for expansion and contraction of piping with offsets or loops and anchors to prevent undue strain.

3.7 PROTECTIVE COATINGS

A. All underground pipe except exterior cast iron water distribution pipe shall be wrapped with "Scotchwrap" No. 50 tape to give not less than two complete layers on the entire underground piping system, or piping shall have X-TRU Coat factory applied plastic protective covering.

B. All buried exterior cast iron water distribution piping shall be tar coated.

3.8 TESTING

A. Before any insulation is installed or before piping is covered or enclosed all piping systems shall be tested and proved tight at not less than 1 1/2 times the maximum service pressure which the piping systems will be required to handle, unless otherwise specified.

B. All tests shall be conducted in the presence of the Architect/Engineer and the building Owner or his representative. Any systems failing to meet the specified test requirements shall be corrected and retested until the test requirements are met.

3.9 FLUSHING, DRAINING, AND CLEANING PIPE SYSTEMS

A. The Contractor shall flush water piping systems with water before placing them in operation. After systems are in operation and during the test period all strainer screens shall be removed and thoroughly cleaned. The Contractor shall notify the Architect/Engineer in writing when this requirement is to be accomplished.

B. All domestic water lines shall be sterilized as described in Section 221113 - DOMESTIC WATER SYSTEM of these specifications.

END OF SECTION 221000

SJC EXTENSION OFFICE

SECTION 221113

DOMESTIC WATER SYSTEMS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including General and Special Conditions and the General Requirements, apply to the work specified in this section.

1.2 DESCRIPTION OF WORK

A. The Contractor shall furnish and install the Domestic Water System as shown on the drawings including specialties shown or called out in the fixture and/or equipment list and as necessary for satisfactory operation of the system.

1.3 RELATED WORK IN OTHER SECTIONS

220000	PLUMBING INDEX
220500	GENERAL PLUMBING REQUIREMENTS
220513	COMMON MOTOR REQUIREMENTS FOR PLUMBING EQUIPMENT
220523	VALVES
220700	PIPING INSULATION
221000	PIPE AND PIPE FITTINGS

1.4 STERILIZATION

A. All domestic water piping shall be sterilized as described in Part 3 of this section.

PART 2 – PRODUCTS

2.1 PIPE AND PIPE FITTINGS

A. Pipe and pipefittings shall be as described in Section 221000 - PIPE AND PIPE FITTINGS.

B. All piping in any utilities tunnel shall have welded or silver brazed joints.

2.2 SHOCK ABSORBERS

A. Shock absorbers and/or air cushions shall be installed where shown on the drawings. Shock absorbers shall be equal to Zurn Z-1700, Diatrol Series 500 or approved equal sized for the system being protected.

PART 3 – EXECUTION

3.1 INSTALLATION

A. The installation shall conform to the requirements of Section 220500 - GENERAL PLUMBING REQUIREMENTS, and Section 221000 - PIPE AND PIPE FITTINGS.

B. Insulating couplings shall be furnished and installed at all connections between copper and steel pipe to prevent electrolysis.

C. Each water service main, branch main, riser and branch to a group of fixtures shall be valved. Stop valves shall be provided at each fixture.

3.2 STERILIZATION

A. Domestic Water lines shall be sterilized as follows: Chlorine shall be applied to provide a solution of not less than 250 PPM. The chlorinating material shall be introduced into the waterline in a manner approved by the Architect/Engineer. The solution shall be circulated if provided with pumps and all valves in the line shall be operated several times during the contact period. After a contact period of no less than eight (8) hours the system shall be flushed with clean water until the residual chlorine content is not greater than 0.2 PPM.

B. The sterilization procedure shall be witnessed by the Architect/Engineer and Owner.

3.3 TESTS

A. General: All tests shall be conducted in the presence of the Architect/Engineer or his representative. Any systems failing to meet the specified test requirements shall be corrected and retested until the test requirements are met.

B. Water Systems: The complete water systems shall be hydrostatically tested at a pressure of 150 psi and shall show no loss in pressure for a period of one hour.

END OF SECTION 221113

SJC EXTENSION OFFICE

SECTION 221123

NATURAL GAS PIPING SYSTEMS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including General and Special Conditions and the General Requirements, apply to the work specified in this section.

1.2 DESCRIPTION OF WORK

A. The Contractor shall furnish and install the Natural Gas System as shown on the drawings including specialties necessary for satisfactory operation of the system.

1.3 RELATED WORK IN OTHER SECTIONS

220000	PLUMBING INDEX
220500	GENERAL PLUMBING REQUIREMENTS
220513	COMMON MOTOR REQUIREMENTS FOR PLUMBING EQUIPMENT
220523	VALVES
221000	PIPE AND PIPE FITTINGS

PART 2 – PRODUCTS

2.1 PIPE AND PIPE FITTINGS

A. Pipe and pipe fittings shall be as described in Section 221000 - PIPE AND PIPE FITTINGS.

B. All underground gas piping shall be welded.

C. Any underground gas piping shall have a protective coating as specified in Section 221000 - PIPE AND PIPE FITTINGS.

D. All gas piping in any utilities tunnel shall be welded.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Furnish and install all piping as indicated on the drawings, and all accessories in strict accordance with the applicable gas code.

B. All gas piping in any utilities tunnel shall be isolated from any metal to metal contact with hangers, supports, rails, etc.

C. Ventilated conduit shall be used to carry natural gas piping whenever such piping is run under any building, building sidewalk, structure, or through or within a

concealed return air space. Ventilated conduit construction shall conform to the details shown on the drawings.

D. Gas trains connecting gas fired equipment shall conform to UL requirements.

E. All equipment (AHU, AC, Water Heaters, etc.) connected to the gas system shall be connected with gas valve, union, dirt leg with removable cap (up 4" above any surface) and flexible connection.

F. All piping and accessories shall be supported by unistrut brackets and gasketed pipe clamps, inside of the building.

3.2 TESTS

A. All gas piping shall be tested with air pressure of 60 psi and shall show no loss in pressure for a period of 24 hours on a gauge for recording pressure.

END OF SECTION 221123

SJC EXTENSION OFFICE

SECTION 221313

SOIL AND WASTE PIPING SYSTEMS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including General and Special Conditions and the General Requirements, apply to the work specified in this section.

1.2 DESCRIPTION OF WORK

A. The Contractor shall furnish and install the soil and waste piping system as shown on the drawings including specialties shown or called out in the equipment list and as necessary for satisfactory operation of the system.

1.3 RELATED WORK IN OTHER SECTIONS

220000	PLUMBING INDEX
220500	GENERAL PLUMBING REQUIREMENTS
220513	COMMON MOTOR REQUIREMENTS FOR PLUMBING EQUIPMENT
221000	PIPE AND PIPE FITTINGS

1.4 REQUIREMENTS

A. See Sections 220500 - GENERAL PLUMBING REQUIREMENTS and 221000 - PIPE AND PIPE FITTINGS for general requirements.

B. Furnish and install all concrete, grout, and other required materials to fill all block outs and/or sleeves left open for this Subcontractor's convenience or for the installation of this work.

PART 2 – PRODUCTS

2.1 PIPE AND PIPE FITTINGS

A. The pipe and pipefittings shall be as described in Section 221000 - PIPE AND PIPE FITTINGS.

2.2 FLOOR DRAINS

A. Drains shall be Zurn, Wade, or Smith and shall be equal to those specified on the drawings.

2.3 FLOOR SINKS

A. Drains shall be Zurn, Wade, or Smith and shall be equal to those specified on the drawings.

2.4 CLEANOUTS

A. Cleanouts shall be as manufactured by Zurn, Wade, or Smith and shall be of the same size as the pipe except that cleanout plugs larger than four inches will not be required. Cleanouts installed in connection with cast iron soil pipe shall consist of a long sweep, quarterbend or one or two eighth bends extended to an easily accessible place, or as indicated on the drawings.

B. Cleanouts in finish floors shall be of the type made to match the floor and/or covering. All exposed metal shall be polished or chrome plated brass.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Installation shall conform to Section 220500 - GENERAL PLUMBING REQUIREMENTS, and Section 221000 - PIPE AND PIPE FITTINGS.

B. Flashings: Vent pipes shall be flashed and made watertight at the roof with sheet lead flashing. Flashing shall weigh at least four pounds per square foot, shall be 24 inches square and shall be turned up around the pipe and into the top of the pipe. Vent pipes shall extend at least 12 inches above roof.

C. Traps: Each fixture and piece of equipment connecting to the drainage system shall be equipped with a trap. Each trap shall be placed as near to the fixture as possible and no fixture shall be double trapped.

D. Floor Drains: All floor drains shall be installed with grates square with the building lines.

3.2 TESTS

A. The entire sanitary system shall be tested in accordance with the requirements of the State Plumbing Code, all local codes and ordinances, and the Uniform Plumbing Code.

END OF SECTION 221313

SJC EXTENSION OFFICE

SECTION 221413

ROOF DRAINAGE SYSTEMS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including General and Special Conditions and the General Requirements, apply to the work specified in this section.

1.2 DESCRIPTION OF WORK

A. The Contractor shall furnish and install the roof drainage system as shown on the drawings and/or listed in the fixture schedule and as necessary for satisfactory roof drainage.

1.3 RELATED WORK IN OTHER SECTIONS

220000	PLUMBING INDEX
220500	GENERAL PLUMBING REQUIREMENTS
220513	COMMON MOTOR REQUIREMENTS FOR PLUMBING EQUIPMENT
220700	PIPING INSULATION
221000	PIPE AND PIPE FITTINGS

PART 2 – PRODUCTS

2.1 PIPE AND PIPE FITTINGS

A. Pipe and pipefittings shall be as described in Section 221000 - PIPE AND PIPE FITTINGS.

2.2 SPLASH BLOCKS

A. Splash blocks shall be provided where required to prevent erosion of the soil and shall be sized to cover the splash area.

2.3 OVERFLOW DRAINS

A. Where roof drains are required, overflow drains having the same size as the roof drains shall be installed with the inlet flow line located 2" above the low point of the roof unless overflow scuppers are provided.

B. Overflow Drains shall be piped separated from the roof drains to discharge or underground storm sewer connection.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Installation shall conform to the requirements of Section 220500 - GENERAL MECHANICAL REQUIREMENTS, and Section 221000 - PIPE AND PIPE FITTINGS.

B. All roof drainage piping shall be carefully coordinated with ductwork and piping shown on the mechanical plans and routed so that no conflict occurs.

C. All roof drainage piping shall be carefully coordinated with the structural work and any conflicts shall be immediately brought to the attention of the Architect/Engineer.

3.2 TESTS

A. Roof drainage piping shall be tested by filling the system to the highest level with no drop in water level for a period of 15 minutes.

END OF SECTION 221413

SJC EXTENSION OFFICE

SECTION 224200

PLUMBING FIXTURES

PART 1 – GENERAL

1.1 SCOPE

A. Plumbing fixtures shall be supplied, set, and connected as shown on plans. Fixtures shall be protected from damage during construction and shall be thoroughly cleaned of all tape, paint, and adhesive prior to final acceptance.

PART 2 – PRODUCTS

2.1 PLUMBING FIXTURES

A. Plumbing fixtures shall be as manufactured by KOHLER, AMERICAN STANDARD, or SLOAN and shall be as scheduled on the drawings.

B. Flush valves shall be as manufactured by Zurn, Delany, or Sloan.

2.2 FITTINGS AND PIPES

A. Fittings and piping shall be brass and whenever exposed, shall be polished chrome-plated. Provide tight fitting wall and/or floor escutcheons of chrome-plated brass whenever pipes pass through floors, wall, or ceilings.

B. All porcelain or vitreous china shall be clean, smooth, and bright. All shall be warranted not to craze, discolor, or scale.

C. This contractor shall furnish and install all required water, waste, soil, and vent connections to all plumbing fixtures together with all fittings, supports, fastening devices, cocks, valves, traps, etc., leaving all in complete working order.

D. All automatic or self-closing valves for faucets shall be adjusted in accordance with manufacturer's instructions and supervised as necessary by equipment supplier's representative at the request of the Architect or Engineer.

E. Owner furnished equipment shall be connected with drains, traps, hot water, cold water and other services required for optimum operation. This contractor shall obtain information from the Owner or his approved representative for services required or field verify specific requirements.

END OF SECTION 224200

SJC EXTENSION OFFICE

SECTION 230000

HEATING, VENTILATING, AND AIR CONDITIONING INDEX

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including General Special Conditions and the General Requirements, apply to the work specified in this section.

1.2 DESCRIPTION OF WORK

A. Furnish all service tools, equipment, etc., which are required for the complete installation of all Heating, Ventilating, and Air Conditioning Work, as indicated on the Drawings and specified herein. Heating, Ventilating, And Air Conditioning work indicated on the Drawings and/or specifications covering other trades shall conform to Division 23 of these Specifications.

B. Work or equipment not indicated or specified, which is necessary for the complete and proper operation of the Heating, Ventilating, And Air Conditioning systems, shall be accomplished without additional cost to the Owner.

C. Furnish all labor and materials required for Heating, Ventilating, and Air Conditioning service connections to all the various items of equipment requiring connection throughout the project shown on the Contract Drawings (even if not shown on Heating, Ventilating, and Air Conditioning Drawings). Coordinate with other trades for the installation of required connections and service.

1.3 HEATING, VENTILATING, AND AIR CONDITIONING DIVISION INDEX

PART 2 – PRODUCTS (Not used.)

PART 3 – EXECUTION (Not used.)

END OF SECTION 230000

SJC EXTENSION OFFICE

SECTION 230100

DEMONSTRATION AND TRAINING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including General and Special Conditions and the General Requirements, apply to the work specified in this section.

1.2 DESCRIPTION OF WORK

A. After completion of the installation and upon completion of the Test and Balancing, the Contractor shall schedule the System Demonstration, Operating Test, and Training Session for the Owner.

B. The following individuals, companies or representatives thereof shall be in attendance.

1. Mechanical Trade
2. Electrical Trade
3. Sheet Metal Trade
4. Energy Management Systems Contractor
5. Test and Balance Agency
6. Air Handler Manufacturer
7. Fan Coil Manufacturer
8. Pump Manufacturer
9. Dry Cooler and Air Washer Manufacturer

1.3 RELATED WORK IN OTHER SECTIONS

230000	HEATING, VENTILATING AND AIR CONDITIONING INDEX
230500	GENERAL HEATING, VENTILATING, AND AIR CONDITIONING REQUIREMENTS
230513	COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT
230548	BALANCING MECHANICAL SYSTEMS

1.4 QUALIFICATIONS

A. The representatives listed in 1.2B above shall be thoroughly familiar with the operation and function of the equipment or systems he represents and be prepared to indoctrinate the Owner or his designated personnel.

PART 2 – PRODUCTS

2.1 SCHEDULE

A. The Contractor shall schedule and coordinate the System Demonstration and Training Session for the Owner over 1 consecutive 8 hour working day.

B. The Owner may, after the training session has started:

1. Excuse the equipment manufacturer when his indoctrination session is completed.

2. Conclude the session early if he feels the intent and purpose of the session has been met.

2.2 ADJUSTMENTS

A. The Contractor shall have available, tools, equipment, and personnel to readjust or refine the operation of any part of the mechanical system as directed by the Owner or Architect/Engineer.

PART 3 – EXECUTION

3.1 TRAINING

A. The Contractor shall schedule and coordinate the indoctrination of the Owner and his designated personnel during the Operating Test. The proposed time schedule shall be coordinated with the individuals, companies or representatives who will be conducting the indoctrination and training. This proposed time schedule shall be submitted to the Architect/Engineer for approval.

B. Before final inspection, instruct Owner's designated personnel in operation, adjustment, and maintenance of products, equipment, and system at agreed upon times.

C. For equipment requiring seasonal operation, perform instructions for other seasons within six (6) months.

1. Contractor shall provide a minimum of eight (8) hours of training for seasonal system operation.

2. Contractor shall prepare a written report of training and submit to architect upon completion of training.

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

E. Prepare and insert additional data in Operation and Maintenance manual when need for such data become apparent during instruction.

3.2 TRAINING

A. The Contractor shall schedule and coordinate the indoctrination of the Owner and his designated personnel during the Operating Test. The proposed time schedule shall be coordinated with the individuals, companies or representatives who will be conducting the indoctrination and training. This proposed time schedule shall be submitted to the Architect/Engineer for approval.

3.3 DOCUMENTATION

A. The Contractor shall prepare an indoctrination schedule similar to the following:

INDOCTRINATION SCHEDULE:
PROJECT:
LOCATION:

PERSONNEL	ITEM/SYSTEM	DATE	START TIME	STOP TIME

B. The Owner shall initial each line to verify attendance.

3.4 OPERATING INSTRUCTIONS

A. The operating instructions specified in Sections 230500 and 253000 of these specifications shall be presented at the start of the Session. These instructions shall include manufacturer's published data having all information that does not apply crossed out.

3.5 OPERATING TEST

A. The Contractor shall conduct an operational test on all equipment installed under this Division of the Specifications. This test shall be continuous for a minimum of three consecutive days within seven days prior to the demonstration and training period with required data available at the demonstration and shall continue during the demonstration period. The test shall verify the operation of the mechanical systems and demonstrate the performance of the total system.

B. The following data shall be recorded hourly during normal building occupancy hours.

1. Outdoor ambient temperatures:

a) Measure and record outdoor dry bulb and wet bulb temperature.
b) Calculate and record relative humidity.

2. Indoor space temperature:

a) Measure dry bulb temperature in several rooms served by each air handling unit including at least one room in each control zone. Note any variation over 2`F from setpoint.
b) Measure wet bulb temperature in each space having a space humidistat. Calculate space relative humidity and note any variation over 5% from setpoint.

3. Air Temperatures:

a) Entering and leaving each piece of equipment having air temperature change including:

1) DX refrigeration coils
2) Air washers
3) Air Handling Unit return, OSA and mixed air
4) Fan coils
5) Unit Ventilator including return, OSA and mixed air
6) Unit Heater

4. Air Pressure:

a) Building static pressure relative to ambient (outside)
b) Supply static pressure at outlet of each air handling unit
c) Supply static pressure at the end of each duct run
d) Supply static pressure at the inlet of each variable air volume terminal

5. Weather Conditions:

a) Sun
b) Wind velocity
c) Precipitation
d) Barometric pressure

3.6 READINGS AND MEASUREMENTS

A. The Test and Balance Agency shall be available and take any or all readings and measurements required or desired by the Owner or Architect/Engineer during this Demonstration and Training Session.

END OF SECTION 230100

SECTION 230500

GENERAL HEATING, VENTILATING, AND AIR CONDITIONING REQUIREMENTS

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes: General Mechanical Requirements specifically applicable to Division 23 sections in addition to Division 1 - General Requirements.

B. Scope:

1. The work covered by this division consists of performing all operations in connection with the installation of heating, cooling, ventilating, and plumbing including site utility work as indicated under this section. This entire section applies to all mechanical work and all mechanical sections of these specifications. This Contractor shall read and comply with all sections of these specifications including all General and Special Conditions.

1.2 REFERENCES

A. Standard Requirements:

1. For products or 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. All work shall be executed in accordance with the 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. In the event of a conflict between the various codes and standards, the more stringent shall govern. Where these specifications and accompanying drawings conflict with these requirements, the Contractor shall report the matter to the Architect/Engineer. The Architect/Engineer shall prepare any supplementary drawings required, illustrating how the work may be installed so as to comply. On approval of the change by the Architect/Engineer, the Contractor shall install the work in a satisfactory manner without additional cost to the Owner. On completion of the various parts of the work, the installation shall be tested by the constituted authorities and approved, and on completion of the work, this Contractor shall obtain and deliver to the Owner final certificates of acceptance. This Contractor shall furnish copies of each certificate to the Architect/Engineer.

C. The Contractor shall secure all permits and licenses for his work and shall pay all fees in connection with such permits and licenses.

D. The contractor shall hold and save the Owner free and harmless from liability of any nature or kind arising from his failure to comply with codes and ordinances.

E. Any and all meter deposits and all utility extension costs shall be paid by the Contractor whose work is done in connection with the service that the meter is connected to.

F. Schedule of Referenced Organizations: The following is a list of the acronyms of organizations referenced in these Specifications:

1.	AABC	Associated Air Balance Council
2.	ADC	Air Diffusion Council 435 North Michigan Ave. Chicago, IL 60611
3.	AGA	American Gas Association 1515 Wilson Boulevard Arlington, VA 22209
4.	AMCA	Air Movement and Control Association 30 West University Drive Arlington Heights, IL 60004
5.	ANSI	American National Standards Institute 1430 Broadway New York, NY 10018
6.	ASHRAE	American Society of Heating Refrigerating and Air Conditioning Engineers 345 East 47th Street New York, NY 10017
7.	ASME	American Society of Mechanical Engineers 345 East 45th Street New York, NY 10017
8.	ASTM	American Society for Testing and Materials 1916 Race Street Philadelphia, PA 19103
9.	AWWA	American Water Works Association 6666 West Quincy Avenue Denver, CO 80235
10.	AWS	American Welding Society 2501 NW 7th Street Miami, FL 33125
11.	FM	Factory Mutual System 1151 Boston-Providence Turnpike Norwood, MA 02062

12.	FS	Federal Specification General Services Administration Specifications and Consumer Information Distribution Section (WFSIS) Washington Navy Yard, Building 197 Washington, DC 20407
13.	NBFU	National Board of Fire Underwriters 5530 Wisconsin Avenue, Suite 750 Chevy Chase, Maryland 20815
14.	NEC	National Electric Code (of NFPA)
15.	NEBB	National Environmental Balancing Bureau 8224 Old Courthouse Road Vienna, VA 22180
16.	NEMA	National Electrical Manufacturer's Association 2101 L Street, NW Washington, DC 20037
17.	NFPA	National Fire Protection Association Battery March Park Quincy, MA 02269
18.	NSF	National Sanitation Foundation Box 1468 Ann Arbor, MI 48106
19.	OSHA	Occupational Safety and Health Administration U.S. Department of Labor
20.	SMACNA	Sheet Metal and Air Conditioning Contractor's National Association 8224 Old Courthouse Road Vienna, VA 22180
21.	TIMA	Thermal Insulation Manufacturers Association Technical Services 1420 King Street Alexandria, VA 22314
22.	UL	Underwriters Laboratories, Inc. 333 Pfingston Road Northbrook, IL 60062

G. Underwriters Laboratories Inc. (UL): All materials, appliances, equipment, devices, or appurtenances shall conform to the applicable standards of Underwriters Laboratories Inc., where such standards have been established.

1.3 DRAWINGS

A. Drawings and specifications shall be considered as cooperative, and work or materials called for by one and not mentioned in the other, or vice versa, shall be done and furnished as though treated by both.

B. In the cases of discrepancies in figures, drawings, or specifications, the Architect/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 save only at his expense, and, in case of any settlement or any complication arising from such adjustment to the Contractor, he 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 Architect/Engineer for such further drawings or explanations as may be necessary, allowing a reasonable time for the Architect/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, reference shall be made to the Architect\Engineer whose decision shall be final and conclusive. No alleged oral admission, condonation, or inadvertent neglect on the part of the Architect/Engineer will be accepted as an excuse for inferior work.

E. The mechanical plans do not give exact details as to elevations of ductwork and 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 the structural conditions, provide proper grading of lines, to avoid all obstructions, to conform to details of installation supplied by the manufacturer of the equipment to be installed, and thereby to provide an integrated, satisfactory operational installation.

F. Should the particular equipment which any Bidder proposes to install, require other space conditions than those indicated on the drawings, the Bidder shall arrange for such space with the Architect/Engineer before submitting his bid. Should changes become necessary on account of failure to comply with these details, the Contractor shall make such necessary changes at his (the Contractor's own expense).

G. The Contractor shall submit working scale drawings of all his apparatus and equipment which in any way varies from these specifications and plans which shall be checked by the Architect/Engineer and approved before the work is started, Contractor before work proceeds. Interference with structural conditions shall be corrected by the Contractor.

H. All equipment shall be installed in accordance with the manufacturer's recommendations. Provide all accessories and components for optimum operation as recommended by the manufacturer.

I. Site visit: The Contractor shall visit the site prior to bidding and satisfy himself as the conditions under which the mechanical systems are to be installed. No subsequent allowance shall be made in his behalf for failure to make such a visit. Contractor shall examine all work noted under the demolition drawings and all new work and shall satisfy himself as to the extent of work required to be completed.

1.4 SYSTEM DESCRIPTIONS

A. Not Used.

1.5 PRIOR APPROVALS

A. Each equipment item for which the Contractor desires to install equipment other than the specific item identified in the equipment schedule or equivalent equipment by manufacturers specifically named in the schedule, the Contractor shall bear full responsibility to prove to the Engineer that the furnished equipment is equivalent to or better than the specified item. Failure to provide such proof will result in rejection of the shop drawing submittal by the Engineer. Prior written or verbal approval by the Engineer of equipment by other manufacturers will not relieve the Contractor of responsibility to provide equivalence. Prior approval is required, however, any prior approval given is intended only to provide preliminary agreement that the alternate manufacturer may make equipment that complies with the specification requirements and not that all equipment manufactured by him is acceptable.

1.6 SHOP DRAWINGS

A. Shop drawings or fully descriptive catalog data shall be submitted by the Contractor for all items of material and equipment furnished and installed under this Contract. This shall include piping, ductwork, mechanical equipment, plumbing equipment, control items, etc. The Contractor shall submit to the Architect/Engineer a sufficient number of copies of all such shop drawings or catalog data to provide him with as many review copies as he may need, plus three (3) copies for retention by the Architect/Engineer. No materials or equipment shall be installed until officially approved by the Architect/Engineer.

B. Before submitting Shop Drawings to the Architect/Engineer for review, the Contractor shall examine them and satisfy himself that they are correctly representative of the material or equipment to which they pertain. The Contractor shall so note these Drawings before submitting them. The Contractor's review of Shop Drawings is not intended to take the place in any way of the official review of the Architect/Engineer, and the Shop Drawings which have not been reviewed by the Architect/Engineer shall not be used in fabrication or installing any work.

C. The review of Shop Drawings or catalog data by the Architect/Engineer shall not relieve the Contractor from responsibility for deviations from the plans and Specifications unless he has, in writing, specifically called attention to such deviations as the time of submission and has obtained the permission of the Architect/Engineer thereon, nor shall it relieve him from the responsibility for error of any kind in Shop Drawings. When the Contractor does call such deviations to

the attention of the Architect/Engineer, he shall state in his letter whether or not such deviations involve any extra cost. If this is not mentioned, it will be assumed that no extra cost is involved for making the change.

D. After receiving approval on the make and type of materials, the Contractor shall order such materials in sufficient time so that no delay or changes will be caused. This is done to facilitate progress on the job and failure on the part of the Contractor shall render him liable to stand the expense of any and all delays occasioned by failure on this part to provide necessary details. All shop drawings shall be delivered to the Architect/Engineer's office within thirty (30) days from the date of the contract.

E. Shop drawings will be returned unchecked unless the following information is included: reference to all pertinent data in the Specifications or on the drawings, size and characteristics of the equipment, name of the project and a space large enough to accept an approval stamp. The data submitted shall reflect the actual equipment performance under the specified conditions and shall not be a copy of the scheduled data on the drawings.

1.7 SUBMITTALS

A. Submittal data shall be organized in commercial quality, three ring binders with durable and cleanable covers. Product information for each piece of equipment shall be separated by an indexing leaf with clear tabs. The product name and symbol (i.e., AHU/Air Handling Unit) shall be typed on white paper inserts and placed in appropriate tab. Complete data must be furnished showing performance, quality, and dimensions. A signed review by the Architect/Engineer must be obtained before purchasing any equipment.

B. The following items shall be submitted for review by the Architect/Engineer but are not limited to:

1. Air Conditioning Units
2. Fans
3. Diffusers, Registers and Grilles
4. Fire Dampers
5. Pipe Insulation
6. Duct Insulation
7. Coils
8. Temperature Controls
9. Cross Connection Control Devices
10. Plenum Materials and Supports
11. Pumps
12. Hydronic Air Control Devices
13. Kitchen Hood and Fans
14. Filter Assemblies and Filters
15. Fan Coil Units
16. Heat Exchangers
17. Flexible Pipe Connections
18. Heating Terminal Equipment
19. Roof Top Equipment

20. Ductwork Shop Drawings
21. Radiant Heating Equipment
22. Vibration Isolation Equipment and Calculations

1.8 QUALITY ASSURANCE

A. General: Comply with Division 1.

B. Welder Qualifications: Welders shall be certified by the American Society of Mechanical Engineers (ASME) National Certified Pipe for the type of work being performed. Current operators' certificates in accordance with ASME standards shall be on file at the site and shall be available to the Architect/Engineer for examination. Coupons shall be available for review by the Architect and Engineer.

C. Locations of all pipes, ducts, outlets, appliance, etc., as shown on the drawings, are approximate only and are understood to be subject to such revisions as may prove necessary or desirable at the time the work is installed. Each Contractor will be required to install his work with relation to existing building conditions and shall be entirely responsible for the correctness of his work with reference to finished elevations, etc. Piping shown on the drawings is diagrammatic only and their exact locations, depths, and invert elevations shall be as required for proper flow and coordination with other trades.

D. The contract drawing depicts graphically the arrangement of piping and ductwork. Should local conditions necessitate a rearrangement, or if any of the piping or ductwork can be installed to better advantage in a different manner, the Contractor shall, before proceeding with the work, prepare and submit three (3) copies of Drawings of the proposed arrangement for the Architect/Engineer's review.

E. If the Contractor proposes to install equipment, including piping and ductwork, requiring space conditions other than those shown, or to rearrange the equipment, he shall assume full responsibility for the rearrangement of the space and shall have the Architect/Engineer review the change before proceeding with the work. The request for such change shall be accompanied by Shop Drawings of the space in question.

F. Each Contractor is responsible for the proper location and size of all slots, holes, or openings in the building structure pertaining to his work, and for the correct location of pipe sleeves.

G. Each Contractor shall coordinate his work with that of all other trades that it may be installed in the most direct and workmanlike manner without hindering or handicapping the other trades. Piping interferences shall be handled by giving precedence to pipelines which require a stated grade for proper operation. Drainage lines shall take precedence over water lines in determination of elevations. In all cases, lines requiring a stated grade for their proper operation shall have precedence over electrical conduit and ductwork.

H. All oiling devices and all parts of equipment requiring adjustment shall be easily accessible. Lubricate all equipment properly in accordance with manufacturer's instructions. Furnish zerk grease fittings on all greaseable bearings.

I. Equipment and Materials: The materials and equipment shall be new and shall be the standard products of the manufacturers regularly engaged in the production of Plumbing, Heating, Cooling, Ventilation, and Fire Protection Equipment, and shall be the manufacturer's latest standard design. Where two or more units of the same class of equipment are required, these units shall be the products of the same manufacturer. However, the component parts of the systems need not be the products of the same manufacturer. Specific equipment specified hereinafter is to be considered a standard of quality and operation. In general, all capacities of equipment, and motor and starter characteristics are shown in schedules on the drawings. Reference shall be made to the schedules for specific information. The capacities shown are minimum capacities. Variations in the characteristics will be permitted only on written approval of the Architect/Engineer. All equipment shall be shipped to the job with not less than a prime coat of paint or as specified hereinafter. Insofar as is possible all items of the same type (i.e., pumps, fans, etc.) shall be by the same manufacturer. Where installation instructions are not included in these specifications or on the plans, the manufacturer's instructions shall be followed. All equipment affected by altitude shall be rated to operate at the altitude where it is to be installed.

J. Excavation and Backfilling: This Contractor shall do all necessary excavation and backfill for the installation of the Mechanical systems as may be required. Curb cuts, asphalt and concrete patching, cutting and patching existing floor, etc., shall be part of this Contractor's responsibility. No extra payment will be made for rock excavation. Trenches for all underground piping shall be excavated to the required depths. The bottoms of trenches shall be tamped hard and graded to secure maximum fall. Bell holes shall be excavated to assure the pipe resting for its entire length on solid ground. Should rock be encountered, it shall be excavated to a depth of 6 inches below the bottom of the pipe, and before laying the pipe, the space between the bottom of the pipe and the rock surface shall be filled with gravel, thoroughly tamped. Pipe laid in trenches dug in fill shall be supported down in the trenches and shall be filled. No roots, rocks or foreign materials of any description shall be used in backfilling the trenches. The backfill material shall be identical to the surrounding fill material and shall be placed in 6-inch layer, wetted, and compacted to the density of the adjacent soil. See Division 2 for additional information for site utilities. All surplus materials shall be hauled from the project by the Contractor at his expense.

K. Cutting and Repairing:

1. Responsibility of the Contractor whose work is involved. Coordinate with others to prevent unnecessary cutting and repairing.

2. Lay out and locate equipment, openings, and chases. Install sleeves, inserts, and supports. Arrange with those whose work is involved to do cutting and replacing caused by negligence or error with costs reimbursed by the Contractor at fault. Cutting and replacing of existing work shall be the responsibility of the Contractor whose work is being installed.

3. Removal or terminating connections of existing work which is abandoned or replaced shall also be done hereunder to provide correct and finished work.

L. Foundations: All equipment shall be provided with suitable foundations and supports. It shall be the responsibility of the Contractor to provide for the proper locations of these foundations and supports. This applies to all rooftop equipment also.

1. All concrete foundations required by equipment furnished by the Mechanical Contractor shall be constructed by them (except where otherwise noted) the conformity with the recommendations of the manufacturer of the respective equipment, and with the approval of the Architect/Engineer. All corners of the foundations shall be neatly chamfered. Foundation bolts shall be placed in the forms when the concrete is poured. Allow 1 inch below the equipment base for alignment, leveling and grouting with nonshrinking grout. Grouting shall be done after the equipment is leveled in place. After the grout has hardened, the foundation bolts shall be pulled up tight and the equipment shimmed, if necessary. After removal of the forms, the surface of the foundation shall be rubbed.

2. Unless otherwise noted, foundations shall be a minimum of 6-inch high. All concrete work performed by these Contractors shall conform entirely to the requirements of the Concrete Specifications which describe this class of work.

M. Code Requirements: Comply with state and local code requirements and ordinances. Call for inspections required by responsible building inspection authority.

N. Applicable Building Codes and Ordinances: Including the latest edition of each code, but not limited to the following:

1. International Building Code.
2. Uniform Mechanical Code.
3. Uniform Plumbing Code.
4. Governing Fire Department Requirements
5. Utility Company Requirements
6. National Fire Protection Association Standards
7. NFPA 70 - National Electrical Code
8. NFPA 90A - Installation of Air Conditioning and Ventilating Systems
9. NEPA 90B - Installation of Warm Air Heating and Air Conditioning Systems
10. NFPA 13 - Sprinkler Systems
11. NFPA 101 - Life Safety
12. NFPA 96 - Installation of Equipment for the Removal of Smoke and Grease Laden Vapors from Commercial Cooking Equipment
13. International Energy Conservation Code 2018

O. Access Panels

1. Similar to Milcor, or as noted on the drawings, size as required for concealed expansion joints, valving, gauges, balancing dampers, valves, traps, pitot stations, equipment and similar items requiring accessibility. Notify the General Contractor 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.

1.9 DELIVERY, STORAGE, AND HANDLING

A. General: Comply with Division 1

B. Large Items: Make arrangements with other trades on the job for introduction into the building of equipment too large to pass through finished openings.

C. Acceptance: Check and sign for materials to be furnished by others for installation under all Mechanical Divisions upon delivery. Contractor shall be responsible for the storage and safekeeping of such materials from time of delivery until final acceptance.

D. Protection: Close ends of pipe and ductwork at the close of each working day during construction to prevent entry of foreign material. Protect insulation against dirt, water, chemical or mechanical damage before, during and after installation. Protect fixtures and equipment against damage during mechanical work with heavy paper or plastic until final clean-up.

E. Storage: Store equipment in covered enclosure or wrap with weather tight 6 mil Visqeen.

F. Shipping Protection: Protective casings, crating, and coverings to remain in place until start-up of equipment.

1.10 PROJECT CONDITIONS

A. Performance: All systems are to be rated at 6,000 ft. elevation.

1.11 SEQUENCING AND SCHEDULING

A. General: Comply with Division 1.

B. Schedule: Coordinate and order the progress of mechanical work to conform to the progress of the work of the other trades. Complete the entire installation as soon as the condition of the building will permit.

C. Utility Interruptions: Schedule mechanical utility interruptions with the Architect/Engineer/Owner minimum of seven (7) days prior to the requested outage. Plan work so that duration of the interruptions a maximum of one day.

1.12 CONTROLS WIRING AND ELECTRICAL EQUIPMENT

A. All mechanical equipment controls wiring, conduit, relays, interlocks, and all accessories required for a completely operational controls system shall be the complete responsibility of the mechanical contractor. The mechanical contractor has the option to hire the project electrical contractor or any qualified controls contractor to install mechanical controls wiring and conduit. Refer to Specification Section 253000 for coordination requirements between mechanical, electrical, and controls subcontractors.

B. Electrical items such as disconnect switches and motor starters associated with equipment provided by Division 23, when specifically mentioned to be furnished by the Mechanical Contractor, whether in these specifications or on the Electrical or Mechanical Drawings, shall be furnished by the Contractor. These items shall be mounted and connected as required for a completely operational system. See Control Systems Specification for further information.

C. All electrical equipment characteristics (voltage, etc.) must be verified by the Contractor prior to ordering. If the Contractor proposes to furnish motors varying in horsepower and/or characteristics from those specified, he shall first inform the Architect/Engineer of the change and shall then coordinate the change with the Electrical Contractor and shall pay all additional charges in connection with the change.

D. All motors shall meet all the requirements of all Electrical Divisions.

1. 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. Totally enclosed fan cooled (TEFC) motors shall be used in all areas of exposure to weather or other environmental contamination. All motors shall have copper windings. All motors to have minimum power factor of 85% or have switched correction to 90%. Unless indicated otherwise, motors shall be NEMA design B with a service factor of 1.15 with 40°C rise and total temperature rise of 65°C ambient and when powered from the system voltage feeding the motor. TEFC motors shall a service factor of 1.00 with total temperature is of 65°C in the above conditions. Motors located in areas exceeding 40°C ambient shall be factory-rated for the ambient temperature of the motor environment. Single phase motors shall generally be NEMA Type N split phase induction motors with built-in thermal protectors. Single phase motors connected on loads requiring high starting torque shall be capacitor-start induction motors. Single phase motors of 1/10 HP or less may be shaded pole induction motors.

1.13 PROTECTION AGAINST HAZARDOUS CONDITIONS

A. The Contractor shall take precautions against hazardous construction conditions at all times during construction. The final condition of the facilities shall be safe, and where safety to operating personnel is jeopardized, suitable signage shall be posted.

B. Protruding metal (bolts, steel angles, etc.) potentially hazardous to maintenance and operating personnel, shall be cut back and/or protected to reduce the risk of injury. All openings between floors shall be protected with barriers around the openings, gratings across the openings, or steel bars through the openings to avoid and protect against injury.

1.14 HAZARDOUS SIGNS

A. Equipment room contains moving or rotating parts, floor openings, or other potentially hazardous environments and shall include a sign on the door entering it that shall read similar to the following: **Hazardous Area - Authorized Personnel Only.**

1.15 OPERATING AND MAINTENANCE INSTRUCTIONS

A. The Mechanical Contractor shall furnish to the Owner a bound (three (3) ring binder) manual in triplicate, containing complete repair parts lists, and operating, service, and maintenance instructions on all mechanical equipment, fixtures, and systems, as noted below:

1. Table of Contents: Provide title of Project; names, addresses, and telephone numbers of Architect/Engineer, Sub-consultants, and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.

2. For Each Product System: List names, addresses and telephone numbers of Sub-contractors and suppliers, including local source of supplies and replacement parts.

3. Product Data: Mark each sheet to clearly identify specific product and component parts, and data applicable to installation. Delete inapplicable information.

4. Warranties and Bonds: Bind in copy of each.

5. Each Item of Equipment and Each System: Include description of unit or system, and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.

6. Include color-coded wiring diagrams as installed for control system.

7. Operating Procedures: Include start-up, break-in and routine normal operating instructions and sequences. Include regulation, control, stopping, shutdown, and emergency instructions. Include summer, winter, and any special operating instructions.

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

9. Provide servicing and lubrication schedule and list of lubricants required.

10. Include manufacturer's printed operation and maintenance instructions.

11. Include sequence of operation by controls manufacturer.

12. Provide original manufacturer's part list, illustrations, assembly drawings and diagrams required for maintenance.

13. Provide control diagrams by controls manufacturer as installed.

14. Provide charts of valve tag numbers, with locations and functions of each valve, keyed to flow and control diagrams.

15. Provide list of original manufacturer's spare parts and recommended quantities and to be maintained in storage.

16. Include Test and Balance (T&B) Reports as specified in Section 230593.

B. The Mechanical Contractor shall also provide training as required by Section 230100 to the Owner's operation and maintenance personnel.

1.16 OPERATION PRIOR TO ACCEPTANCE

A. The Owner shall have the right to operate any and all apparatus as soon as and as long as it is in operating condition, after Owner personnel have received operational training, whether or not such apparatus has been accepted as complete and satisfactory, except that this shall not be construed to mean operations before any required alterations or repairs have been made. This operation does not indicate acceptance of the equipment by the Owner. When the Contractor enters into a contract with the Owner, he agrees to the above.

1.17 WARRANTY AND SERVICE PROGRAM

A. Due to the critical performance requirements and to clearly establish warranty responsibility for this project, the Contractor shall provide a full-service maintenance and warranty program to the Owner for one full year after beneficial occupancy (substantial completion).

B. This service program shall be included as part of the base bid and shall include service, maintenance, repair, replacement, lubrication, temperature control calibration and repairs, and documenting proof for all service and maintenance work on all equipment and system furnished by the Contractor.

C. A single representative in the employment of the Contractor shall be responsible for coordination and follow through of this program. This representative's name and phone number shall be submitted to the Owner as part of the maintenance manuals and supportive data. The Contractor shall respond to a request for service with 24 hours if so requested.

D. During this first year of operation, the following sequence of maintenance service shall be performed as a minimum.

1. Clean strainers in piping.

2. Fans and/or pumps be lubricated and oiled once every four (4) months.

3. Controls shall be calibrated throughout the facility at the end of six (6) months (following substantial completion). Any leaks in the piping systems shall be repaired.

4. All equipment manufacturer's service recommendations shall be followed during this period.

1.18 FLUSHING AND DRAINING

A. It shall be the responsibility of this Contractor to properly drain and flush all ducts and pipes before use or acceptance to ensure that all debris is completely removed. Damage caused by such debris remaining in the ducts or pipes shall be repaired by this Contractor at his expense. This Contractor shall demonstrate to the Architect/Engineer's representative that all piping is clean.

1.19 CLEANING

A. This Contractor shall remove from the building construction site all rubbish and dirt as it accumulates under the contract. At completion, all areas shall be broom cleaned and all obstructions, surplus materials, etc., removed.

1.20 GUARANTEE

A. The Contractor shall guarantee all materials, equipment, and workmanship furnished and installed by him under this Contract, to be free from all defects of workmanship and materials, and shall agree to replace at his expense, without expense to the Owner, at any time within one year after installation is accepted by the Architect/Engineer, any and all defective equipment, parts, etc., that may be found. (This excludes normal maintenance and daily servicing of equipment which is the Owner's responsibility.)

1.21 FLOOR, WALL, AND CEILING PLATES

A. Where exposed pipes pass through floors, finished walls, or finished ceiling, they shall be fitted with chromium-plated escutcheons of an approved pattern. Escutcheons and plates in Mechanical Rooms do not require chrome finish.

B. This Contractor shall be responsible for providing and installing all counter flashing. All openings in the roof shall be flashed and counterflashed. Use four-pound lead flashing materials for all vent lines and welded flashing in steel lines passing through roof. The Mechanical Contractor shall notify the General Contractor where each roof penetration is and the size of the opening.

1.22 PIPE SLEEVES

A. Schedule 40 steel pipe sleeves or pipe sleeves made of No. 20 gauge galvanized steel, properly secured in place with approximately 1/4" space

between each sleeve and the surface of the pipe and/or insulation passing through it, shall be provided for all pipes passing through concrete floors, roofs, and masonry walls. All pipe sleeves shall be fixed in place as the walls and floors are built up. The Contractor shall furnish and locate all sleeves and pipes passing through concrete floors, exterior masonry walls, and roofs shall be made watertight with approved non-hardening plastic material. Sleeves through pipe chase or equipment room floors shall project a minimum of 2-inch above the floor and shall be of black steel pipe with waterproof flange at center of floor thickness. Each sleeve through a fireproof wall shall be packed with approved fireproof rope in the annular space.

1.23 PIPE HANGERS

A. Pipe hangers shall be Fee and Mason of a type suitable for each use. Perforated straps shall not be used in any work. For ferrous pipes up to and including 4 inch in size, use Fee and Mason Fig. 199 malleable iron, adjustable, split ring, swivel hanger. For plumbing piping larger than 4 inches, use Fee and Mason Fig 239 steel clevis hanger. Where several pipes are parallel at the same elevation, trapeze hangers may be used. Where trapeze hangers are used, the pipes shall be supported on rollers where indicated on the Drawings. For copper pipes up to and including 3 inch in size, use Fee and Mason Fig. 360 malleable iron, copper plated hangers. For copper pipes larger than 3 inches, use Fee and Mason Fig. 364 copper plated clevis hanger.

B. Hanger rod sizes shall conform to the following schedule:

1.	Pipe up to and including 2"	3/8" rods
2.	Pipe 2-1/2", 3" and 3-1/2"	1/2" rods
3.	Pipe 4" and 5"	5/8" rods
4.	Pipe 6"	3/4" rods
5.	Pipe 8", 10", and 12"	7/8" rods

C. Unless shown otherwise on the Plans, all horizontal runs of ferrous piping shall be suspended from the floor or roof construction, as the case may be, by means of hangers with the following spacing:

1.	Pipe up to and including 1-1/4"	8'
2.	Pipe 1-1/2" and 2"	10'
3.	Pipe 2-1/2" and 3"	12'
4.	Pipe 3 1/2" and 4"	14'
5.	Pipe 5" and 6"	16'
6.	Pipe 8" and 10"	20'

D. Unless shown otherwise on the Plans, all horizontal runs of copper piping shall be suspended from the floor or roof construction as the case may be, by means of hangers with the following maximum spacing:

1.	Pipe up to 3/4" in size	5'
2.	Pipe 1" and 1-1/4"	6'
3.	Pipe 1-1/2" and larger	10'

E. There shall be a hanger within 2 inches of each elbow or tee. Additional supports shall be provided for valves, strainers, etc. Cast iron pipe shall have not less than one hanger per length of pipe. Vertical risers shall be supported by approved riser clamps at each floor. Vertical pipes within a space shall have not less than two supports.

F. Supports and hangers shall be installed to permit free expansion and contraction in the piping systems. Hangers shall permit vertical adjustment to maintain proper pitch. Where necessary to control expansion and contraction, the piping shall be guided and firmly anchored. No piping shall be self-supporting, nor shall it be supported from equipment connection.

G. Hanger rods for all equipment, pipes, ducts, trapezes, vibration isolators, etc., shall be installed straight, true and plumb. Do not bend or flex hanger rods to accommodate sloping structures, avoid obstacles, or for any other purpose. Where necessary, utilize swivel beam clamps, beveled or swivel hardware, angled, swivel or hinged brackets spanning members or other appropriate means of connection.

H. Expansion bolts shall be Ackerman-Johnson or Hilti.

I. Beam clamps suitable for use with this type of steel construction involved shall be Grinnell.

1.24 PRESSURE VESSEL CERTIFICATION

A. Not used.

1.25 ISOLATION

A. Excessive vibration or objectionable noise created in any part of the building by the operation of any equipment furnished and/or installed under the Mechanical Contract will be extremely objectionable and the Contractor shall take all precautions against the same by isolating the various items of equipment from the building structure and by such other means as may be necessary to eliminate all excessive vibration and objectionable noise produced by any equipment installed by them, and consequently, they shall design all foundations, supports, etc., for their equipment, and all piping with this end in view. In addition, these Contractors shall supervise the construction of all foundations and supports, whether they build them or not, in order that they may be constructed in such a manner as to prevent the transmission of objectionable noise and/or excessive vibration. Submit calculations on all vibration isolation equipment.

B. All equipment having moving parts shall be isolated from the building structure by means of Korfund isolation materials, unless specifically noted otherwise. All isolators shall be the same brand and shall be supplied from the same source. Equipment manufacturer's recommendations shall be followed in the isolation of equipment.

C. Vibration isolators shall have sufficient resilience to meet the following minimum efficiencies:

Motor HP	Equipment Room
Up to 5	90%
7-1/2 to 15	93%
20 to 40	95%
50 to 100	97.5%

D. Spring isolators shall be of the housed type with ribbed pads bonded to the underside of the baseplate or may be unhoused stable springs. Isolators shall be furnished with snubbers and limit stops where so recommended by the equipment manufacturer.

E. The Supplier of the isolating equipment shall, upon completion of the job, check all isolating materials and verify that they are installed properly, and submit a report in writing to the Architect/Engineer.

1.26 TESTING

A. Before completion of this project, the Mechanical Contractor shall test all materials and equipment which normally require testing. All piping, etc., shall be tested to meet code requirements or the Specification requirements, whichever is more stringent.

B. All equipment shall be operated sufficiently long enough to prove to the Architect/Engineer that the equipment performs satisfactorily and meets the requirements set forth on the Plans or in these Specifications.

1.27 CERTIFICATIONS

A. Before receiving final payment, the contractor shall verify that all equipment furnished, and all work done is in compliance with all applicable codes mentioned in these Specifications. Submit certifications and acceptable certificates to the Architect/Engineer.

1.28 GENERAL PIPING INSTALLATION REQUIREMENTS

A. Provisions for Drainage: All piping systems shall be installed so that they may be easily drained. Drain caps, plugs, or hose bibbs shall be installed at low points. Grade piping toward drain locations.

B. Alignment: All installed pipelines shall be straight and shall remain straight against strains. Proper allowance shall be made for expansion and contraction.

C. Clean as Installed: All piping shall be kept 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. All detergents, solvents and other cleaning agents shall be compatible with the materials of fabrication of the system in which they are used. They shall not adversely affect the materials of mechanisms in the systems and they shall be acceptable to equipment manufacturers. All detergents, solvents, and other cleaning agents shall also be compatible with the process streams to be handled by the systems in which they are used.

D. Insulated Fittings: Install between any dissimilar metals such as steel and copper.

E. Expansion and Contraction: The Contractor shall make all necessary provisions for expansion and contraction with proper fittings, anchors, dresser couplings, loops, etc. Install flexible connectors on each pipe at each building expansion joint.

F. Welding: Refer to Paragraph 1.29 of this section of these specifications.

G. Bending: No bending of pipe will be permitted.

H. General: The installation shall be coordinated with respect to space available with heating, cooling, ventilating, and electrical installation. In every instance where there is a conflict in the routing of the piping and the ducting, the routing of the ducting shall govern. Installed piping shall not interfere with the operation or accessibility of doors or windows, shall not encroach on aisles, passageways, and equipment, and shall not interfere with the servicing or maintenance of equipment. Pipe shall be cut accurately to measurements established at the construction site and shall be worked into place without springing or forcing, properly clearing all openings and equipment. Cutting or weakening of structural members to facilitate piping, installation is not permitted. Pipes shall have burrs removed by reaming and shall be so installed as to permit free expansion and contraction without damage to joints or hangers. Piping above ground shall be run parallel with the lines of the building unless otherwise noted on the drawings. Unless otherwise shown on the drawings, horizontal piping shall pitch down in the direction of flow with grade of not less than 1 inch in 40 feet. Piping connections to equipment shall be in accordance with details shown on the drawings or as recommended by the equipment manufacturer. Service pipe valves and fittings shall be kept a sufficient distance from other work to permit finished covering not less than 1/2 inch from such other work, and not less than 1/2 inch between finished covering on the different services.

I. Installation of Valves: Valves shall be installed at the locations shown on the drawings and where specified and where directed at site. Gate valves shall be used unless otherwise shown, specified, or directed. All valves shall be installed with their stems horizontal or above. Where tight shutoff is required, a composition seat globe valve or resilient seat ball valve shall be used.

J. All valves which must be used during operation, all control valve assemblies, instrument control cases, liquid level controls, gage glasses, orifices, relief valves, and other equipment which must be observed, adjusted, or serviced during operation shall be located conveniently accessible from an operating platform or grade.

K. In general, relief valves within processing unit limits shall be located conveniently accessible from an operating platform or grade.

1. Those in non-hazardous service, such as water, shall discharge directly to outside.

2. Relief valves should have no piping between the vessel or line and the valve inlet, except as shown on the drawings.

3. Relief valves shall be installed in a vertical position. Vent piping shall be braced and supported in a manner that will not produce excessive stresses in the relief valve and will permit removal of the relief valve without necessary temporary supports for the vent lines.

L. Equipment Connections: All piping connections to pumps and other equipment shall be installed without strain at the pipe connection of the equipment. The contractor shall be required as directed to remove the bolts in flanged connections or disconnect piping to demonstrate that the piping has been so connected. Pipe connections to equipment shall be made with unions or flanged fittings. Provide removable headers for large equipment for service access.

M. Joints

1. Flanged Joints: All flanged joints shall be face matched. Raised face flanges shall not be mated to flat-faced cast-iron flanges on valves or equipment. The raised face must be turned off. All flanged bolt holes shall straddle the horizontal and vertical center line unless otherwise noted.

2. Screwed Joints: Screwed pipe joints shall have American Standard Taper Pipe Threads ANSI-B2.1 Latest Edition. Burrs formed when cutting pipe shall be removed by reaming. Care shall be taken that the inside of pipe is thoroughly clean and free of cutting oil and foreign matter before installation. Joints shall be made perfectly tight by the use of Teflon tape or approved Teflon thread sealing and lubricating compound.

3. Solder-Joints: Tubing shall be cut square and burrs removed. Both inside of fittings and outside of tubing shall be well cleaned with steel wool or wire brush before seating. Care shall be taken to prevent annealing of fittings and hard drawn tubing when making connections. Joints for serrated fittings on water, compressed air below 60 psig, and vacuum lines shall be made with a 95 percent tin and 5 percent antimony. Cored solder or solder containing lead will not be permitted.

N. Reducers: Reduction in pipe size shall be made with one piece reducing fittings. Bushings reducing at least two pipe sizes will be acceptable only when there is no room for reducing couplings or swaged nipples.

O. Unions: All piping unions shall be of the ground joint type constructed from materials equivalent in alloy composition and strength to other fittings specified with which they are used. Union Pressure classes and end connections shall be the same as the fittings used in the lines with the unions. Steel unions shall have hardened stainless steel seating surfaces on both faces.

P. Hanger Supports:

1. All hanger rods used to support piping, conduit, mechanical units, equipment, trapezes, and other items shall be straight and installed

plumb, regardless of length. Do not bend rods to adapt to sloped or rotated structural members, secondary support members or to sloped mounting holes on supported equipment. Contractor shall utilize available swivel, hinged, or rigid mounting techniques designed to accommodate a slope or rotation, or shall design a custom solution. Selected techniques for each application shall be submitted for approval prior to use.

2. Do not bend rods to circumvent an obstruction.

3. Loads on hanger rods shall be applied in direct tension. Do not apply compression, lateral or moment loads to hanger rods. Install bracing or additional supports to prevent hanger rod from incurring non-tension loading.

4. Do not create offsets in rods; use only in-line couplers, and only when length of coupled rod exceeds standard available length (typically 12 feet), or when full lengths cannot be placed in position. Provide additional horizontal bracing to prevent swaying of supported piping or equipment.

5. Do not straighten bent rods for subsequent use. If a rod becomes bent, cut off and discard the bent portion. Remaining straight portion of rod may be used.

1.29 WELDING

A. All welding of piping covered by this specification, regardless of condition of service shall be accompanied as follows:

1. The welding shall be in accordance with the recommendations of the American Welding Society. Mitering of pipe to form elbows, notching to form these, or any similar construction will not be permitted. Welding fittings shall be installed on all welded lines. Joints to be welded shall be properly aligned and spaced, using special welding clamps where necessary. All welders to be employed shall have passed qualification tests prescribed by the National Certified Pipe Welding bureau (or by another reputable testing laboratory or agency) using procedures approved by the American Society of Mechanical Engineers or the American Welding Society. The welders will be required to pass qualification tests when the work of the welder creates a reasonable doubt as to his proficiency. Tests shall be conducted at no additional expense to the Owner.

2. Each welder shall, in addition to having passed the prescribed qualification tests (as noted in Paragraph 1.30.A.1), prepare sample coupons at the job site on a portion of pipe that is cut such that the cross section of the weld is open to view. The sample weld should be prepared using a 6-inch diameter pipe. The sample shall reflect a continuous weld with perpendicular cut out to show the weld in cross sectional view. This sample, when accepted and approved by a certified welding inspector, shall be used as a standard of quality to compare to other welds that this welder will be performing on the job. This same sample weld will also be

a basis for accepting or rejecting the welder for working on this project. The sample weld shall be identified with a date and the welder's name and shall be kept at the site throughout the project.

3. All welding on pressure piping shall conform to all of the requirements of the American Society of Mechanical Engineers Code for Pressure Piping - B31.1 (An American National Standards Institute publication), as defined in the latest edition of the ANSI Power Piping B31.1 Manual. All welding shall also conform to all of the requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code. All chapters, current addenda and supplements of these manuals shall apply. This code shall be used to establish standards of performance and quality of welds. However, the Owner reserves the right to perform radiographic testing of all welds, to compare any of the welds to the approved "standard" sample welds of each welder, and to compare the welds to the welding diagrams and sketches of those recommended in the ANSI B31.1 Power Piping Manual. The intent is to obtain the highest quality welding job possible. The cost of any initial radiographic testing, for random inspection, shall be paid for by the Owner. If radiographic random testing reveals that a weld is defective, the Contractor shall bear the cost of all repairs and re-testing necessary to be made to subject weld until conformance with radiographic tests is reached. The potential for random radiographic testing and welding quality control applies to all pressure piping systems in this project, including systems below 100 psig. If a question should arise regarding the possibility of faulty welding or if there are obvious visual defects in the welding, the Contractor shall be required to correct such deficiencies to a quality level consistent with the recommendations, welding diagrams and sketches in the ANSI B31.1 Manual. The quality level shall also reflect that of the approved sample welds accomplished by each welder for this particular project.

1.30 TESTING FOR PIPING SYSTEMS

A. General: Before insulation is applied, all piping, equipment, and accessories installed under this contract shall be inspected and tested by the Contractor. All labor, material, and equipment required for testing shall be furnished by the Contractor. The Contractor shall be responsible for all repairs and retesting as required. All instruments and other equipment whose safe pressure range is below that of the test pressure shall be removed from the line or blanked off before applying tests. Prior to performing tests, all lines shall be "blown" free of all loose dirt and foreign particles. The lines shall then be thoroughly flushed with water (liquid lines only) at a sufficient flow rate and period of time to ensure complete cleaning of the lines of all dirt, scale, and foreign matter. Satisfactory flushing of the lines shall be subject to approval. After testing and flushing lines, all filters and strainers shall be cleaned.

B. Safety: Since the Risk of failure, with the attendant possibility of injury, is appreciable greater with further testing, all safety measures required by codes or ordinance or reasonable applicable to the situation shall be taken.

C. Concealment: Equipment or piping to be pressure tested shall not be insulated, covered, or concealed prior to that test. Compression joint underground piping may be backfilled prior to pressure test except that joints shall remain exposed until after the test, but tie rods, clamps, etc., shall be in place and fastened.

D. Pressure Ratings: These tests shall not be used to establish pressure ratings.

E. System Protection: Protect all piping and equipment against overpressure, collapse from vacuum, and hydraulic shock during the filling, testing, and draining procedures. Seats of iron valves shall not be subjected to a pressure in excess of the maximum cold working pressure of the valve. Pressure tests against other closed valves shall not exceed twice the normal rating. Note that where significant differences in elevation exists, there is a risk of overpressure in the lower portions of the system in order to attain test pressure in the upper portion of the system

F. Test Temperature: Apply test pressure only after the system and test medium are at approximately the same temperature, preferably not less than 60°F. Note that some applicable codes require testing above a specified minimum temperature.

G. Sectionalizing: Systems may be separated into sub-systems for testing if such action will expedite or simplify the testing.

H. Temporary Supports: During hydrostatic testing of lines provide temporary supports to prevent overstressing supports or hangers. When tests are completed, remove all temporary supports, locks, stops, etc., and adjust supports for their cold load and alignment.

I. Testing: Domestic hot and cold water piping and heating water piping shall be tested hydrostatically at the test pressures specified and shall show no drop in pressure in a 2 hour period. Leaks shall be located by soap testing

1. Test Pressures:

a) Steam and condensate (low pressure): 125 psig.

J. Test Report

1. A detailed report of pressure tests on piping and equipment shall be forwarded in duplicate to the Architect/Engineer. This report shall show date of test, lines tested, test medium, length of time test pressure was held, pressure drop or rise, and extent of venting or repressurizing.

1.31 COOPERATION WITH OTHER TRADES

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 harm to the Owner from interference, delay, or absence of coordination.

1.32 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. He shall examine the adjoining work on which 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.

1.33 SAFETY GUARDS

A. The Mechanical Contractor shall furnish and install safety guards required in order to obtain certificates of inspection from all authorities having jurisdiction. All belt driven equipment, projecting shafts, and other rotating parts shall be enclosed or adequately guarded. Provide coupling guards on all rotating shafts.

1.34 PROTECTION

A. All work, equipment, and materials shall be protected at all times to prevent obstruction, damage, or breakage. All pipe openings shall be closed with caps or plugs during installation. All equipment shall be covered and protected against dirt, water, chemical, or mechanical injury. At the completion of the work, all equipment shall be thoroughly cleaned, and the entire system shall be delivered in a perfect, unblemished condition.

1.35 PAINTING AND IDENTIFICATION

A. All equipment shall be delivered to the job with suitable factory finish. Should the finish be marred in transit or during installation, it shall be finished to present a neat, workmanlike appearance.

B. Except as elsewhere hereinafter specifically required, any painting of equipment, piping, ductwork, grilles, insulation, etc., furnished and installed under this Section of the Specifications will be done by the Painting Contractor. However, the Mechanical Contractor shall leave his equipment clean and free from any grease, dirt, rust, etc., and in suitable condition for painting.

C. No nameplates on equipment shall be painted, and suitable protection shall be afforded to the plates to prevent their being rendered illegible during the painting operation.

D. The piping shall be painted the basic color as indicated in other sections of these specifications and shall be marked every 10 feet on centers with Brady pipe markers. Arrows, approximately 6 inch in length and spaced about 10 feet on centers shall indicate the direction of the flow pipe. Locate additional labels as required in Mechanical Rooms. Staple in place, brush with clear lacquer. Markers shall state pipe size, flow direction, and pipe usage (such as "cold water," etc.).

1.36 RECORD DRAWINGS

A. The Contractor shall, during the execution of the work, maintain a complete set of drawings upon which all dimensional locations of equipment piping and all deviations and/or changes in the work shall be recorded. Water, storm, and drainage mains shall be delivered to the Architect/Engineer in good condition upon the completion and acceptance of the work and before final payment is made.

1.37 SUPPLIER RESPONSIBILITY

A. Each supplier, whether furnishing equipment as specified or as a substitution shall be responsible for certifying that the equipment is properly installed and that the warranty is valid. Submit written reports on the installation and the equipment performance when requested to do so by the Architect/Engineer (or his representative). Each supplier shall be responsible for furnishing qualified personnel at the job site at anytime requested by the Architect/Engineer (or his representative) during the construction or warranty periods.

END OF SECTION 230500

SJC EXTENSION OFFICE

SECTION 230593

BALANCING OF MECHANICAL SYSTEMS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including General and Special Conditions and the General Requirements, apply to the work specified in this section.

1.2 DESCRIPTION OF WORK

A. Furnish all labor, materials and equipment required to test and balance the mechanical systems identified on the contract drawings and these specifications, including but not limited to:

1. Testing, adjustment, and balancing of hydronic, steam, and refrigerating systems.

2. Measurement of final operating condition of HVAC systems.

3. Sound measurement of equipment operating conditions.

4. Vibration measurement of equipment operating conditions.

5. Adjustment of the mechanical systems shall include but not limited to impellers trimmed, new sheeves and belts to match cfm required, etc. as required to match equipment specified.

6. Operating Test

1.3 RELATED SECTIONS

230000	HEATING, VENTILATING AND AIR CONDITIONING INDEX
230100	DEMONSTRATION AND TRAINING
230500	GENERAL HEATING, VENTILATING, AND AIR CONDITIONING REQUIREMENTS
251100	ELECTRICAL CONTROLS AND INTERLOCKS
253000	CONTROLS AND INSTRUMENTATION

1.4 REFERENCES

A. The publications listed below form a part of these specifications to the extent referenced. Each publication shall be the latest edition of each except as noted.

1. AABC - National Standards for Testing and Balancing Heating, Ventilating and Air Conditioning System.

2. ADC - Test Code for Grilles, Registers, and Diffusers.

3. ASHRAE 111 - Practices for Measurement, Testing, Adjusting, and Balancing of Building Heating, Ventilation, Air-conditioning, and Refrigeration Systems.

4. NEBB - Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems.

5. NFPA – NFPA 90A - Installation of Air Conditioning and Ventilating System.

6. SMACNA - HVAC Systems Testing, Adjusting, and Balancing.

1.5 SUBMITTALS

A. Field Reports: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.

B. Prior to commencing work, submit report forms or outlines indicating adjusting, balancing, and equipment data required.

C. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Architect/Engineer and for inclusion in operating and maintenance manuals.

D. Provide reports in letter size, 3-ring binder manuals, complete with index page and indexing tabs, with cover identification at front and side. Include set of reduced drawings with air outlets and equipment identified to correspond with data sheets and indicating thermostat locations.

E. Include detailed procedures, agenda, sample report forms and copy of AABC National Project Performance Guaranty prior to commencing system balance.

F. Test Reports: Indicate data on AABC National Standards for Total System Balance forms.

G. When test and balancing has been completed, the balancing agency shall prepare a complete report including design and test conditions compared. The report shall be as outlined below.

H. Seven copies of the complete and compiled test data shall be submitted to the Contractor for forwarding to the Architect/Engineer for evaluation and approval.

1. The Report shall be on standard 8-1/2" x 11" good quality paper and bound together to form a complete report. All forms shall be typewritten. Field data may be handwritten on appropriate printed or typewritten forms. Copies of handwritten field notes shall be legible.

2. Each sheet shall have the Building number, name of the Testing Firm, instruments used to perform the tests, name of personnel performing the

test, and date test was performed. Date and firm performing the calibration on photometry equipment shall also be included.

3. Outside weather conditions shall be noted during the times the tests were made: cloud cover, temperature, wind speed and direction, precipitation, etc.

I. The Report shall have a T & B Summary section including:

1. Identification of any system or equipment item the Contractor had difficulty balancing to specification or could not be balanced to specification.

2. Identification of any piece of equipment or system whose balance should be rechecked and/or reset during weather conditions different from those present during system balancing.

1.6 PROJECT RECORD DOCUMENTS

A. Record actual locations of flow measuring stations balancing valves and rough setting. Show locations on Test and Balance report reduced size plan drawings.

1.7 QUALITY ASSURANCE

A. Perform total system balance in accordance with NEBB Procedural Standards for Testing, Balancing, and Adjusting of Environmental Systems.

1.8 QUALIFICATIONS

A. The balancing shall be performed by Energy Balance, Inc., De La Pena LLC, or Kirk Air. Qualified personnel are limited to registered mechanical Engineers and agencies regularly engaged in testing and balancing work. The Contractor shall submit, prior to the start of the balancing work, the qualifications and experience record of the balancing personnel for approval by the Architect/Engineer.

B. Perform Work under supervision of registered Professional Engineer experienced in performance of this Work and licensed in the state where the Project is located.

C. The balancing agency shall not be associated with or the same contractor furnishing the controls or instrumentation.

1.9 PRE-BALANCING CONFERENCE

A. Convene pre-balancing conference one week prior to commencing work of this section in coordination with Architect/Engineer/General Contractor and his Subcontractors.

1.10 SEQUENCING

A. Sequence work to commence after completion of systems and schedule completion of work before Substantial Completion of Project. See section 3.1 for pre-balancing inspection.

PART 2 – PRODUCT

2.1 INSTRUMENTS

A. Instruments in general shall be direct reading. Pressures between 2" W.G. and 12" W.G. shall be measured with manometers. Duct velocities above 600 fpm shall be measured with a pitot tube. Averaging hoods with tight seal shall be used for airflow measurement at diffusers, registers, and grilles. RPM shall be measured with a revolution counter and stopwatch. Mercury thermometers are preferred; bi-metallic thermometers may be used if calibration is checked daily. Test report shall list all instruments used and include accuracy and date calibrated. The Contractor shall provide all instruments to make the tests herein specified and required for complete system balancing.

2.2 AIR HANDLERS

A. After the air system is balanced and an optimum fan speed is selected, the adjustable sheaf or sheaves furnished shall be replaced by the Mechanical Contractor with new non-adjustable sheaves for permanent operation.

PART 3 – EXECUTION

3.1 EXAMINATION

A. The test and balance agency shall review the plans and specifications prior to installation of the system and submit a report to the Architect/Engineer of any deficiencies in the system which could preclude proper adjusting, balancing, and testing of the system.

B. The test and balance agency shall inspect the system prior to adjusting, balancing, and testing work to ensure that all specified components which will affect proper execution of such work are installed and are operating properly. A report shall be submitted to the Architect/Engineer indicating the results of the inspection within three days of the inspection. The following is a partial list of items to be inspected and report provided to the Architect/Engineer.

1. Systems are started and operating in a safe and normal condition.

2. Temperature control systems and control systems are installed complete and operable.

3. Proper thermal overload protection is in place for electrical equipment.

4. Final filters are clean and in place. If required, install temporary media in addition to final filters.

5. Duct systems are clean of debris.

6. Fans are rotating correctly.

7. Fire/smoke and volume dampers are in place and open. The smoke detectors and power to them is installed and the dampers are operational. Air coil fins are cleaned and combed.

8. Access doors are closed and duct end caps are in place.

9. Air outlets are installed and connected.

10. Duct system leakage is minimized.

11. Hydronic systems are flushed, filled, and vented.

12. Pumps are rotating correctly.

13. Proper strainer baskets are clean and in place.

14. Service and balance valves are open.

C. Submit field reports in a timely manner within one week of pre-balancing conference. Report defects and deficiencies noted during performance of services which prevent system balance.

D. Beginning of work means acceptance of existing conditions of the installed system and equipment on the project.

3.2 PREPARATION

A. Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to Architect/Engineer to facilitate spot checks during testing.

B. Provide additional balancing devices as required.

3.3 INSTALLATION TOLERANCES

A. Air Handling Systems: Adjust to within plus or minus 5 percent of design for supply systems and plus or minus 10 percent of design for return and exhaust systems.

B. Air Outlets and Inlets: Adjust total to within plus 10 percent and minus 5 percent of design to space. Adjust outlets and inlets in space to within plus or minus 10 percent of design.

3.4 ADJUSTING

A. Ensure recorded data represents actual measured or observed conditions.

B. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.

C. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.

D. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

E. At final inspection, recheck random selections of data recorded in report. Recheck points or areas as selected and witnessed by the Owner.

3.5 AIR SYSTEM PROCEDURE

A. Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities at site altitude.

B. Make air quantity measurements in ducts by Pitot tube traverse of entire cross-sectional area of duct.

C. Measure air quantities at air inlets and outlets.

D. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.

E. Use volume control devices to regulate air quantities only to extent that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.

F. Vary total system air quantities by adjustment of fan speeds. Provide drive changes required. Vary branch air quantities by damper regulation.

G. Provide system schematic with required and actual air quantities recorded at each outlet or inlet.

H. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 percent loading of filters.

I. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.

J. Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.

K. Where modulating dampers are provided, take measurements and balance at extreme conditions. Balance variable volume systems at maximum air flow rate, full cooling, and at minimum air flow rate, full heating.

L. Measure building static pressure and adjust supply, return, and exhaust air systems to provide required relationship between each to maintain approximately 0.05 inches positive static pressure near the building entries.

3.6 SCHEDULES

A. Equipment Requiring Testing, Adjusting, and Balancing

1. Direct Fired Furnaces
2. Packaged Roof Top Heating/Cooling Units
3. Packaged Terminal Air Conditioning Units
4. Kitchen Hood
5. Air Coils
6. Exhaust Fans
7. Terminal Heat Transfer Units
8. Air Handling Units
9. Fans
10. Air Filters
11. Air Terminal Units
12. Air Inlets and Outlets

B. Report Forms

1. Title Page

a) Name of Testing, Adjusting, and Balancing Agency
b) Address of Testing, Adjusting, and Balancing Agency
c) Telephone number of Testing, Adjusting, and Balancing Agency
d) Project name
e) Project location
f) Project Architect
g) Project Engineer
h) Project Contractor
i) Project altitude
j) Report date

2. Summary Comments

a) Design versus final performance
b) Notable characteristics of system

c) Description of systems operation sequence
d) Summary of outdoor and exhaust flows to indicate amount of building pressurization
e) Nomenclature used throughout report
f) Test conditions, including weather conditions

3. Instrument List:

a) Instrument
b) Manufacturer
c) Model number
d) Serial number
e) Range
f) Calibration date

4. Electric Motors:

a) Manufacturer
b) Model/Frame
c) HP/BHP
d) Phase, voltage, amperage; nameplate, actual, no load
e) RPM
f) Service factor
g) Starter size, rating, heater elements
h) Sheave Make/Size/Bore

5. V-Belt Drive:

a) Identification/location
b) Required driven RPM
c) Driven sheave, diameter and RPM
d) Belt, size and quantity
e) Motor sheave diameter and RPM
f) Center to center distance, maximum, minimum, and actual

6. Gas Fired Equipment

a) Manufacturer
b) Model number
c) Serial number
d) Firing rate
e) Overfire draft
f) BTUH at sea level
g) BTUH at altitude
h) Gas pressure at meter outlet
i) Gas flow rate in cfh
j) Heat input
k) Burner manifold gas pressure
l) Orifice size
m) Air temperature rise for gas fired equipment
n) Check all limit devices for proper operation, setting and calibration

o) Make up water pressure setting
p) Working pressure
q) Ambient temperature
r) Relief valve setting
s) Static pressure
t) Heat output

7. Air Cooled Condenser:

a) Identification/number
b) Location
c) Manufacturer
d) Model number
e) Serial number
f) Entering DB air temperature, design and actual
g) Leaving DB air temperature, design and actual
h) Number of compressors

8. Electric Duct Heater:

a) Manufacturer
b) Identification/number
c) Location
d) Model number
e) Design kW
f) Number of stages
g) Phase, voltage, amperage
h) Test voltage (each phase)
i) Test amperage (each phase)
j) Air flow, specified and actual
k) Temperature rise, specified and actual

9. Air Moving Equipment

a) Location
b) Manufacturer
c) Model number
d) Serial number
e) Arrangement/Class/Discharge
f) Air flow, specified and actual
g) Return air flow, specified and actual
h) Outside air flow, specified and actual
i) Total static pressure (total external), specified and actual
j) Inlet pressure
k) Discharge pressure
l) Sheave Make/Size/Bore
m) Number of Belts/Make/Size
n) Fan RPM

10. Return Air/Outside Air Data:

    a) Identification/location
    b) Design air flow
    c) Actual air flow
    d) Design return air flow
    e) Actual return air flow
    f) Design outside air flow
    g) Actual outside air flow
    h) Return air temperature
    i) Outside air temperature
    j) Required mixed air temperature
    k) Actual mixed air temperature
    l) Design outside/return air ratio
    m) Actual outside/return air ratio

11. Exhaust Fan Data:

    a) Location
    b) Manufacturer
    c) Model number
    d) Serial number
    e) Air flow, specified and actual
    f) Total static pressure (total external), specified and actual
    g) Inlet pressure
    h) Discharge pressure
    i) Sheave Make/Size/Bore
    j) Number of Belts/Make/Size
    k) Fan RPM

12. Duct Traverse:

    a) System zone/branch
    b) Duct size
    c) Area
    d) Design velocity
    e) Design air flow
    f) Test velocity
    g) Test air flow
    h) Duct static pressure
    i) Air temperature
    j) Air correction factor

13. Duct Leak Test:

    a) Description of ductwork under test
    b) Duct design operating pressure
    c) Duct design test static pressure
    d) Duct capacity, air flow
    e) Maximum allowable leakage duct capacity times leak factor
    f) Test apparatus

1) Blower
2) Orifice, tube size
3) Orifice size
4) Calibrated

g) Test static pressure
h) Test orifice differential pressure
i) Leakage

14. Air Monitoring Station Data:

a) Identification/location
b) System
c) Size
d) Area
e) Design velocity
f) Design air flow
g) Test velocity
h) Test air flow

15. Terminal Unit Data:

a) Manufacturer
b) Type, constant, variable, single, dual duct
c) Identification/number
d) Location
e) Model number
f) Size
g) Minimum static pressure
h) Minimum design air flow
i) Maximum design air flow
j) Maximum actual air flow
k) Inlet static pressure

16. Air Distribution Test Sheet:

a) Air terminal number
b) Room number/location
c) Terminal type
d) Terminal size
e) Area factor
f) Design velocity
g) Design air flow
h) Test (final) velocity
i) Test (final) air flow
j) Percent of design air flow

17. Sound Level Report:

a) Location

b) Octave bands - equipment off
c) Octave bands - equipment on

18. Vibration Test:

a) Location of points:

1) Fan bearing, drive end
2) Fan bearing, opposite end
3) Motor bearing, center (if applicable)
4) Motor bearing, drive end
5) Motor bearing, opposite end
6) Casing (bottom or top)
7) Duct after flexible connection (discharge)
8) Duct after flexible connection (suction)

b) Test readings:

1) Horizontal, velocity and displacement
2) Vertical, velocity and displacement
3) Axial, velocity and displacement

c) Normally acceptable readings, velocity and acceleration
d) Unusual conditions at time of test
e) Vibration source (if non-complying)

3.7 CALCULATIONS

A. The following calculations shall be made and become part of the reported data.

1. The CFM at each heating, cooling, and fan coil, the heating and/or cooling capacity of each and the air temperature change of each.

2. The fuel flow to each gas fired unit and the BTUH input.

3. The capacity of each refrigeration unit in BTUH or tons at full capacity and at each unloaded step.

3.8 OPERATING TEST

A. The test and balance agency shall coordinate and set up an operating test when Test & Balance is completed to ensure complete operation of the system in all modes. The controls contractor, sheet metal trade and the general contractor shall certify in writing test completion and all units are operating as designed. Attach copy of operating test to Test & Balance report.

END OF SECTION 230593

SJC EXTENSION OFFICE

SECTION 230713

DUCT INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Furnish and Install

1. Ductwork insulation.

2. Duct liner.

3. Insulation jackets.

1.2 RELATED DOCUMENTS

A. The general provisions of the Contract, including General and Special Conditions and the General Requirements, apply to the work specified in this section.

1.3 DESCRIPTION OF WORK

A. Work Included: The work included by this specification consists of furnishing all labor, accessories, equipment, and materials necessary for the installation of all insulation for ductwork and mechanical equipment in accordance with the specification and applicable drawings. This includes but is not limited to:

1. All supply ductwork

2. Return ductwork not within the conditioned space

3. All ductwork in the mechanical room

4. Outside air inlet ductwork that is within the conditioned space.

5. Mechanical equipment not factory insulated.

B. Do not internally insulate ductwork from evaporative coolers unless specifically indicated on the drawings.

C. Exterior duct wrap insulation with vapor barrier shall be used on all outdoor air ductwork within conditioned spaces.

D. Supply and return air ductwork shall be insulated with duct liner except in air handling systems having air washers or humidifiers. Where air washers or humidifiers are used, exterior duct insulation shall be used. Where duct liner is used, dimensions shown on the drawings shall be clear inside duct liner.

E. Testing:

1. All ductwork and mechanical equipment shall be tested for leakage and approved by the Architect/Engineer before any insulation is applied. The insulation contractor shall have this verified in writing before beginning work.

1.4 RELATED WORK IN OTHER SECTIONS

099000	PAINTING: PAINTING INSULATION JACKETS.
230000	HEATING, VENTILATING, AND AIR CONDITIONING INDEX
230500	GENERAL HEATING, VENTILATING, AND AIR CONDITIONING REQUIREMENTS
230513	COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT
233000	AIR DISTRIBUTION

1.5 REFERENCES

A. ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate.

B. ASTM C518 - Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.

C. ASTM C553 - Mineral Fiber Blanket and Felt Insulation.

D. ASTM C612 - Mineral Fiber Block and Board Thermal Insulation.

E. ASTM E84 - Surface Burning Characteristics of Building Materials.

F. ASTM E96 - Water Vapor Transmission of Materials.

G. NFPA 255 - Surface Burning Characteristics of Building Materials.

H. SMACNA - HVAC Duct Construction Standards 1985 Ed. - Metal and Flexible.

I. UL 723 - Surface Burning Characteristics of Building Materials.

1.6 DEFINITIONS

A. Exposed Location: Exposed in mechanical rooms or rooms with finished walls or ceilings.

B. Concealed Location: Located in pipe chase, furred spaces, attics, crawl spaces, above suspended ceilings in finished and unfinished rooms, or all other locations not exposed to view.

C. Duct Sizes: Inside clear dimensions. For lined ducts, maintain sizes inside lining.

D. K Factors: All K Factors shown in the following specifications are expressed in BTU-in/hr-sq.ft-F.

1.7 SUBMITTALS

A. General: Comply with Section 230500.

B. Product Data: Provide product description, list of materials and thickness for each service, and locations.

C. Manufacturer's Installation Instructions: Indicate procedures, which ensure acceptable workmanship and installation standards will be achieved.

1.8 QUALITY ASSURANCE

A. Regulatory Requirements Fire Hazard Classification: Insulation shall have a composite (insulation, jacket or facing, and adhesive to secure jacket or facing) fire hazard rating as tested by ASTM E84, NFPA 255, or UL 723 not to exceed 25 flame spread, 50 fuel contribution, and 50 smoke development. Materials shall be labeled accordingly.

B. Certifications of Insulation and Covering Materials: UL listed; flame spread/fuel contributed/smoke development rating of 25/50 in accordance with ASTM E84, NFPA 255, and UL 723.

1.9 QUALIFICATIONS

A. Applicator: Company specializing in performing the work of this section with minimum five years of documented experience.

1.10 DELIVERY, STORAGE, AND HANDLING

A. General Requirements: Comply with Section 230500. Deliver materials to job site in original non-broken factory packaging, labeled with manufacturer's density and thickness. Store in a warm, dry location and protect against dirt, water, chemical, and mechanical damage.

1.11 PROJECT CONDITIONS

A. Manufacturer's Requirements: Maintain ambient temperatures and conditions required by manufacturers of adhesive and insulation while in storage.

B. Environmental Requirements: Perform work at ambient and equipment temperatures as recommended by the insulation manufacturer.

C. Protection: Protect insulation against dirt, water, chemical or mechanical damage before, during and after installation. Repair or replace any such insulation or covering damaged prior to final acceptance of work.

1.12 WARRANTY

A. General: Satisfy requirements of Section 230500.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:

1. Owens-Corning Fiberglass Corporation.

2. Knauf.

3. Certainteed.

4. Manville.

2.2 INSULATION MATERIALS

A. Glass Fiber, Flexible:

1. Insulation: ASTM C-553; flexible, noncombustible blanket.

a) 'K' value: ASTM C518, of 0.29 at 75 degrees F.
b) Maximum service temperature: 250 degrees F.
c) Maximum moisture absorption: 0.20 percent by volume.
d) Density: 0.75 lb/cu ft.

2. Vapor Barrier Tape:

a) Kraft paper reinforced with glass fiber yarn and bonded to aluminum film.

3. Tie Wire: Annealed steel, 16 gage.

B. Glass Fiber, Rigid:

1. Insulation: ASTM C612; rigid, noncombustible blanket.

a) 'K' value: ASTM C518, of 0.29 at 75 degrees F.
b) Maximum service temperature: 250 degrees F.
c) Maximum moisture absorption: 0.20 percent by volume.
d) Density: 0.75 lb/cu ft.

2. Vapor Barrier Jacket:

a) Kraft paper reinforced with glass fiber yarn and bonded to aluminum film.

b) Moisture vapor Transmission: ASTM E96; 0.04 perm.
c) Secure with pressure sensitive tape.

3. Vapor Barrier Tape:

a) Kraft paper reinforced with glass fiber yarn and bonded to aluminum film, with pressure sensitive rubber-based adhesive.

C. Glass Fiber Duct Liner, Flexible

1. Insulation: ASTM C-553; flexible, noncombustible blanket.

a) 'K' value: ASTM C518, of 0.28 at 75 degrees F.
b) Maximum service temperature: 250 degrees F.
c) Density: 2.0 lb/cu ft.
d) Maximum Velocity on Coated Air Side: 4000 ft/min.

2. Adhesive

a) Waterproof, fire-retardant type.

3. Liner Fasteners: Galvanized steel, self-adhesive pad with integral head.

D. Glass Fiber Duct Liner, Rigid:

1. Insulation: ASTM C-612; flexible, noncombustible.

a) 'K' value: ASTM C518, of 0.23 at 75 degrees F.
b) Maximum service temperature: 250 degrees F.
c) Density: 2.0 lb/cu ft.
d) Maximum Velocity on Coated Air Side: 4000 ft/min.

2. Adhesive:

a) Waterproof, fire-retardant, type.

3. Liner Fasteners: Galvanized steel, self-adhesive pad with integral head.

2.3 JACKETS

A. Canvas Jackets: UL listed.

1. Fabric: 6 oz/sq yd, plain weave cotton treated with dilute fire retardant lagging adhesive.

2. Lagging Adhesive: Compatible with insulation.

B. Aluminum Jacket: ASTM B209.

1. Thickness: 0.025-inch sheet.

2. Finish: Smooth or Corrugated.

3. Joining: Longitudinal slip joints and 2-inch laps.

4. Fittings: 0.016-inch thick die shaped fittings covers with factory attached protective liner.

5. Metal Jacket Bands: 3/8-inch wide, 0.016-inch thick aluminum.

6. Flexible glass fiber with fire resistant coating facing air stream; ASTM E-84/ASTM C518-70; 'k' value of 0.25 maximum at 75 F, 2 lb. density, one-inch thickness.

C. Type C: Neoprene faced, rigid glass fiberboard, 2 lb. density, ASTM E- 84/ASTM C-518; 'k' value of 0.23 at 75 F; one-inch thickness.

D. Jackets:

1. Interior Applications

a) Vapor Barrier Jackets: Kraft reinforced foil vapor barrier with self-sealing adhesive joints.

2. Exterior Applications

a) Sheet metal enclosure of corrugated aluminum, 0.02 in. thick, with metal jacket bands: 3/8 inch wide, 0.016 thick aluminum; or stick clips with smooth finish.

2.4 ACCESSORIES

A. Impale Anchors: Galvanized steel, 12 gage, self-adhesive pad and press on washer head.

B. Joint Tape: Glass fiber cloth, open mesh.

C. Lagging Adhesive: Fire resistive to ASTM E-84 or NFPA 255 or UL 723.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that ductwork has been tested before applying insulation materials.

B. Verify that surfaces are clean, foreign material removed, and dry.

3.2 INSTALLATION

A. General

1. Applications: Apply insulation tightly over clean, dry surfaces with sections or edges firmly butted together or lapped. Make insulation continuous through sleeves or openings in walls or floors.

2. Vapor Barriers: Seal vapor barriers and run continuous throughout for heated and cooled supply air ductwork.

3. Finishes: Finish insulation neatly at hangers, supports and other protrusions. Locate insulation or cover seams in least visible locations.

4. Installation Repairs: Repair separation of joints or cracking of insulation due to thermal movement or poor workmanship.

5. Exterior Locations: Re-cover with corrugated aluminum jacket attached with suitable aluminum rivets.

6. Manufacturer's Instructions: Install materials in accordance with manufacturer's instructions.

7. Thermal Units: Provide insulation with vapor barrier on ductwork downstream of fan coil terminal units.

8. Factory Insulated Equipment: Do not insulate factory-insulated equipment.

9. Attachment: Apply insulation as close as possible to equipment by grooving, scoring, and beveling insulation, if necessary. Secure insulation to equipment with studs, pins, clips, adhesive, wires, or bands.

10. Cement and Fillers: Fill joints, cracks, seams, and depressions with bedding compound to form smooth surface. On cold equipment, use vapor barrier cement.

11. Placards: Do not insulate over nameplate or ASME stamps. Bevel and seal insulation around such nameplate or any operable device.

12. Service Access: When equipment with insulation requires periodical opening for maintenance, repair, or cleaning, install insulation in such a manner that it can be easily removed and replaced without damage.

13. Insulation shall be installed in a workmanlike manner by workmen regularly engaged in this type of work. Insulation shall not be applied until all surfaces are clean and dry and until inspection and release for insulation application.

14. A complete moisture and vapor seal shall be provided on cold surfaces where vapor barrier jackets or coatings are required. Anchors, hangers

and other projections shall be insulated and vapor sealed to prevent condensation.

15. Duct insulation shall be continuous through walls and floor openings except where walls or floors are required to be fire stopped or required to have a fire resistance ratings.

B. Locations for Insulation:

1. External: Outside of ducts not internally lined, located interior of building, in mechanical room.

a) Rectangular: 1-1/2-inch thick glass fiber insulation. Fasten to duct with weld pins or stock clips spaced 12 inches to 18 inches o.c. with minimum of two rows per side of duct. Secure with washers firmly embedded in insulation. Seal joints, breaks and punctures in cold air ductwork wire fire-retardant vapor adhesive reinforced with a three-inch wide strip similar to that of facing.

b) Round: Two-inches thick glass fiber blanket duct wrap. Adhere insulation to duct with fire retardant adhesive applied in bands around the duct. Butt tight with facing overlapping all joints at least two inches. Seal cold air ductwork with fire retardant vapor barrier adhesive. Seal breaks and punctures in the facing of cold air ductwork with vapor barrier tape sealed with fire retardant adhesive.

2. For exterior applications, provide insulation with vapor barrier jacket w/2" thick rigid insulation w/minimum R-value of 8. Cover with caulked aluminum jacket with seams located on bottom side of horizontal duct section.

3. Insulation below grade shall be polyurethane spray foam, suitable for use in wet environments without degradation and having the following properties.

a) All duct shall be supported on 2" thick rigid polystyrene board exceeding the width of the duct. Spray foam shall be applied to assure a 2" MINIMUM coverage. Insulation shall be coated with Deer-O Foam Cap W-256 applied at the rate of one gallon per 100 square ft. for vapor barrier protection with a perm rating of 0.00019.

C. Duct Liner

1. Duct liner shall be installed in accordance with Figures 6-1 through 607 of the SMACNA High Velocity Duct Manual and the Manufacturer's recommendations.

END OF SECTION 230713

SJC EXTENSION OFFICE

SECTION 250000

INTEGRATED AUTOMATION INDEX

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including General Special Conditions and the General Requirements, apply to the work specified in this section.

1.2 DESCRIPTION OF WORK

A. Furnish all service tools, equipment, etc., which are required for the complete installation of all Integrated Automation Work, as indicated on the Drawings and specified herein. Integrated Automation work indicated on the Drawings and/or specifications covering other trades shall conform to Division 25 of these Specifications.

B. Work or equipment not indicated or specified, which is necessary for the complete and proper operation of the Integrated Automation systems shall be accomplished without additional cost to the Owner.

C. Furnish all labor and materials required for Integrated Automation service connections to all the various items of equipment requiring controls service throughout the project shown on the Contract Drawings (even if not shown on Integrated Automation Drawings). Coordinate with other trades for the installation of required connections and service.

1.3 INTEGRATED AUTOMATION DIVISION INDEX

250500	GENERAL INTEGRATED AUTOMATION REQUIREMENTS
251100	ELECTRICAL CONTROLS AND INTERLOCKS
253000	CONTROLS AND INSTRUMENTATION

PART 2 – PRODUCTS (Not used.)

PART 3 – EXECUTION (Not used.)

END OF SECTION 250000

SJC EXTENSION OFFICE

SECTION 250500

GENERAL INTEGRATED AUTOMATION REQUIREMENTS

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes: General Mechanical Requirements specifically applicable to Division 25 sections in addition to Division 1 - General Requirements.

B. Scope:

1. The work covered by this division consists of performing all operations in connection with the installation of heating, cooling, ventilating, and plumbing including site utility work as indicated under this section. This entire section applies to all mechanical work and all mechanical sections of these specifications. This Contractor shall read and comply with all sections of these specifications including all General and Special Conditions.

1.2 REFERENCES

A. Standard Requirements:

1. For products or 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. All work shall be executed in accordance with the 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. In the event of a conflict between the various codes and standards, the more stringent shall govern. Where these specifications and accompanying drawings conflict with these requirements, the Contractor shall report the matter to the Architect/Engineer. The Architect/Engineer shall prepare any supplementary drawings required, illustrating how the work may be installed so as to comply. On approval of the change by the Architect/Engineer, the Contractor shall install the work in a satisfactory manner without additional cost to the Owner. On completion of the various parts of the work, the installation shall be tested by the constituted authorities and approved, and on completion of the work, this Contractor shall obtain and deliver to the Owner final certificates of acceptance. This Contractor shall furnish copies of each certificate to the Architect/Engineer.

C. The Contractor shall secure all permits and licenses for his work and shall pay all fees in connection with such permits and licenses.

D. The contractor shall hold and save the Owner free and harmless from liability of any nature or kind arising from his failure to comply with codes and ordinances.

E. Any and all meter deposits and all utility extension costs shall be paid by the Contractor whose work is done in connection with the service that the meter is connected to.

F. Schedule of Referenced Organizations: The following is a list of the acronyms of organizations referenced in these Specifications:

1.	AABC	Associated Air Balance Council
2.	ADC	Air Diffusion Council 435 North Michigan Ave. Chicago, IL 60611
3.	AMCA	Air Movement and Control Association 30 West University Drive Arlington Heights, IL 60004
4.	ANSI	American National Standards Institute 1430 Broadway New York, NY 10018
5.	ASHRAE	American Society of Heating Refrigerating and Air Conditioning Engineers 345 East 47th Street New York, NY 10017
6.	ASME	American Society of Mechanical Engineers 345 East 45th Street New York, NY 10017
7.	ASTM	American Society for Testing and Materials 1916 Race Street Philadelphia, PA 19103
8.	FM	Factory Mutual System 1151 Boston-Providence Turnpike Norwood, MA 02062
9.	FS	Federal Specification General Services Administration Specifications and Consumer Information Distribution Section (WFSIS) Washington Navy Yard, Building 197 Washington, DC 20407
10.	NBFU	National Board of Fire Underwriters 5530 Wisconsin Avenue, Suite 750 Chevy Chase, Maryland 20815
11.	NEC	National Electric Code (of NFPA)

12. NEBB — National Environmental Balancing Bureau
8224 Old Courthouse Road
Vienna, VA 22180

13. NEMA — National Electrical Manufacturer's Association
2101 L Street, NW
Washington, DC 20037

14. NSF — National Sanitation Foundation
Box 1468
Ann Arbor, MI 48106

15. OSHA — Occupational Safety and Health Administration
U.S. Department of Labor

16. SMACNA — Sheet Metal and Air Conditioning Contractor's
National Association
8224 Old Courthouse Road
Vienna, VA 22180

17. TIMA — Thermal Insulation Manufacturers Association
Technical Services
1420 King Street
Alexandria, VA 22314

18. UL — Underwriters Laboratories, Inc.
333 Pfingston Road
Northbrook, IL 60062

G. Underwriters Laboratories Inc. (UL): All materials, appliances, equipment, devices or appurtenances shall conform to the applicable standards of Underwriters Laboratories Inc., where such standards have been established.

1.3 DRAWINGS

A. Drawings and specifications shall be considered as cooperative, and work or materials called for by one and not mentioned in the other, or vice versa, shall be done and furnished as though treated by both.

B. In the cases of discrepancies in figures, drawings, or specifications, the Architect/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 save only at his expense, and, in case of any settlement or any complication arising from such adjustment to the Contractor, he 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 Architect/Engineer for such further drawings or explanations as may be necessary, allowing a reasonable

time for the Architect/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, reference shall be made to the Architect\Engineer whose decision shall be final and conclusive. No alleged oral admission, condonation, or inadvertent neglect on the part of the Architect/Engineer will be accepted as an excuse for inferior work.

E. The mechanical plans do not give exact details as to elevations of ductwork and 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 the structural conditions, provide proper grading of lines, to avoid all obstructions, to conform to details of installation supplied by the manufacturer of the equipment to be installed, and thereby to provide an integrated, satisfactory operational installation.

F. Should the particular equipment which any Bidder proposes to install, require other space conditions than those indicated on the drawings, the Bidder shall arrange for such space with the Architect/Engineer before submitting his bid. Should changes become necessary on account of failure to comply with these details, the Contractor shall make such necessary changes at his (the Contractor's own expense).

G. The Contractor shall submit working scale drawings of all his apparatus and equipment which in any way varies from these specifications and plans which shall be checked by the Architect/Engineer and approved before the work is started, Contractor before work proceeds. Interference with structural conditions shall be corrected by the Contractor.

H. All equipment shall be installed in accordance with the manufacturer's recommendations. Provide all accessories and components for optimum operation as recommended by the manufacturer.

1.4 SYSTEM DESCRIPTIONS

A. Not Used.

1.5 PRIOR APPROVALS

A. Each equipment item for which the Contractor desires to install equipment other than the specific item identified in the equipment schedule or equivalent equipment by manufacturers specifically named in the schedule, the Contractor shall bear full responsibility to prove to the Engineer that the furnished equipment is equivalent to or better than the specified item. Failure to provide such proof will result in rejection of the shop drawing submittal by the Engineer. Prior written or verbal approval by the Engineer of equipment by other manufacturers will not relieve the Contractor of responsibility to provide equivalence. Prior approval is not required, however, any prior approval given is intended only to provide preliminary agreement that the alternate manufacturer may make equipment that

complies with the specification requirements and not that all equipment manufactured by him is acceptable.

1.6 SHOP DRAWINGS

A. Shop drawings or fully descriptive catalog data shall be submitted by the Contractor for all items of material and equipment furnished and installed under this Contract. This shall include piping, ductwork, mechanical equipment, plumbing equipment, control items, etc. The Contractor shall submit to the Architect/Engineer a sufficient number of copies of all such shop drawings or catalog data to provide him with as many review copies as he may need, plus three (3) copies for retention by the Architect/Engineer. No materials or equipment shall be installed until officially approved by the Architect/Engineer.

B. Before submitting Shop Drawings to the Architect/Engineer for review, the Contractor shall examine them and satisfy himself that they are correctly representative of the material or equipment to which they pertain. The Contractor shall so note these Drawings before submitting them. The Contractor's review of Shop Drawings is not intended to take the place in any way of the official review of the Architect/Engineer, and the Shop Drawings which have not been reviewed by the Architect/Engineer shall not be used in fabrication or installing any work.

C. The review of Shop Drawings or catalog data by the Architect/Engineer shall not relieve the Contractor from responsibility for deviations from the plans and Specifications unless he has, in writing, specifically called attention to such deviations as the time of submission and has obtained the permission of the Architect/Engineer thereon, nor shall it relieve him from the responsibility for error of any kind in Shop Drawings. When the Contractor does call such deviations to the attention of the Architect/Engineer, he shall state in his letter whether or not such deviations involve any extra cost. If this is not mentioned, it will be assumed that no extra costs is involved for making the change.

D. After receiving approval on the make and type of materials, the Contractor shall order such materials in sufficient time so that no delay or changes will be caused. This is done to facilitate progress on the job and failure on the part of the Contractor shall render him liable to stand the expense of any and all delays occasioned by failure on this part to provide necessary details. All shop drawings shall be delivered to the Architect/Engineer's office within thirty (30) days from the date of the contract.

E. Shop drawings will be returned unchecked unless the following information is included: reference to all pertinent data in the Specifications or on the drawings, size and characteristics of the equipment, name of the project and a space large enough to accept an approval stamp. The data submitted shall reflect the actual equipment performance under the specified conditions and shall not be a copy of the scheduled data on the drawings.

1.7 SUBMITTALS

A. Submittal data shall be organized in commercial quality, three ring binders with durable and cleanable covers. Product information for each piece of equipment

shall be separated by an indexing leaf with clear tabs. The product name and symbol (i.e., AHU/Air Handling Unit) shall be typed on white paper inserts and placed in appropriate tab. Complete data must be furnished showing performance, quality, and dimensions. A signed review by the Architect/Engineer must be obtained before purchasing any equipment.

B. The following items shall be submitted for review by the Architect/Engineer but are not limited to:

1. Temperature Controls

2. Vibration Equipment and Calculations

1.8 QUALITY ASSURANCE

A. General: Comply with Division 1.

B. Welder Qualifications: Welders shall be certified by the American Society of Mechanical Engineers (ASME) National Certified Pipe for the type of work being performed. Current operators' certificates in accordance with ASME standards shall be on file at the site and shall be available to the Architect/Engineer for examination. Coupons shall be available for review by the Architect and Engineer.

C. Locations of all pipes, ducts, outlets, appliance, etc., as shown on the drawings, are approximate only and are understood to be subject to such revisions as may prove necessary or desirable at the time the work is installed. Each Contractor will be required to install his work with relation to existing building conditions and shall be entirely responsible for the correctness of his work with reference to finished elevations, etc. Piping shown on the drawings is diagrammatic only and their exact locations, depths, and invert elevations shall be as required for proper flow and coordination with other trades.

D. The contract drawing depicts graphically the arrangement of piping and ductwork. Should local conditions necessitate a rearrangement, or if any of the piping or ductwork can be installed to better advantage in a different manner, the Contractor shall, before proceeding with the work, prepare and submit three (3) copies of Drawings of the proposed arrangement for the Architect/Engineer's review.

E. If the Contractor proposes to install equipment, including piping and ductwork, requiring space conditions other than those shown, or to rearrange the equipment, he shall assume full responsibility for the rearrangement of the space and shall have the Architect/Engineer review the change before proceeding with the work. The request for such change shall be accompanied by Shop Drawings of the space in question.

F. Each Contractor is responsible for the proper location and size of all slots, holes, or openings in the building structure pertaining to his work, and for the correct location of pipe sleeves.

G. Each Contractor shall coordinate his work with that of all other trades that it may be installed in the most direct and workmanlike manner without hindering or handicapping the other trades. Piping interferences shall be handled by giving precedence to pipe lines which require a stated grade for proper operation. Drainage lines shall take precedence over water lines in determination of elevations. In all cases, lines requiring a stated grade for their proper operation shall have precedence over electrical conduit and ductwork.

H. All oiling devices and all parts of equipment requiring adjustment shall be easily accessible. Lubricate all equipment properly in accordance with manufacturer's instructions. Furnish zerk grease fittings on all greaseable bearings.

I. Equipment and Materials: The materials and equipment shall be new and shall be the standard products of the manufacturers regularly engaged in the production of Plumbing, Heating, Cooling, Ventilation, and Fire Protection Equipment, and shall be the manufacturer's latest standard design. Where two or more units of the same class of equipment are required, these units shall be the products of the same manufacturer. However, the component parts of the systems need not be the products of the same manufacturer. Specific equipment specified hereinafter is to be considered a standard of quality and operation. In general, all capacities of equipment, and motor and starter characteristics are shown in schedules on the drawings. Reference shall be made to the schedules for specific information. The capacities shown are minimum capacities. Variations in the characteristics will be permitted only on written approval of the Architect/Engineer. All equipment shall be shipped to the job with not less than a prime coat of paint or as specified hereinafter. Insofar as is possible all items of the same type (i.e., pumps, fans, etc.) shall be by the same manufacturer. Where installation instructions are not included in these specifications or on the plans, the manufacturer's instructions shall be followed. All equipment affected by altitude shall be rated to operate at the altitude where it is to be installed.

J. Excavation and Backfilling: This Contractor shall do all necessary excavation and backfill for the installation of the Mechanical systems as may be required. Curb cuts, asphalt and concrete patching, cutting and patching existing floor, etc., shall be part of this Contractor's responsibility. No extra payment will be made for rock excavation. Trenches for all underground piping shall be excavated to the required depths. The bottoms of trenches shall be tamped hard and graded to secure maximum fall. Bell holes shall be excavated to assure the pipe resting for its entire length on solid ground. Should rock be encountered, it shall be excavated to a depth of 6 inches below the bottom of the pipe, and before laying the pipe, the space between the bottom of the pipe and the rock surface shall be filled with gravel, thoroughly tamped. Pipe laid in trenches dug in fill shall be supported down in the trenches and shall be filled. No roots, rocks or foreign materials of any description shall be used in backfilling the trenches. The backfill material shall be identical to the surrounding fill material and shall be placed in 6-inch layer, wetted, and compacted to the density of the adjacent soil. See Division 2 for additional information for site utilities. All surplus materials shall be hauled from the project by the Contractor at his expense.

K. Cutting and Repairing:

1. Responsibility of the Contractor whose work is involved. Coordinate with others to prevent unnecessary cutting and repairing.

2. Lay out and locate equipment, openings, and chases. Install sleeves, inserts, and supports. Arrange with those whose work is involved to do cutting and replacing caused by negligence or error with costs reimbursed by the Contractor at fault. Cutting and replacing of existing work shall be the responsibility of the Contractor whose work is being installed.

3. Removal or terminating connections of existing work which is abandoned or replaced shall also be done hereunder to provide correct and finished work.

L. Foundations: All equipment shall be provided with suitable foundations and supports. It shall be the responsibility of the Contractor to provide for the proper locations of these foundations and supports. This applies to all rooftop equipment also.

1. All concrete foundations required by equipment furnished by the Mechanical Contractor shall be constructed by them (except where otherwise noted) the conformity with the recommendations of the manufacturer of the respective equipment, and with the approval of the Architect/Engineer. All corners of the foundations shall be neatly chamfered. Foundation bolts shall be placed in the forms when the concrete is poured. Allow 1 inch below the equipment base for alignment, leveling and grouting with nonshrinking grout. Grouting shall be done after the equipment is leveled in place. After the grout has hardened, the foundation bolts shall be pulled up tight and the equipment shimmed, if necessary. After removal of the forms, the surface of the foundation shall be rubbed.

2. Unless otherwise noted, foundations shall be a minimum of 6-inch high. All concrete work performed by these Contractors shall conform entirely to the requirements of the Concrete Specifications which describe this class of work.

M. Code Requirements: Comply with state and local code requirements and ordinances. Call for inspections required by responsible building inspection authority.

N. Applicable Building Codes and Ordinances: Including the latest edition of each code, but not limited to the following:

1. International Building Code.
2. Uniform Mechanical Code.
3. Uniform Plumbing Code.
4. Governing Fire Department Requirements
5. Utility Company Requirements
6. National Fire Protection Association Standards

7. NFPA 70 - National Electrical Code
8. NFPA 90A - Installation of Air Conditioning and Ventilating Systems
9. NEPA 90B - Installation of Warm Air Heating and Air Conditioning Systems
10. NFPA 13 - Sprinkler Systems
11. NFPA 101 - Life Safety
12. NFPA 96 - Installation of Equipment for the Removal of Smoke and Grease Laden Vapors from Commercial Cooking Equipment

O. Access Panels

1. Similar to Milcor, or as noted on the drawings, size as required for concealed expansion joints, valving, gauges, balancing dampers, valves, traps, pitot stations, equipment and similar items requiring accessibility. Notify the General Contractor 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.

1.9 DELIVERY, STORAGE AND HANDLING

A. General: Comply with Division 1.

B. Large Items: Make arrangements with other trades on the job for introduction into the building of equipment too large to pass through finished openings.

C. Acceptance: Check and sign for materials to be furnished by others for installation under all Mechanical Divisions upon delivery. Contractor shall be responsible for the storage and safekeeping of such materials from time of delivery until final acceptance.

D. Protection: Close ends of pipe and ductwork at the close of each working day during construction to prevent entry of foreign material. Protect insulation against dirt, water, chemical or mechanical damage before, during and after installation. Protect fixtures and equipment against damage during mechanical work with heavy paper or plastic until final clean-up.

E. Storage: Store equipment in covered enclosure or wrap with weather tight 6 mil Visqeen.

F. Shipping Protection: Protective casings, crating, and coverings to remain in place until start-up of equipment.

1.10 PROJECT CONDITIONS

A. Performance: All systems are to be rated at [5,500 ft.] elevation.

1.11 SEQUENCING AND SCHEDULING

A. General: Comply with Division 1.

B. Schedule: Coordinate and order the progress of mechanical work to conform to the progress of the work of the other trades. Complete the entire installation as soon as the condition of the building will permit.

C. Utility Interruptions: Schedule mechanical utility interruptions with the Architect/Engineer/Owner minimum of seven (7) days prior to the requested outage. Plan work so that duration of the interruptions a maximum of one day.

1.12 CONTROLS WIRING AND ELECTRICAL EQUIPMENT

A. All mechanical equipment controls wiring, conduit, relays, interlocks, and all accessories required for a completely operational controls system shall be the complete responsibility of the mechanical contractor. The mechanical contractor has the option to hire the project electrical contractor or any qualified controls contractor to install mechanical controls wiring and conduit. Refer to specification 251000 for installation requirements. Refer to Specification Section 253000 for coordination requirements between mechanical, electrical, and controls subcontractors.

B. Electrical items such as disconnect switches and motor starters associated with equipment provided by Division 25, when specifically mentioned to be furnished by the Mechanical Contractor, whether in these specifications or on the Electrical or Mechanical Drawings, shall be furnished by the Contractor. These items shall be mounted and connected as required for a completely operational system. See Control Systems Specification for further information.

C. All electrical equipment characteristics (voltage, etc.) must be verified by the Contractor prior to ordering. If the Contractor proposes to furnish motors varying in horsepower and/or characteristics from those specified, he shall first inform the Architect/Engineer of the change and shall then coordinate the change with the Electrical Contractor and shall pay all additional charges in connection with the change.

1.13 PROTECTION AGAINST HAZARDOUS CONDITIONS

A. The Contractor shall take precautions against hazardous construction conditions at all times during construction. The final condition of the facilities shall be safe, and where safety to operating personnel is jeopardized, suitable signage shall be posted.

B. Protruding metal (bolts, steel angles, etc.) potentially hazardous to maintenance and operating personnel, shall be cut back and/or protected to reduce the risk of injury. All openings between floors shall be protected with barriers around the openings, gratings across the openings, or steel bars through the openings to avoid and protect against injury.

1.14 HAZARDOUS SIGNS

A. Equipment room contains moving or rotating parts, floor openings, or other potentially hazardous environments and shall include a sign on the door entering

it that shall read similar to the following: **Hazardous Area - Authorized Personnel Only.**

1.15 OPERATING AND MAINTENANCE INSTRUCTIONS

A. The Mechanical Contractor shall furnish to the Owner a bound manual in triplicate, containing complete repair parts lists, and operating, service, and maintenance instructions on all mechanical equipment, fixtures, and systems.

B. The Mechanical Contractor shall also provide training as required by Section 230100 to the Owner's operation and maintenance personnel.

1.16 OPERATION PRIOR TO ACCEPTANCE

A. The Owner shall have the right to operate any and all apparatus as soon as and as long as it is in operating condition, after Owner personnel have received operational training, whether or not such apparatus has been accepted as complete and satisfactory, except that this shall not be construed to mean operations before any required alterations or repairs have been made. This operation does not indicate acceptance of the equipment by the Owner. When the Contractor enters into a contract with the Owner, he agrees to the above.

1.17 WARRANTY AND SERVICE PROGRAM

A. Due to the critical performance requirements and to clearly establish warranty responsibility for this project, the Contractor shall provide a full service maintenance and warranty program to the Owner for one full year after beneficial occupancy (substantial completion).

B. This service program shall be included as part of the base bid and shall include service, maintenance, repair, replacement, lubrication, temperature control calibration and repairs, and documenting proof for all service and maintenance work on all equipment and system furnished by the Contractor.

C. A single representative in the employment of the Contractor shall be responsible for coordination and follow through of this program. This representative's name and phone number shall be submitted to the Owner as part of the maintenance manuals and supportive data. The Contractor shall respond to a request for service with 24 hours if so requested.

D. During this first year of operation, the following sequence of maintenance service shall be performed as a minimum.

1. Clean strainers in piping.

2. Fans and/or pumps be lubricated and oiled once every four (4) months.

3. Controls shall be calibrated throughout the facility at the end of six (6) months (following substantial completion). Any leaks in the piping systems shall be repaired.

4. All equipment manufacturer's service recommendations shall be followed during this period.

1.18 FLUSHING AND DRAINING

A. It shall be the responsibility of this Contractor to properly drain and flush all ducts and pipes before use or acceptance to ensure that all debris is completely removed. Damage caused by such debris remaining in the ducts or pipes shall be repaired by this Contractor at his expense. This Contractor shall demonstrate to the Architect/Engineer's representative that all piping is clean.

1.19 CLEANING

A. This Contractor shall remove from the building construction site all rubbish and dirt as it accumulates under the contract. At completion, all areas shall be broom cleaned and all obstructions, surplus materials, etc., removed.

1.20 GUARANTEE

A. The Contractor shall guarantee all materials, equipment, and workmanship furnished and installed by him under this Contract, to be free from all defects of workmanship and materials, and shall agree to replace at his expense, without expense to the Owner, at any time within one year after installation is accepted by the Architect/Engineer, any and all defective equipment, parts, etc., that may be found. (This excludes normal maintenance and daily servicing of equipment which is the Owner's responsibility.)

1.21 FLOOR, WALL, AND CEILING PLATES

A. Where exposed pipes pass through floors, finished walls, or finished ceiling, they shall be fitted with chromium-plated escutcheons of an approved pattern. Escutcheons and plates in Mechanical Rooms do not require chrome finish.

B. This Contractor shall be responsible for providing and installing all counter flashing. All openings in the roof shall be flashed and counterflashed. Use four-pound lead flashing materials for all vent lines and welded flashing in steel lines passing through roof. The Mechanical Contractor shall notify the General Contractor where each roof penetrations is and the size of the opening.

1.22 PIPE SLEEVES

A. Schedule 40 steel pipe sleeves or pipe sleeves made of No. 20 gauge galvanized steel, properly secured in place with approximately 1/4" space between each sleeve and the surface of the pipe and/or insulation passing through it, shall be provided for all pipes passing through concrete floors, roofs, and masonry walls. All pipe sleeves shall be fixed in place as the walls and floors are built up. The Contractor shall furnish and locate all sleeves and pipes passing through concrete floors, exterior masonry walls, and roofs shall be made watertight with approved non-hardening plastic material. Sleeves through pipe chase or equipment room floors shall project a minimum of 2-inch above the floor and shall be of black steel pipe with waterproof flange at center of floor thickness.

Each sleeve through a fireproof wall shall be packed with approved fireproof rope in the annular space.

1.23 PIPE HANGERS

A. Pipe hangers shall be Fee and Mason of a type suitable for each use. Perforated straps shall not be used in any work. For ferrous pipes up to and including 4 inch in size, use Fee and Mason Fig. 199 malleable iron, adjustable, split ring, swivel hanger. For plumbing piping larger than 4 inches, use Fee and Mason Fig 239 steel clevis hanger. Where several pipes are parallel at the same elevation, trapeze hangers may be used. Where trapeze hangers are used, the pipes shall be supported on rollers where indicated on the Drawings. For copper pipes up to and including 3 inch in size, use Fee and Mason Fig. 360 malleable iron, copper plated hangers. For copper pipes larger than 3 inches, use Fee and Mason Fig. 364 copper plated clevis hanger.

B. Hanger rod sizes shall conform to the following schedule:

1.	Pipe up to and including 2"	3/8" rods
2.	Pipe 2-1/2", 3" and 3-1/2"	1/2" rods
3.	Pipe 4" and 5"	5/8" rods
4.	Pipe 6"	3/4" rods
5.	Pipe 8", 10", and 12"	7/8" rods

C. Unless shown otherwise on the Plans, all horizontal runs of ferrous piping shall be suspended from the floor or roof construction, as the case may be, by means of hangers with the following spacing:

1.	Pipe up to and including 1-1/4"	8'
2.	Pipe 1-1/2" and 2"	10'
3.	Pipe 2-1/2" and 3"	12'
4.	Pipe 3 1/2" and 4"	14'
5.	Pipe 5" and 6"	16'
6.	Pipe 8" and 10"	20'

D. Unless shown otherwise on the Plans, all horizontal runs of copper piping shall be suspended from the floor or roof construction as the case may be, by means of hangers with the following maximum spacing:

1.	Pipe up to 3/4" in size	5'
2.	Pipe 1" and 1-1/4"	6'
3.	Pipe 1-1/2" and larger	10'

E. There shall be a hanger within 2 inches of each elbow or tee. Additional supports shall be provided for valves, strainers, etc. Cast iron pipe shall have not less than one hanger per length of pipe. Vertical risers shall be supported by approved riser clamps at each floor. Vertical pipes within a space shall have not less than two supports.

F. Supports and hangers shall be installed to permit free expansion and contraction in the piping systems. Hangers shall permit vertical adjustment to maintain

proper pitch. Where necessary to control expansion and contraction, the piping shall be guided and firmly anchored. No piping shall be self-supporting, nor shall it be supported from equipment connection.

G. Expansion bolts shall be Ackerman-Johnson or Hilti.

H. Beam clamps suitable for use with this type of steel construction involved shall be Grinnell.

1.24 PRESSURE VESSEL CERTIFICATION

A. Not used.

1.25 ISOLATION

A. Excessive vibration or objectionable noise created in any part of the building by the operation of any equipment furnished and/or installed under the Mechanical Contract will be extremely objectionable and the Contractor shall take all precautions against the same by isolating the various items of equipment from the building structure and by such other means as may be necessary to eliminate all excessive vibration and objectionable noise produced by any equipment installed by them, and consequently, they shall design all foundations, supports, etc., for their equipment, and all piping with this end in view. In addition, these Contractors shall supervise the construction of all foundations and supports, whether they build them or not, in order that they may be constructed in such a manner as to prevent the transmission of objectionable noise and/or excessive vibration. Submit calculations on all vibration isolation equipment.

B. All equipment having moving parts shall be isolated from the building structure by means of Korfund isolation materials, unless specifically noted otherwise. All isolators shall be the same brand and shall be supplied from the same source. Equipment manufacturer's recommendations shall be followed in the isolation of equipment.

C. Vibration isolators shall have sufficient resilience to meet the following minimum efficiencies:

Motor HP	Equipment Room
Up to 5	90%
7-1/2 to 15	93%
20 to 40	95%
50 to 100	97.5%

D. Spring isolators shall be of the housed type with ribbed pads bonded to the underside of the baseplate, or may be unhoused stable springs. Isolators shall be furnished with snubbers and limit stops where so recommended by the equipment manufacturer.

E. The Supplier of the isolating equipment shall, upon completion of the job, check all isolating materials and verify that they are installed properly, and submit a report in writing to the Architect/Engineer.

1.26 TESTING

A. Before completion of this project, the Mechanical Contractor shall test all materials and equipment which normally require testing. All piping, etc., shall be tested to meet code requirements or the Specification requirements, whichever is more stringent.

B. All equipment shall be operated sufficiently long enough to prove to the Architect/Engineer that the equipment performs satisfactorily and meets the requirements set forth on the Plans or in these Specifications.

1.27 CERTIFICATIONS

A. Before receiving final payment, the contractor shall verify that all equipment furnished and all work done is in compliance with all applicable codes mentioned in these Specifications. Submit certifications and acceptable certificates to the Architect/Engineer.

1.28 GENERAL PIPING INSTALLATION REQUIREMENTS

A. Provisions for Drainage: All piping systems shall be installed so that they may be easily drained. Drain caps, plugs, or hose bibbs shall be installed at low points. Grade piping toward drain locations.

B. Alignment: All installed pipelines shall be straight and shall remain straight against strains. Proper allowance shall be made for expansion and contraction.

C. Clean as Installed: All piping shall be kept 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. All detergents, solvents and other cleaning agents shall be compatible with the materials of fabrication of the system in which they are used. They shall not adversely affect the materials of mechanisms in the systems and they shall be acceptable to equipment manufacturers. All detergents, solvents, and other cleaning agents shall also be compatible with the process streams to be handled by the systems in which they are used.

D. Insulated Fittings: Install between any dissimilar metals such as steel and copper.

E. Expansion and Contraction: The Contractor shall make all necessary provisions for expansion and contraction with proper fittings, anchors, dresser couplings, loops, etc. Install flexible connectors on each pipe at each building expansion joint.

F. Welding: Refer to Paragraph 1.29 of this section of these specifications.

G. Bending: No bending of pipe will be permitted.

H. General: The installation shall be coordinated with respect to space available with heating, cooling, ventilating, and electrical installation. In every instance

where there is a conflict in the routing of the piping and the ducting, the routing of the ducting shall govern. Installed piping shall not interfere with the operation or accessibility of doors or windows, shall not encroach on aisles, passageways, and equipment, and shall not interfere with the servicing or maintenance of equipment. Pipe shall be cut accurately to measurements established at the construction site and shall be worked into place without springing or forcing, properly clearing all openings and equipment. Cutting or weakening of structural members to facilitate piping, installation is not permitted. Pipes shall have burrs removed by reaming and shall be so installed as to permit free expansion and contraction without damage to joints or hangers. Piping above ground shall be run parallel with the lines of the building unless otherwise noted on the drawings. Unless otherwise shown on the drawings, horizontal piping shall pitch down in the direction of flow with grade of not less than 1 inch in 40 feet. Piping connections to equipment shall be in accordance with details shown on the drawings or as recommended by the equipment manufacturer. Service pipe valves and fittings shall be kept a sufficient distance from other work to permit finished covering not less than 1/2 inch from such other work, and not less than 1/2 inch between finished covering on the different services.

I. Installation of Valves: Valves shall be installed at the locations shown on the drawings and where specified and where directed at site. Gate valves shall be used unless otherwise shown, specified, or directed. All valves shall be installed with their stems horizontal or above. Where tight shutoff is required, a composition seat globe valve or resilient seat ball valve shall be used.

J. All valves which must be used during operation, all control valve assemblies, instrument control cases, liquid level controls, gage glasses, orifices, relief valves, and other equipment which must be observed, adjusted, or serviced during operation shall be located conveniently accessible from an operating platform or grade.

K. In general, relief valves within processing unit limits shall be located conveniently accessible from an operating platform or grade.

1. Those in non-hazardous service, such as water, shall discharge directly to outside.

2. Relief valves should have no piping between the vessel or line and the valve inlet, except as shown on the drawings.

3. Relief valves shall be installed in a vertical position. Vent piping shall be braced and supported in a manner that will not produce excessive stresses in the relief valve and will permit removal of the relief valve without necessary temporary supports for the vent lines.

L. Equipment Connections: All piping connections to pumps and other equipment shall be installed without strain at the pipe connection of the equipment. The contractor shall be required as directed to remove the bolts in flanged connections or disconnect piping to demonstrate that the piping has been so connected. Pipe connections to equipment shall be made with unions or flanged fittings. Provide removable headers for large equipment for service access.

M. Joints

1. Flanged Joints: All flanged joints shall be face matched. Raised face flanges shall not be mated to flat-faced cast-iron flanges on valves or equipment. The raised face must be turned off. All flanged bolt holes shall straddle the horizontal and vertical center line unless otherwise noted.

2. Screwed Joints: Screwed pipe joints shall have American Standard Taper Pipe Threads ANSI-B2.1 Latest Edition. Burrs formed when cutting pipe shall be removed by reaming. Care shall be taken that the inside of pipe is thoroughly clean and free of cutting oil and foreign matter before installation. Joints shall be made perfectly tight by the use of Teflon tape or approved Teflon thread sealing and lubricating compound.

3. Solder-Joints: Tubing shall be cut square and burrs removed. Both inside of fittings and outside of tubing shall be well cleaned with steel wool or wire brush before seating. Care shall be taken to prevent annealing of fittings and hard drawn tubing when making connections. Joints for serrated fittings on water, compressed air below 60 psig, and vacuum lines shall be made with a 95 percent tin and 5 percent antimony. Cored solder or solder containing lead will not be permitted.

N. Reducers: Reduction in pipe size shall be made with one piece reducing fittings. Bushings reducing at least two pipe sizes will be acceptable only when there is no room for reducing couplings or swaged nipples.

O. Unions: All piping unions shall be of the ground joint type constructed from materials equivalent in alloy composition and strength to other fittings specified with which they are used. Union Pressure classes and end connections shall be the same as the fittings used in the lines with the unions. Steel unions shall have hardened stainless steel seating surfaces on both faces.

1.29 WELDING

A. All welding of piping covered by this specification, regardless of condition of service shall be accompanied as follows:

1. The welding shall be in accordance with the recommendations of the American Welding Society. Mitering of pipe to form elbows, notching to form these, or any similar construction will not be permitted. Welding fittings shall be installed on all welded lines. Joints to be welded shall be properly aligned and spaced, using special welding clamps where necessary. All welders to be employed shall have passed qualification tests prescribed by the National Certified Pipe Welding bureau (or by another reputable testing laboratory or agency) using procedures approved by the American Society of Mechanical Engineers or the American Welding Society. The welders will be required to pass qualification tests when the work of the welder creates a reasonable doubt as to his proficiency. Tests shall be conducted at no additional expense to the Owner.

2. Each welder shall, in addition to having passed the prescribed qualification tests (as noted in Paragraph 1.30.A.1), prepare sample coupons at the job site on a portion of pipe that is cut such that the cross section of the weld is open to view. The sample weld should be prepared using a 6-inch diameter pipe. The sample shall reflect a continuous weld with perpendicular cut out to show the weld in cross sectional view. This sample, when accepted and approved by a certified welding inspector, shall be used as a standard of quality to compare to other welds that this welder will be performing on the job. This same sample weld will also be a basis for accepting or rejecting the welder for working on this project. The sample weld shall be identified with a date and the welder's name and shall be kept at the site throughout the project.

3. All welding on pressure piping shall conform to all of the requirements of the American Society of Mechanical Engineers Code for Pressure Piping - B31.1 (An American National Standards Institute publication), as defined in the latest edition of the ANSI Power Piping B31.1 Manual. All welding shall also conform to all of the requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code. All chapters, current addenda and supplements of these manuals shall apply. This code shall be used to establish standards of performance and quality of welds. However, the Owner reserves the right to perform radiographic testing of all welds, to compare any of the welds to the approved "standard" sample welds of each welder, and to compare the welds to the welding diagrams and sketches of those recommended in the ANSI B31.1 Power Piping Manual. The intent is to obtain the highest quality welding job possible. The cost of any initial radiographic testing, for random inspection, shall be paid for by the Owner. If radiographic random testing reveals that a weld is defective, the Contractor shall bear the cost of all repairs and re-testing necessary to be made to subject weld until conformance with radiographic tests is reached. The potential for random radiographic testing and welding quality control applies to all pressure piping systems in this project, including systems below 100 psig. If a question should arise regarding the possibility of faulty welding or if there are obvious visual defects in the welding, the Contractor shall be required to correct such deficiencies to a quality level consistent with the recommendations, welding diagrams and sketches in the ANSI B31.1 Manual. The quality level shall also reflect that of the approved sample welds accomplished by each welder for this particular project.

1.30 COOPERATION WITH OTHER TRADES

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 harm to the Owner from interference, delay, or absence of coordination.

1.31 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. He shall examine the adjoining work on which 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.

1.32 SAFETY GUARDS

A. The Mechanical Contractor shall furnish and install safety guards required in order to obtain certificates of inspection from all authorities having jurisdiction. All belt driven equipment, projecting shafts, and other rotating parts shall be enclosed or adequately guarded. Provide coupling guards on all rotating shafts.

1.33 PROTECTION

A. All work, equipment, and materials shall be protected at all times to prevent obstruction, damage, or breakage. All pipe openings shall be closed with caps or plugs during installation. All equipment shall be covered and protected against dirt, water, chemical, or mechanical injury. At the completion of the work, all equipment shall be thoroughly cleaned, and the entire system shall be delivered in a perfect, unblemished condition.

1.34 PAINTING AND IDENTIFICATION

A. All equipment shall be delivered to the job with suitable factory finish. Should the finish be marred in transit or during installation, it shall be finished to present a neat, workmanlike appearance.

B. Except as elsewhere hereinafter specifically required, any painting of equipment, piping, ductwork, grilles, insulation, etc., furnished and installed under this Section of the Specifications will be done by the Painting Contractor. However, the Mechanical Contractor shall leave his equipment clean and free from any grease, dirt, rust, etc., and in suitable condition for painting.

C. No nameplates on equipment shall be painted, and suitable protection shall be afforded to the plates to prevent their being rendered illegible during the painting operation.

D. The piping shall be painted the basic color as indicated in other sections of these specifications and shall be marked every 10 feet on centers with Brady pipe markers. Arrows, approximately 6 inch in length and spaced about 10 feet on centers shall indicate the direction of the flow pipe. Locate additional labels as required in Mechanical Rooms. Staple in place, brush with clear lacquer. Markers shall state pipe size, flow direction, and pipe usage (such as "cold water," etc.).

1.35 RECORD DRAWINGS

A. The Contractor shall, during the execution of the work, maintain a complete set of drawings upon which all dimensional locations of equipment piping and all deviations and/or changes in the work shall be recorded. Water, storm, and drainage mains shall be delivered to the Architect/Engineer in good condition

upon the completion and acceptance of the work and before final payment is made.

1.36 SUPPLIER RESPONSIBILITY

A. Each supplier, whether furnishing equipment as specified or as a substitution shall be responsible for certifying that the equipment is properly installed and that the warranty is valid. Submit written reports on the installation and the equipment performance when requested to do so by the Architect/Engineer (or his representative). Each supplier shall be responsible for furnishing qualified personnel at the job site at anytime requested by the Architect/Engineer (or his representative) during the construction or warranty periods.

END OF SECTION 250500

SJC EXTENSION OFFICE

SECTION 251100

ELECTRICAL CONTROLS AND INTERLOCKS

PART 1 – GENERAL

1.1 Conform with applicable provisions of the General Conditions, Supplementary Conditions and General Requirements.

1.2 RELATED WORK IN OTHER SECTIONS

260500	GENERAL ELECTRICAL PROVISIONS
260526	GROUNDING
260533	RACEWAYS, BOXES AND FITTINGS
262726	WIRING DEVICES AND PLATES

1.3 DESCRIPTION OF WORK

A. All disconnect means, motor controllers, electrical controls, protective, and signal devices for equipment furnished under Division 25 of these specifications will be installed and connected as scheduled herein or as otherwise noted on the drawings.

B. Electrical items not shown on the electrical drawings, but which are required for equipment furnished under Division 25 of this specification shall be furnished under this section of the specifications and shall be installed and electrically connected in conformance with Division 26 Specifications.

1.4 SUBMITTALS

A. Submittal data for each individual electrically controlled item of equipment or device furnished under this Division of these specifications shall include complete electrical wiring diagrams, and elementary control diagrams (ladder form) showing all internal and external wiring connections and services. The submittal data shall itemize all electrical characteristics that are of a special nature or critical to the electrical installation or control system. Such equipment and devices will not be considered for approval until these requirements are met. These submittals shall form a part Section 250500 requirements and shall be properly coordinated by the Contractor.

B. As soon as possible after contract notice to proceed, one print of the ladder diagrams shall be submitted by the contractor showing all necessary wiring for the mechanical equipment and devices proposed for installation. This print shall be reviewed and approved by the contractor, and then submitted to the Architect/Engineer for approval. The print shall indicate all components which shall be wired to the control/power circuits by the contractor, with all terminals for external connections of the components identified and labeled to correspond to the manufacturer's designations. Internal or factory installed wiring of package-type components need not be shown. Control diagrams shall show all internal and external wiring connection and shall clearly indicate field wiring furnished

and installed under Division 25, differentiated from field wiring furnished and installed under Division 26.

C. Revised Drawings: After the Architect/Engineer has approved the marked copy of the control diagrams submitted in accordance with Paragraph B above, the Contractor shall issue prints to all involved parties. The control diagrams shall be certified in writing as being acceptable to the contractor. The approved drawings will then be included in the control submittal and the Operating and Maintenance Manual.

1.5 INSTALLATION

A. No control work shall be performed until control submittal has been approved by the Architect/Engineer.

1.6 CHANGES DURING CONSTRUCTION

A. The complete responsibility and costs for revisions during construction to the approved control diagrams, and the resultant changes to the installation requirements, not covered by contract change order, shall be assigned to the contractor requesting such revisions.

PART 2 – PRODUCTS

2.1 CONTROL AND INTERPOSING RELAYS

A. Relays other than those on I/O cards shall be general purpose, enclosed plug-in type with 8 pin octal plug and protected by a heat and shock resistant dust cover. Relays shall be of the Neon or LED indicator type.

B. Relay contact configuration and ratings shall be for rated load voltage and exceed load current rating by no less than fifty percent. Minimum contact rating shall be 10 amps at 120 volts AC.

2.2 TERMINAL STRIPS

A. Terminal strips shall be of the molded nylon or polypropylene barrier type, individual plug-in mounted on a mounting channel. Terminal connections shall be rated 300-volt, 40-amp and shall be of the tubular clamp type for use with bare wire ends, or of the strap screw type for use with crimp spade lug prepared wire ends. Terminal strips shall provide for removable marking strips or have prepainted matte finish marking surfaces. Buchanan 600 series or approved substitute.

PART 3 – EXECUTION

3.1 RELAYS

A. All remote field devices shall be controlled through the use of an interposing relay. In no case shall a contactor or motor starter be directly controlled from a solid-state device output or relay contact of a rating less than that stated above.

3.2 COMPONENT IDENTIFICATION

A. All individual components (relays, timers, terminal strips, etc.) shall be clearly marked with the identification nomenclature shown on the manufacturer's shop drawings. Identification shall be by the use of press-type tape strip (kroy) covered with Scotch 600 clear tape or approved substitute method.

3.3 CONTROL WIRING INSTALLATION

A. The installation and wiring of all electrical equipment installed under this contract shall meet all Electrical Division specifications. Special attention is called to the following:

1. All wiring to be in conduit.

2. All control wiring to be color-coded throughout. Conductor color shall be consistent for the entire length of circuit.

3. All splices shall be made in junction boxes on terminal strips.

4. All control wiring to terminate on marked terminal strips and shall be marked at all terminal points. Both ends of each wire shall be marked with a designation shown on the manufacturer's shop drawings, using interlocking chevron shaped snap-on plastic markers, hot-marked shrinkable tubing, hot stamping of the wire, or clear shrink-on tubing securing adhesive labels. Markers which depend solely on adhesive are not acceptable.

END OF SECTION 251100

SJC EXTENSION OFFICE

SECTION 253000

CONTROLS AND INSTRUMENTATION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including General and Special Conditions and the General Requirements, apply to the work specified in this section.

1.2 DESCRIPTION OF WORK

A. Furnish and install a control system, complete in all respects to provide the Sequence of Control shown on the drawings.

B. All disconnect means, motor controllers, and all protective and signal devices for all electrical equipment provided under all Electrical Divisions will be furnished, installed, and connected under all Electrical Divisions with the following exceptions:

1. All controls wiring and conduit for HVAC equipment is the complete responsibility of all Mechanical Divisions. Electrical connections, relays, interlocks, etc. not shown on the electrical drawings, but which are required for equipment furnished under all Mechanical Divisions shall be installed and electrically connected by all Mechanical Divisions in conformance with all Electrical Division Specifications.

2. All disconnect means, motor controllers, and all protective and signal devices furnished with, mounted on and connected integral with equipment furnished under other divisions.

3. All disconnect means, motor controllers, electrical controls, protective, and signal devices for equipment furnished under all Mechanical Divisions of these specifications will be installed and connected as scheduled herein or as otherwise noted on the drawings.

C. The mechanical trade is entirely responsible for furnishing, installing, wiring, connecting, and placing the control systems in operation. Electrical work required will be the final responsibility of the Mechanical Contractor either by his own electricians or by his subcontract with an Electrical Contractor.

1.3 RELATED WORK IN OTHER SECTIONS

230593 BALANCING OF MECHANICAL SYSTEMS
250000 INTEGRATED AUTOMATION INDEX
250500 GENERAL INTEGRATED AUTOMATION REQUIREMENTS

1.4 GENERAL REQUIREMENTS

A. The control system shall be furnished complete for the heating and air conditioning systems by Alteron, Invensys (Siebe), Delta, TAC (Andover), and Honeywell. The temperature control company shall have a permanent, fully staffed, well-established, local office and service organization. A complete stock of all repair and replacement parts for all items furnished under this contract shall be carried in stock at the local office at all times.

B. Submittals: Shall include plan size drawings, with individual literature on each item, showing control sequences, complete electrical ladder diagrams and all control components and their wiring requirements. The Contractor shall be responsible to see that all systems are properly coordinated.

C. Operation and Maintenance Manuals: As soon as possible after Award of Contract, the Contractor shall prepare an Operation and Maintenance (O & M) Manual and submit it to the Engineer for review and approval. The control system testing and training specified hereafter shall not be conducted until the O & M Manual has been approved. See Specification Section 251000 – Direct Digital Control Software and Components. The Manual shall contain, as a minimum:

1. Approved control diagrams.

2. Equipment and device catalog cuts identifying each control device with a unique number or symbol coordinated with the control diagram symbols.

3. A Sequence of Control for each system's control diagram identifying the function and physical location of each adjustable control device, written in language understandable to personnel not specifically trained in HVAC control systems.

4. A Troubleshooting section for each control system indicating what tests and/or adjustments can be made to identify and/or correct common problems with control systems of the type installed. This description should address procedures to determine the cause of high or low space temperature and/or humidity in a typical room served by each air handling system. The description should be adequate to lead untrained persons to conclude, at minimum, whether the unit is receiving adequate primary cooling or heating, whether mixed air and supply air temperatures are reasonable and whether field adjustments or technical service is required to solve the problem. This troubleshooting section shall be bound in a separate section of O & M Manual and shall clearly refer to control device symbols shown on the Control Diagram drawings.

1.5 SPECIAL REQUIREMENTS

A. The controls trade shall check and adjust his control system completely, four (4) times during the warranty period. The fourth (4) check to be made during the final thirty days of the warranty period.

B. The controls trade will furnish the Owner with an accurate, up-to-date wiring diagram of all electrical and electronic equipment installed under this contract.

C. The Contractor shall furnish a complete set of parts lists, operating instructions and maintenance literature, in duplicate, for proper maintenance of all control equipment.

D. Steel lockable covers shall be provided for all space thermostats where shown on the drawings and where the space thermostat could be damaged.

PART 2 – PRODUCTS

2.1 CONTROL AND INTERPOSING RELAYS

A. Relays other than those on I/O cards shall be general purpose, enclosed plug-in type with 8 pin octal plug and protected by a heat and shock resistant dust cover. Relays shall be of the Neon or LED indicator type.

B. Relay contact configuration and ratings shall be for rated load voltage and exceed load current rating by no less than fifty percent. Minimum contact rating shall be 10 amps at 120 volts AC.

2.2 TERMINAL STRIPS

A. Terminal strips shall be individual plug-in type on a mounting channel. Terminal connections shall be rated 300 volt, 40 amp and shall be of the tubular clamp type for use with bare wire ends, or of the strap screw type for use with crimp spade lug prepared wire ends. Buchanan 600 series or approved substitute.

2.3 AUTOMATIC DAMPERS

A. All automatic dampers shall be furnished by the controls trade and shall be constructed of galvanized sheet steel with bushings made of oil impregnated sintered bronze to give constant lubrication. Each damper section shall have positive closing neoprene blade and edge seals. Outside air, return air and relief dampers shall have blades designed so that the blades are interconnected to give parallel movement. Each modulating damper shall provide a near linear relationship between damper opening and airflow. All volume dampers shall have opposed blades, which will produce equal pressure drop flow characteristics. Blade width shall not exceed 6 inches.

2.4 AUTOMATIC CONTROL VALVES – ELECTRIC

A. The controls trade shall provide all automatic control valves and shall be made by the control manufacturer. All electric control valves 2" and smaller in size shall be brass body and trim, 2-1/2" and larger shall be iron body with brass or stainless steel trim. Valves shall be provided with renewable type seats and adjustable springs. Valves shall be designed to pass the quantity of water and with a maximum pressure loss not to exceed 10 ft. Valves shall be provided with "V" port or throttling type seat. Valves 2" or smaller shall be screwed. Valves 2-

1/2" and larger shall be flanged. All sequencing valves shall have positive positioners.

2.5 DAMPER MOTORS – ELECTRIC

A. The damper motor shall be electro-hydraulic type capable of providing full proportional control of dampers. The actuator shall be compatible with any low voltage controller or auxiliary device. One motor shall be provided per damper section.

2.6 CONTROL PANELS

A. An enclosed control panel or panels with hinged door and locking device shall be installed where shown on the drawings. Panel layout shall be as shown. Thermometers switches and pilot lights will be flush mounted on the hinged door. Hard tubing shall be brought into the panel. Tubing within the panel may be plastic neatly bundled and tagged. All indicators and controllers will have descriptive bakelite tags.

2.7 FILTER GAUGES

A. Shall be furnished and installed in each filter bank located in the Mechanical Room and at each rooftop air handling unit. Gauges shall be Dwyer Magnahelic with static pressure tips and interconnecting tubing. Range shall be approximately 1-1/2 times the nominal filter change out pressure differential. Each rooftop filter bank shall also have a differential pressure switch with indicator lamp located on a control panel in the Mechanical Room to indicate filter replacement pressure differential has been exceeded.

2.8 SMOKE AND FIRE DETECTORS

A. Smoke detectors shall be furnished and installed in each air handling unit or system and detectors shall be furnished by the Division 26 Contractor, installed by the Division 25 Contractor, connected and tested by the Division 26 Contractor.

2.9 SEQUENCE OF OPERATION

A. The operation of the control system shall be as indicated on the drawings and control diagrams. The sequence shall be rewritten and shown on the control submittal drawing diagramming that system. The sequence on the submittal drawing shall identify control devices by number and physical location coordinated with the submittal drawing device numbers.

PART 3 – EXECUTION

3.1 RELAYS

A. All remote field devices shall be controlled through the use of an interposing relay.

3.2 INSTALLATION

A. No control work shall be performed until the control system shop drawings have been approved by the Engineer and returned to the contractor.

3.3 CONTROL WIRING

A. The installation and wiring of all electrical equipment installed under this contract shall meet all Division 16 specifications. Special attention is called to the following:

1. All wiring to be in conduit.

2. All control wiring to be color-coded throughout. Conductor color shall be consistent for the entire length of circuit.

3. All splices shall be made in junction boxes on terminal strips.

4. All control wiring to terminate on marked terminal strips and shall be marked at all terminal points. Both ends of each wire shall be marked with a designation shown on the manufacturer's shop drawings, using interlocking chevron shaped snap-on plastic markers, hot-marked shrinkable tubing, hot stamping of the wire, or clear shrink-on tubing securing adhesive labels. Markers which depend solely on adhesive are not acceptable.

B. Terminal strips shall be used in all boxes and cabinets where more than six control wires are terminated, spliced or both.

C. All control wiring shall be color coded and marked in each box, at each termination with Brady wrap around labels or suitable tags approved by the Architect. The schematic control diagrams shown on the contract drawings are for the convenience of the contractor and may not be complete in all details of control wiring for the equipment purchased for installation.

3.4 SYSTEM TESTING

A. The integrity and accuracy of each function and control point shall be demonstrated to the satisfaction of the Architect/Engineer during the test period. At the termination of the testing period the Contractor shall spend one working day instructing the Owner or his designated personnel in the control system operation. A complete operating booklet shall be provided and used during the training period.

B. Upon completion of the installation, the Contractor or his authorized representative shall be sent to the installation to certify that all necessary electrical tests and control adjustments have been completed. He shall then file a letter of Certification indicating that the system functions and conforms to the intent of these specifications.

END OF SECTION 253000

SJC EXTENSION OFFICE

SECTION 260000

ELECTRICAL INDEX

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including General Special Conditions and the General Requirements, apply to the work specified in this section.

1.2 DESCRIPTION OF WORK

A. Furnish all service tools, equipment, etc., which are required for the complete installation of all Electrical Work, as indicated on the Drawings and specified herein. Electrical work indicated on the Drawings and/or specifications covering other trades shall conform to Division 26 of these Specifications.

B. Work or equipment not indicated or specified, which is necessary for the complete and proper operation of the Electrical systems, shall be accomplished without additional cost to the Owner.

C. Furnish all labor and materials required for electrical service and control connections to all the various items of equipment requiring electric or wiring service throughout the project shown on the Contract Drawings (even if not shown on the Electrical Drawings). Coordinate with other trades for the installation of required connections and service.

1.3 ELECTRICAL DIVISION INDEX

260500	GENERAL ELECTRICAL PROVISIONS
260519	LOW VOLTAGE CONDUCTORS
260526	GROUNDING
260533	RACEWAYS, BOXES, AND FITTINGS
262416	PANELBOARDS
262716	CABINETS
262726	WIRING DEVICES AND PLATES
262800	MOTOR AND CIRCUIT DISCONNECTS
262813	FUSES
264300	SURGE SUPPRESSION PROTECTION DEVICES
265119	LED INTERIOR LIGHTING

PART 2 – PRODUCTS (Not used.)

PART 3 – EXECUTION (Not used.)

END OF SECTION 260000

SJC EXTENSION OFFICE

SECTION 260500

GENERAL ELECTRICAL PROVISIONS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including General Special Conditions and the General Requirements, apply to the work specified in this section.

1.2 REQUIREMENTS OF REGULATORY AGENCIES AND STANDARDS

A. Regulatory Agencies: Installation, materials, equipment, and workmanship shall conform to the applicable provisions of the National Electrical Code (NEC), the National Electrical Safety Code (NESC), Occupational Safety and Health Act (OSHA) all local, state, and national codes, ordinances and regulations governing the particular class of work involved and the terms and conditions of the electrical utility and other authorities having lawful jurisdiction pertaining to the work required. All modifications required by these codes, rules, regulations, and authorities shall be made by the Contractor without additional charge to the Owner. The Contractor shall secure all permits and licenses required for his work and shall pay all fees in connection with such permits and licenses.

B. On completion of the various parts of the work, the installation shall be tested by the constituted authorities and approved; and, on completion of the work, the Contractor shall obtain and deliver to the Owner, final certificates of acceptance. The Contractor shall furnish copies of each certificate to the Architect/Engineer.

C. Underwriter's Laboratories (UL): All materials, appliances, equipment, or devices shall conform to the applicable standards of Underwriter's Laboratories, Inc. where such standards have been established.

D. Standards: The current edition of the following specifications and standards shall form a part of these specifications:

1. National Fire Protection Association Standards

2. National Electrical Code, NFPA 70 (NEC)

3. Life Safety Code, NFPA 101

4. NFPA 72

5. Occupational Safety and Health Act (OSHA)

6. National Electrical Safety Code (NESC)

7. Underwriter's Laboratories, Inc. (Standards)

8. American National Standards Institute (ANSI)

9. American Society of Testing and Materials (ASTM)

10. Institute of Electrical and Electronic Engineers (IEEE)

11. Insulated Cable Engineer's Association (ICEA)

12. National Electrical Manufacturer's Association (NEMA)

13. Americans with disabilities Act Accessibility Guidelines (ADA)

1.3 DRAWINGS

A. The electrical drawings show the general arrangement of all conduit, outlets, equipment, etc. and shall be followed as closely as actual building construction and the work of other trades will permit. The architectural and structural drawings shall be considered as a part of the work insofar as these drawings furnish the Contractor with information relating to the design and construction of the building. Architectural drawings shall take precedence over electrical drawings. Because of the small scale of the electrical drawings, it is not possible to indicate all offsets, fittings and accessories which may be required. The Contractor shall investigate the structural and finish conditions affecting the work and shall arrange his work accordingly, providing such fittings, elbow, pullboxes, and accessories as may be required to meet such conditions.

B. The Contractor shall verify the dimensions governing the electrical work at the building. No extra compensation shall be claimed or allowed because of differences between actual dimensions and those indicated on the drawings.

C. Drawings and specifications shall be considered as complementary. Work or materials called for by one and not mentioned in other shall be provided as though treated by both.

D. In the case of conflict between drawings and specifications, the greater or more restrictive requirement shall apply.

E. Any question as to the intent of the drawings or specifications shall be referred to the Architect/Engineer, whose decision shall be final and conclusive.

F. Should the Contractor observe any conflict or variation in the plans and specifications, he shall notify the Architect/Engineer in writing no later than seven (7) days prior to date of bid opening. Failure to clarify such variations will result in the Contractor bearing all costs arising from electrical work necessary to resolve the conflict or variation.

1.4 SERVICES

A. General: Requirements of the serving power and telephone utilities and availability of services have been determined as accurately as possible. The Contractor shall verify availability of services and determine actual details pertaining to the exact locations and requirements of utilities before submitting bid. No consideration for extra cost will be given resulting from failure to comply

with these requirements by the Contractor. Contractor shall immediately notify the serving utilities that he has the job, and also furnish information as to the total lighting and power loads for the job. He shall also furnish, at the same time, information as to the established completion date of the job.

B. Telephone: Contractor shall immediately notify the serving utility of the estimated date when service will be desired.

1.5 AS-BUILT DRAWINGS

A. During progress of the work, the contractor shall maintain an accurate record of the installation of the system, locating each outlet, and note all circuiting deviations from the contract drawings. Upon completion of the installation, the contractor shall transfer all record data to a single neat and legible set of blue line prints of the original drawings.

1.6 OPERATING INSTRUCTIONS AND MANUALS

A. Instructions: Without additional charge to the Owner, furnish competent instruction to the Owner in the care, adjustment, and operation of all parts of the electrical equipment and systems.

B. Manuals: Upon completion of the work, prepare and deliver to the Owner two (2) sets of complete operating and maintenance manuals for the systems and major equipment installed, suitably bound in book form and must be originals. Include catalog data, shop drawings, wiring diagrams, performance curves and rating data, spare parts lists and manufacturer's operating and maintenance data.

C. Other: The above requirements are in addition to specific instructions and manuals specified for individual systems or equipment.

1.7 SITE VISIT

A. The Contractor shall visit the site prior to bidding and satisfy himself as to the conditions under which the systems are to be installed. No subsequent allowance shall be made in his behalf for failure to make such a visit.

1.8 FIELD MEASUREMENTS

A. The Contractor shall verify the dimensions covering the work. No extra compensation shall be claimed or allowed due to difference between actual dimensions and those indicated on the drawings. No waiver of responsibility for defective work shall be claimed or allowed due to failure to report unfavorable work conditions affecting the work.

1.9 PERFORMANCE TESTS

A. Thoroughly test all fixtures, batteries, services, and all circuits for proper operating condition, required durations and freedom from grounds and short circuits before acceptance is requested. All equipment, appliances and devices shall be operated under load conditions.

B. After the interior wiring system installation is complete and at such time as the Architect/Engineer may direct, conduct operating tests for approval. When requested, test all the wire, cable, devices, and equipment after installation, to assure that all material continues to possess all the original characteristics as required by governing codes and standards listed in these specifications.

C. After occupancy of the building has taken place and nominal building power loads established, make voltage readings at all panelboards. Based on these readings, make final adjustments of taps on all transformers in the building as directed.

D. Perform such other tests as required by other sections of these specifications or as requested to prove acceptability.

E. Furnish all instruments and labor for testing.

1.10 REMODELING WORK

A. Where remodeling work is indicated, the Contractor shall be responsible for all electrical work associated with changes in, or removals of existing walls, ceilings, or floors. This work shall include rerouting of conduits, relocation of fixtures, devices, and conduits as well as provision for circuit continuity for circuits in remodeled areas. The cost of all of this work shall be included in the Contractor's price with no additional compensation allowed for failure to include this work.

1.11 MISCELLANEOUS ITEMS

A. Miscellaneous items not covered in these specifications shall be as indicated on the drawings, installed, and connected in the proper manner and as recommended by the manufacturer.

1.12 GUARANTEE

A. All equipment and workmanship to be furnished under this contract shall be guaranteed for a period of one year from the date of final acceptance thereof against defective materials, design, and workmanship. Upon receipt of notice from the Owner of failure of any part of the guaranteed equipment during the guarantee period, the affected part or parts shall be replaced promptly with new parts by and at the expense of the Contractor. The labor incident to the installation of these replacements shall be furnished by the Contractor.

1.13 STANDARDS OF MATERIAL AND WORKMANSHIP

A. All material shall be new and shall bear the label of the Underwriter's Laboratories, Inc., or be listed under re-examination service. All material shall be of the best grade and latest pattern of manufacture as specified. All work shall be performed in a neat, workmanlike manner and shall present a neat mechanical appearance when completed.

PART 2 – PRODUCTS

2.1 EQUIPMENT REQUIREMENTS

A. The electrical requirements for equipment specified or indicated on the drawings are based on information available at the time of design. If equipment furnished for installation has electrical requirements other than indicated on the electrical drawings, the Contractor shall make all adjustments to wire and conduit size, controls, overcurrent protection and installation as required to accommodate the equipment supplied, without additional charge to the Owner. The complete responsibility and costs for such adjustments shall be assigned to the respective section of this specification under which the equipment is furnished.

2.2 MATERIALS

A. When the product of a specific manufacturer is indicated on the drawings or specified herein by catalog number or trade name, it has been done for convenience in fixing the standard for workmanship, finish, design, and the guaranteed performance. Any material, apparatus, or appliance which the Contractor desires to substitute for those mentioned herein shall also conform to these standards or exceed them and shall follow the procedure as outlined under substitutions and specified herein.

B. All similar materials and equipment shall be the product of the same manufacturer.

C. Where no specific material, apparatus or appliance is mentioned, any first-class product made by a reputable manufacturer may be used, providing it conforms to the contract requirements and meets the approval of the Architect/Engineer.

D. Materials and equipment shall be the standard products of manufacturers regularly engaged in the production of such material and shall be the manufacturer's current and standard design.

E. Altitude: Equipment affected by altitude shall perform satisfactorily for the function intended at the altitude of the project site.

2.3 NAMEPLATES

A. All items of mechanical and electrical equipment shall be identified by the attachment of engraved nameplates, constructed from laminated phenolic plastic, at least 1/16" thick, three-ply, black surface and white core. Plates shall be attached using stainless plate screws unless indicated otherwise. Nomenclature on the label shall include the name of the item and feeder circuit number. Equipment to be labeled shall include, but not be limited to, the following:

1. Air Conditioning Control

2. Contactors

3. Panels and Switches

4. Time Switches

5. Relays

6. Disconnect Switches

7. Starters

8. Transformers

9. Miscellaneous

10. Similar and/or related items

2.4 IDENTIFICATION AND SIGNS

A. Label each individual motor controller, disconnect switch, transformer, and remote-control device to identify each item and its respective service.

B. Provide nameplates with engraved lettering not less than 3/8 inch high where specified or noted. In general, use white core laminated plastic, attached with screws. Embossed plastic adhesive tape is not acceptable. Flush mounted devices may have identification engraved in the device plate.

C. Provide warning signs on all equipment or devices operating at 300 volts or more, reading "DANGER - 480 VOLTS" (insert respective voltage) etc., with white letters on red background of standard code size. Signs may be decals, stencils, or nameplates.

D. Identify panelboards and cabinets by nameplates with descriptions indicated on the drawings together with voltage and phase. Install on outside of hinged doors of panelboards and cabinets.

2.5 CHANGES

A. No changes shall be made in the electrical work as shown and herein specified, unless such changes are authorized in writing by the Architect/Engineer and such authorization shall contain a statement covering the amount of the charges involved in the change.

2.6 SUBSTITUTIONS

A. On all material, substitutions will be considered only if requested by letter from the Contractor to the Architect/Engineer. Letters must be in the engineer's office no later than 10 days prior to the bid date and shall be considered as authorized only upon written confirmation from the Architect/Engineer. Where materials are proposed to be substituted in lieu of the items specified, substitutions shall be equal in quality, workmanship, and design. The burden of proof of equality of materials shall be placed upon the Contractor. Samples of all materials proposed for substitution shall be submitted to the Architect/Engineer, when requested, for examination.

2.7 SHOP DRAWINGS

A. Shop drawings shall be furnished for all equipment and materials. They shall be furnished by the Contractor as required in the Submittal Section. Where equipment will be furnished "as specified," a statement to that effect is sufficient. Where substitutions are proposed, complete data must be furnished showing performance, quality, and dimensions.

B. The Contractor shall submit to the Architect/Engineer for checking a complete descriptive and technical data list for all items of material furnished under this contract. Complete outlines, dimensions, electrical services, control diagrams, electrical characteristics of special nature or critical to the installation and pertinent data required for installation shall be shown. Fixture submittals shall include scale drawings showing metal gauges and finish together with complete photometric distribution curves and coefficient of utilization tables. Glare factor curves shall also be submitted for each fixture. Failure to submit this information can be the basis for disapproval.

C. All descriptive and technical data and shop drawings shall bear signed certification that they have been carefully examined and found to be correct with respect to dimension, space available, non-interference with other trades and that the equipment complies with all the requirements of these specifications. Submittals that have not been checked for compliance will not be considered by the Engineer.

D. Only complete submittals will be considered, partial submittals will not be reviewed.

2.8 SUBMITTALS

A. Submittals shall be complete; bound booklets with an index of all items submitted including associated catalog/part numbers. The Contractor shall make submittals on all the following equipment (in addition to any special items indicated elsewhere in the plans or specifications):

1. Lighting Fixtures
2. Wiring devices
3. Conduit
4. Wire
5. Panelboards
6. Switchgear
7. Fuses
8. Metering equipment

9. Transformers

10. Starters

11. Contactors

12. Disconnect switches

13. Lamps

14. Dimming systems

15. Special Systems equipment (Fire Alarm, Intrusion Alarm, Sound, TV, Lightning Protection, etc.).

B. Electrical System Controls: Refer to Section 253000 for additional submittal requirements.

C. After receiving approval on the make and the type of materials, the Contractor shall order such materials in sufficient time to prevent any delay or changes on the job.

PART 3 – EXECUTION

3.1 GENERAL

A. Fabrication, erection and installation of the complete electrical system shall be done in a first class workmanlike manner by qualified personnel experienced in such work and shall proceed in an orderly manner so as not to hold up the progress of the project. The Contractor shall check all areas and surfaces where electrical equipment material is to be installed, removed, or relocated and report any unsatisfactory conditions before starting work. Commencement of work signifies the Contractor's acceptance of existing conditions. In the acceptance or rejection of the finished installation, no allowance will be made for lack of skill on the part of workmen.

3.2 EQUIPMENT

A. Equipment and materials furnished by the Contractor shall fit the spaces allocated for them. Should the equipment which the Contractor proposes to install, require space conditions other than indicated on the drawings, it shall be the Contractor's responsibility to reconcile the available space with the equipment and make any changes required to accommodate the equipment. All required changes shall be made at the Contractor's expense.

B. All equipment, both the Contractor and Owner furnished, shall be installed in accordance with the manufacturer's recommendations.

3.3 COORDINATION

A. The Electrical Plans are diagrammatic but shall be followed as closely as actual construction and the work of other trades will allow. Such minor changes as are necessary to make the electrical work conform to the work of other trades and to the building shall be made without cost to the Owner.

3.4 CIRCUITS AND FEEDERS

A. Circuits and feeders shall be as shown and no deviations from the indicated outlet-circuit grouping will be permitted, except by permission of the Architect/Engineer. Branch circuit numbers are mandatory and shall be changed only on written permission from the Architect/Engineer. Any changes in layout or circuit numbering shall be accurately recorded on the "As-Built" drawings.

3.5 CONDUITS

A. In all spaces, such as ceiling spaces and equipment rooms, all conduits shall be run to a continuous grade and square to the building.

B. The plans do not give exact details as to the elevations of conduits, exact locations, etc., and do not show all off-sets, bends, junction boxes and other installation details. The Contractor shall carefully lay out his work at the site to conform to details of installation.

3.6 LOCATION OF EQUIPMENT AND OUTLETS

A. The approximate locations of cabinets, panelboards, wiring gutters, switches, light outlets, power outlets, etc., are indicated on the drawings; however, they are not intended to give complete and exact information. Determine the exact location after thoroughly examining the general building plans and by actual measurements during construction, subject to the approval of the Architect/Engineer.

B. Verify with Architect/Engineer, prior to installation, all locations of conduit, boxes, etc. stubbed or in the floor.

3.7 PROTECTION OF MATERIALS AND EQUIPMENT

A. The Contractor shall be responsible for the protection of all materials and equipment under this section of the work whether incorporated into the building or not.

B. The Contractor shall provide protection for all work where necessary and will be responsible for all damage done to property during the construction. The above protection shall be maintained while the work is in progress. In no case shall dirt, grit, etc., be ground into the floor finish or coverings.

C. The Contractor shall provide space for storage of materials and equipment at ground level.

3.8 CUTTING AND REPAIRING

A. Cutting and repairing shall be the responsibility of the Contractor. Coordinate to prevent unnecessary cutting and repairing. Lay out and locate equipment, openings, and chases. Install sleeves, inserts, and supports.

3.9 EXCAVATION AND BACKFILLING

A. The Contractor shall do all necessary excavation and backfill for the installation of the systems as may be required. Curb cuts, asphalt, and concrete patching, etc., shall be part of the Contractor's responsibility. Any required trenching will be done by hand and all existing utilities avoided. Damage done to existing utilities will be repaired by the Contractor with no additional payment for the work. In addition to the above, trenches shall be backfilled with dirt, free from debris, rocks, and other foreign matter. Backfill shall be replaced in the trenches in 6" layers and each 6" layer shall be wetted down adequately and properly tamped. Remove surplus dirt and leave premises clean. Perform excavation, backfilling and repaving required for work under this Division in accordance with DIVISION 2, SITE CONSTRUCTION. In general, backfill and tamp with compaction at least equal to that of the surrounding area.

3.10 WARRANTY

A. Deliver originals of all guarantees and warranties on this portion of the work to Owner. Warrant all equipment, materials, and workmanship for one year in accordance with the terms of this Contract.

3.11 PRODUCT HANDLING

A. Use all means necessary to protect electrical materials and equipment before, during and after installation and to protect the installed work of other trades. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Owner and at no extra cost to him.

END OF SECTION 260500

SJC EXTENSION OFFICE

SECTION 260519

LOW VOLTAGE CONDUCTORS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including General and Special Conditions and the General Requirements, apply to the work specified in this section.

1.2 DESCRIPTION OF WORK

A. Furnish and install all conductors as required for the complete installation and operation of all electrically serviced and/or operated equipment, devices, and systems throughout the project.

1.3 RELATED WORK IN OTHER SECTIONS

A. Conduit, feeders, wiring devices and plates, equipment connections, panelboards, transformers, lighting equipment and lamps.

PART 2 – PRODUCTS

2.1 WIRES AND CABLES (600 VOLTS)

A. Type: Conform to the applicable UL and ICEA Standards for the use intended. Copper conductors with 600-volt insulation unless otherwise specified or noted on the drawings. Stranded conductors for No. 6 and larger except where elsewhere specified or noted on the drawings.

B. Use of aluminum conductors will not be permitted.

C. Insulation: Type THWN, 75 degrees C. insulation unless otherwise specified or noted on the drawings. 90 degrees C. minimum insulation within fixture wireways of fluorescent fixtures. Where 90-degree C. insulation is specified, the termination points for this conductor shall be rated for 90 degrees C.

D. Size: No. 12 minimum unless otherwise specified or noted on the drawings. In the case of "homeruns", no conductor smaller than #10 shall be used for runs over 100 feet in length on 120-volt circuits. Not less than NEC requirements for the system to be installed. If the equipment to be installed requires larger conductor and conduit sizes than indicated on the drawings, the required changes shall be made without additional charge. Remote control wires, other than Class 2 remote control and signal circuits, shall be no smaller than #14.

E. Color Coding: Phase, neutral and equipment ground conductors color-coded. Connect all conductors of the same color to the same phase conductor. Color coding shall be A-black, B-red, C-blue, N-white, for 250 volts or less. A-yellow, B-orange, C-brown, N-off white or grey, for 251-600 volts, with green for all equipment ground conductors. Conductors No. 12 and 10 shall be solid color

compounded for the entire length. Conductor sizes larger than No. 10 may be color coded at each termination and in each box or enclosure with six inches of half-lapped 3/4-inch pressure sensitive, plastic tape of respective colors in lieu of solid color compound. The equipment grounding conductor shall be bonded to the outlet box grounding screw with taps to receptacles and equipment. Isolated ground conductors shall be green in color with a yellow trace.

2.2 CONTROL CONDUCTORS

A. Copper, minimum size No. 14 with 19/35 stranding, color coded filled cross linked polyethylene 75-degree C. 600-volt insulation and neoprene or equal outer jacket. Multi conductor control cables shall be provided where more than three control conductors are installed in the same conduit between common terminations. Provide two spare conductors minimum in each control cable.

2.3 DATA/COMMUNICATION AND ELECTRONIC CABLE

A. As required or specified in the section of these specifications specifying the equipment. Splices shall be twisted and soldered or shall use an approved connector.

B. All Cat. 3 and Cat 5 cabling shall be tested in accordance with EIA/TIA performance standards. Refer to 16740 for more detailed information.

2.4 VERTICAL CABLE SUPPORTS

A. Split wedge type supports which clamp each individual conductor and tightens due to weight of the cable shall be used for cables without metallic sheath. Basket weave type supports shall be used for cables with metallic sheath.

2.5 CONNECTORS AND LUGS

A. For Copper Conductors No. 6 and Smaller: 3M Scotch-Lok or T & B Sta-Kon compression or indent type connectors with integral or separate insulating caps.

B. For Copper Conductors Larger Than No. 6: Solderless, indent, hex screw, or bolt type pressure connectors, properly taped or insulated.

2.6 TAPE

A. Plastic tape, 8.5 mils minimum thickness, 1,000,000 megohms minimum insulation resistance, oil resistant vinyl backing, oil resistant acrylic adhesive, incapable of supporting combustion per ASTM D-568 Test Method B.

PART 3 – EXECUTION

3.1 CONDUIT SYSTEMS

A. A complete system of conductors shall be installed in the raceway systems. Control wires shall be run in separate conduits from conductors of other systems. All conductors of all systems shall be installed in raceway or conduit.

B. Lighting fixtures shall not be used as raceways for circuits other than parallel wiring of fixtures. Wiring in fixtures shall be rated for that purpose.

C. When leaving a metal raceway or conduit in a cabinet, box, switch, enclosure, control enclosure or any other like member, conductors shall be protected by means of insulated bushings or end fittings. These protectors shall be "O.Z." type or similar.

D. Conductors may be run in multiple sizes #1/0 to 500 kcmil inclusive provided all multiple conductors are the same size, length, and type of insulation. Multiple runs are to be in separate conduits. Each conduit to include one set of phase conductors, neutral and grounding conductors. All to conform to NEC 300-20.

E. No splices or taps shall be made in any conductors except in outlet boxes, pull boxes, junction boxes, panelboard boxes, manholes or splice boxes. All taps and splices shall be made with solderless connectors and insulated in such a manner that provides an effective insulation equal to that of the adjoining wire. Any splice or tap shall be made only on conductors which are a component part of a single circuit properly protected by approved methods.

F. Before any wire is pulled into any conduit, the conduit shall be thoroughly swabbed in such a manner as to remove all foreign material and to permit the wire itself to be pulled in a clean, dry conduit. The Contractor shall use only approved wire pulling lubricants for pulling any wire. All conductors shall be pulled into their respective conduits by hand, except where written permission of the Engineer is secured to the contrary.

3.2 WIRE AND CABLE TESTS (600 Volts)

A. Measure the insulating resistance of service entrance conductors, feeder circuit conductors and service ground. Measurements shall be taken between conductors and between conductors and ground. Resistance shall be 1,000,000 ohms or more when tested at 500 volts by megger without branch circuit loads. Tests and procedures shall meet the approval of the Architect/Engineer and shall be in accordance with the applicable IPCEA standards for the wires and cables to be installed. Furnish all instruments, equipment and personnel required for testing and conduct tests in the presence of the Architect/Engineer. Submit written reports of the tests and results when requested.

3.3 PULL WIRES

A. In each empty conduit, except underground conduits, install a No.14 galvanized steel pull wire or a plastic line having a tensile strength of not less than 200 pounds. In each empty underground conduit, install a No. 10 AWG bare, hard drawn copper or copper clad pull wire or a plastic line having a tensile strength of no less than 200 pounds.

3.4 IN RACEWAYS

A. Install conductors in rigid conduit, EMT or flexible metallic conduit, unless otherwise specified or noted on the drawings.

3.5 CABLE BENDS

A. Radius of bends not less than 10 times the outer diameter of the cable.

3.6 BUNDLING

A. In cabinets conductors No. 10 and smaller shall be neatly and securely bundled and conductors larger than No. 10 shall be neatly and securely cabled in individual circuits, utilizing marlin twine, two ply lacing or nylon straps.

3.7 CONDUCTOR PULL

A. Conductors shall not be pulled into conduits until after all plastering or concrete work is completed and all conduits in which moisture has collected have been swabbed out.

3.8 FEEDER IDENTIFICATION

A. Tag feeder circuits in each enclosure with wrap around circuit designation labels where more than one feeder passes through or terminates in the enclosure.

3.9 CONNECTORS AND LUGS

A. Install with manufacturer's recommended tools and with the type and quantity of deformations recommended by manufacturer.

B. Contractor shall review one-line and other Drawings to assure that proper lugs are provided in termination equipment such as switches, panels, switchboards, mechanical equipment, etc. Due to voltage drop conductor sizes and/or numbers may not be accommodated by the equipment affected. If manufacturer cannot provide the proper number and size of lugs within their equipment the Contractor shall provide enclosures and properly sized terminals to convert the oversized cable, number and size that is compatible to the equipment affected.

END OF SECTION 260519

SJC EXTENSION OFFICE

SECTION 260526

GROUNDING

PART 1 – GENERAL

1.1 RELATED WORK IN OTHER SECTIONS

260500	GENERAL PROVISIONS
260519	LOW VOLTAGE CONDUCTORS
260533	RACEWAYS, BOXES, AND FITTINGS
262416	PANELBOARDS
262716	CABINETS
262726	WIRING DEVICES AND PLATES
262800	MOTOR AND CIRCUIT DISCONNECTS

PART 2 – PRODUCTS

2.1 MATERIALS

A. Materials, equipment, and devices related to the grounding system are specified under other sections of these specifications.

PART 3 – EXECUTION

3.1 GENERAL

A. Install two separate grounding systems, a service grounding system and an equipment grounding system. The service equipment, conduit systems, supports, cabinets, equipment, and neutral conductor shall be grounded in accordance with the minimum code requirements and as further indicated on the drawings or specified. Connect the two grounding systems together only at the main service equipment and at the secondary terminals of transformers creating separately derived distribution systems such as dry-type transformers.

3.2 SERVICE GROUNDING SYSTEM

A. General: The service grounding system is provided for the AC service neutral ground. Current return conductors, such as neutrals of the service entrance, feeder circuits and branch circuits, shall not be used for equipment grounding. Care must be exercised to ensure that neutral bars are not bonded to the enclosures of panelboards, etc., which are not part of the main service equipment. Except for separately derived systems, the neutral conductors shall be grounded only in the main service equipment.

B. Common Ground Point: Establish one common ground point in the main service equipment by interconnecting the insulated neutral bus (or bar), the uninsulated equipment ground bus (or bar), and service grounding electrode conductor.

C. Neutral Disconnecting Means: Install a neutral disconnecting means in the main service equipment for disconnecting and isolating the neutral bus from the

common ground. The disconnecting means may be disconnecting links in the interconnection between the insulated neutral and uninsulated equipment ground.

D. Neutral Bars: Provide an insulated neutral bar, separate from the uninsulated equipment ground bar, in all panelboards, transformers, starters, disconnect switches, cabinets, etc. which have neutral connections.

3.3 EQUIPMENT GROUNDING SYSTEM

A. General: Provide a complete equipment grounding system in accordance with the minimum code requirements and as further indicated on the drawings or specified. The equipment ground (green conductor) consists of metallic connections to ground of non-current carrying metal parts of the wiring system or apparatus connected to the system. The primary purpose of equipment grounding is to provide greater safety by limiting the electrical potential between non-current carrying parts of the system and to provide a low impedance path to ground for possible ground fault currents.

B. Common Ground Point: Establish one common ground point as specified elsewhere in this section of the specifications for interconnection of the equipment grounding system and the service grounding electrode conductor.

C. Service Equipment Enclosure: Bond the enclosure of the main service equipment to the uninsulated equipment ground bus (or bar) with a conductor or bar sized for 25% of the largest service overcurrent device.

D. Ground Bar: Provide an uninsulated equipment ground bar, separate from any insulated neutral bar, in all switchboards, panelboards, transformers, motor control centers, starters, disconnect switches, cabinets, etc. for grounding the enclosure and for connecting other equipment ground conductors. The ground bar shall be an integrally mounted and braced bus bar in switchboards or a separately mounted bar adequately braced or bolted to the enclosure of other types of equipment. The ground bar shall be adequately braced or bolted to the enclosure after thoroughly cleaning both surfaces to assure good contact. Provide solderless pressure connectors for all conductor terminations. Number and size of pressure connectors on equipment grounding bars as required for the termination of equipment grounding conductors. In addition to the active circuits, provide pressure connectors for all three-phase spares and spaces.

E. Conduits: Where metallic conduits terminate without mechanical connection to a metallic housing of electrical equipment by means of lock nut and bushings, provide ground bushing connected with a bare copper conductor to the ground bar in the electrical equipment. Metallic conduits containing ground wiring only shall be bonded to the ground wire at both conduit entrance and exit. Install grounding conductor in each nonmetallic conduit or duct except those used for telephone, sound, or low-voltage signals and in all flexible conduit that does not have a built-in ground conductor. Bond the conductor at both ends to the equipment grounding system.

F. Feeders and Branch Circuits: Provide a separate green insulated equipment grounding conductor for each single or three-phase feeder and each branch circuit with a three-phase protective device. Provide a separate green insulated equipment grounding conductor for single phase branch circuits unless otherwise indicated. Install the required grounding conductor in the common conduit or raceway with the related phase and/or neutral conductors and connect to the box or cabinet grounding terminal. Where there are parallel feeders installed in more than one raceway each raceway shall have a green insulated equipment ground conductor.

G. Devices: Install a minimum No. 12 green insulated equipment bonding conductor from a grounding terminal in the respective outlet or junction box to the green ground terminal of all receptacles and through flexible conduit to all light fixture housings.

H. Motors: Install a separate green insulated equipment grounding conductor from the equipment ground bar in the motor control center of separate starter through the conduit and flexible conduit to the ground terminal in the connection box mounted on the motor. Install the grounding conductor in the common conduit or raceway with the related motor circuit conductors.

3.4 SEPARATELY DERIVED SYSTEMS

A. Transformers creating separately derived distribution systems, such as dry-type transformers, shall utilize the equipment ground bars in the transformer enclosure for both secondary equipment ground and secondary neutral ground with separate grounding conductor extended to an approved ground electrode.

3.5 GROUNDING ELECTRODE SYSTEM

A. A minimum of two service ground electrodes shall be utilized. One shall be the main cold water metallic water piping system and the other shall be a made electrode consisting of not less than twenty feet of bare copper conductor encased along the bottom of a concrete foundation footing which is in direct contact with the earth (NEC 250-81c). Make the connections to the cold-water pipe inside the building at the point of entrance. Other grounding electrodes (building steel, ground counterpoise, etc.) shall be bonded to the grounding electrode system where utilized. The grounding electrode for separately derived systems shall be approved for the application.

3.6 GROUNDING CONDUCTORS

A. The grounding electrode conductors for the service grounding electrode system shall be insulated or bare copper, sized in accordance with NEC 250-94 (a), including the conductor for the supplemental electrodes. The conductors shall be continuous without joint or splice and shall be installed in conduit with the conduit bonded to the conductor at each end. Install the conductor to permit the shortest and most direct path and terminate in the main service equipment on the common ground point. Equipment grounding conductors shall be green insulated conductors equivalent to the insulation on the associated phase conductor, but not less than Type TW. The equipment grounding conductor or straps shall be

sized in accordance with NEC. Where one feeder serves a series of panelboards or transformers, the equipment grounding conductor shall be continuous without splices. Grounding conductors shall not be installed through metal-sheathed holes. All connections shall be available for inspection and maintenance.

3.7 GROUND CONNECTIONS

A. Clean surfaces thoroughly before applying ground lugs or clamps. If surface is coated the coating must be removed down to the bare metal. After the coating has been removed apply a non-corrosive approved compound to cleaned surface and install lugs or clamps. Where galvanizing is removed from metal it shall be painted or touched up with "Galvanox", or equal.

B. All grounding connections to bare stranded wire, ground rods, etc. shall be BURNDY HY-GROUND™ or approved equivalent or approved exothermic connection method. All connectors shall meet the requirements of IEEE STD 837 (Latest Revision), "IEEE Standard for Qualifying Permanent Connections Used in Substation Grounding". All connectors must be listed by Underwriters Laboratories for direct burial in earth or embedment in concrete applications according to ANSI/UL-467 (latest revision), "Standard for Grounding and Bonding Equipment." Connectors must be suitable for lightning protection applications. Listing to UL-96 "Lightning Protection Components" preferred on applicable items.

3.8 TESTS

A. Test the completed grounding system with a megger at the service ground bar and submit a written report to the Architect/Engineer for approval. The service shall not be energized if the test shows more than 5 ohms, unless approved by the Architect/Engineer.

END OF SECTION 260526

SJC EXTENSION OFFICE

SECTION 260533

RACEWAYS, BOXES, AND FITTINGS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including General and Special Conditions and the General Requirements, apply to the work specified in this section.

1.2 DESCRIPTION OF WORK

A. Furnish and install complete conduit systems for the various electrical systems required for this project. Systems shall be complete with supports, mounting devices, pull boxes, etc., as required for installation of wiring systems and terminal devices.

1.3 RELATED WORK IN OTHER SECTIONS

A. Site work, wiring devices and plates, feeders, panelboards, lighting equipment and lamps, telephone system, transformers, and services.

PART 2 – PRODUCTS

2.1 CONDUITS

A. Steel Conduit: Rigid, threaded, thick wall, hot dipped galvanized.

B. Electrical Metallic Tubing (EMT): Mild steel, zinc coated on the outside and either zinc coated or coated with an approved corrosion resistant coating on the inside. Maximum size 2-inch electrical trade size unless noted on the drawings or specifically approved.

C. Intermediate Metal Conduit (IMC): Rigid, threaded, lightweight steel, zinc-coated on the outside and either zinc-coated or coated with an approved corrosion resistant coating on the inside.

D. Flexible Conduit: Commercial "Greenfield," galvanized steel, with a separate grounding bond wire installed in the conduit in addition to other wires.

E. Liquid Tight Flexible Conduit: Flexible galvanized steel tubing with extruded liquid tight PVC outer jacket and a continuous copper bonding conductor wound spirally between the convolutions. Where a separate grounding conductor is installed in the conduit, bonding conductor in the convolutions may be omitted.

F. Plastic coated rigid steel conduit shall be hot dipped galvanized steel conduit with a coating of polyvinyl chloride, minimum 15 mills (0.015), on the exterior surfaces, shall have an approved corrosion resistant coat inside. To be Pittsburgh, J & L, Republic or approved equal.

G. Rigid Non-Metallic Conduit: Schedule 40, high impact PVC with 7,000 psi tensile strength at 73.4 degrees F., 11,000 psi flexural strength, 8,600 psi compression strength, approved for 90 degrees C. conductors. Carlon, triangle, or approved equal. PVC conduits shall include a ground wire sized as noted or as required by NEC (whichever is larger). No bends shall be made in PVC. Rigid galvanized steel conduit shall be utilized for all elbows, risers, and bends.

H. Aluminum Conduit: Shall not be used unless specifically indicated on the drawings for specialized purposes.

I. Conduit Size: Minimum conduit size, 1/2 inch except where specifically approved for equipment connections. Sizes not noted on drawings shall be as required by the NEC. All homeruns to panels shall be 3/4 inch minimum. Conduits for #12 THWN wire shall be sized the same as for #12 THW wire.

2.2 CONDUIT FITTINGS

A. Connectors and Couplings: Compression type threadless fittings for rigid steel conduit or IMC not permitted. EMT couplings and connectors either steel or malleable iron only, "Concrete Tight" or "Raintight" and either the gland and ring compression type or the stainless steel multiple point locking type. Connectors to have insulated throats. EMT fittings using set screws or indentations as a means of attachment are not permitted.

B. All conduits shall terminate in bushings or connectors which are insulated type, designed to prevent abrasion of wires without impairing the continuity of the conduit grounding system.

C. Rigid Steel Conduit, IMC and EMT Fittings: Iron or steel only.

D. Liquid Tight Flexible Conduit Fittings: With threaded grounding cone, a steel, nylon or equal plastic compression ring and a gland for tightening. Either steel or malleable iron only with insulated throats and male thread and locknut or male bushing with or without "O" ring seat. Each connector shall provide a low resistance ground connection between the flexible conduit and the outlet box, conduit, or other equipment to which it is connected.

E. Rigid Aluminum Conduit Fittings: Malleable iron, steel, or aluminum alloy. Ferrous fittings zinc coated or cadmium plated. Aluminum alloy fittings shall conform with the characteristics defined by UL for aluminum rigid metallic conduit and shall not contain more than 0.04 percent copper.

F. Flexible Conduit Fittings (Commercial Greenfield): Either steel or malleable iron only, with insulated throats and shall be one of the following types:

1. Wedge and screw type with angular wedge fitting between the convolutions of the conduit.

2. Squeeze or clamp type with bearing surface contoured to wrap around the conduit and clamped by one or more screws.

3. Steel, multiple point type, for threading into internal wall of the conduit convolutions.

G. Expansion Fittings: Each conduit that is buried in or rigidly secured to the building construction on opposite sides of a building expansion joint and each long run of exposed conduit that may be subject to excessive stresses shall be provided with an expansion fitting. Expansion fittings shall be hot dipped galvanized malleable iron with factory installed packing and a grounding ring.

H. Sealing Fittings: Threaded, zinc or cadmium plated, cast or malleable iron type for steel conduits and threaded cast aluminum type for aluminum conduits. Fittings used to prevent passage of water vapor shall be of the continuous drain type.

I. Fittings for PVC Coated Rigid Steel Conduit: Ells and couplings used with PVC coated rigid steel conduit shall have a factory applied coating of polyvinyl chloride, minimum 15 mills (0.015) on exterior surfaces and shall have a PVC sleeve extruded a minimum of 2" from one end of the fitting.

2.3 WIREWAYS

A. Square-D Company Square-Duct "lay-in" type without knockouts with lengths and fittings hinged to provide an unobstructed wireway to "lay-in" conductors. Use standard lengths. Field cuts permitted where absolutely necessary. Rust inhibiting phosphatizing coating on sheet metal parts. Blue gray baked enamel finish. Hardware plated to prevent corrosion. Provide all accessories, including tee fittings, junction boxes, cross fittings, transposition section, gusset brackets, nipples, pull boxes, reducer fittings, wall flanges, panel or cabinet flanges, elbows, ceiling, and wall support brackets and supporting hardware, etc.

2.4 OUTLET BOXES

A. Construction: Zinc coated or cadmium plated steel boxes of a class to satisfy the condition at each outlet except where unilet or condulet bodies are required. Knockout type with knockouts removed only where necessary to accommodate the conduit entering. Square cornered, straight sided gang boxes, 4-inch octagon concrete rings and 4-inch octagon hung ceiling boxes with bars may be folded type. One piece deep drawn type for all other boxes.

B. Size: To accommodate the required number and sizes of conduits, wires, and splices in accordance with NEC requirements, but not smaller than size shown or specified. Standard concrete type boxes not to exceed 6 inches deep except where necessary to permit entrance of conduits into side of boxes without interference with reinforcing bars. Special purpose boxes shall be sized for the device or application indicated.

C. Fixture Studs: 3/8-inch malleable iron fixture stud in outlet boxes for ceiling lighting fixtures and interior bracket lighting fixtures, other than lamp receptacles and drop cords.

D. Exposed: Screw joint type, with gasketed weatherproof covers in locations exposed to the weather. Shall be of the continuous drain type. Where required to be "Raintite."

E. Tile Boxes: Rectangular in shape with square corners and straight sides for receptacles and switches mounted in furniture cabinets or in glazed tile, concrete block, marble, brick, stone, or wood walls. Install without plaster rings.

F. Wall Mounted Switch, Receptacle and Signal Boxes: Unless otherwise noted or specified, not less than 4 inches square by 1-1/2 inches deep for single devices, 4-11/16 inches by 1-1/2 inches deep for two devices and multi gang boxes for more than two devices. Boxes for switches and receptacles on unfinished walls may be screw joint type with covers to fit the devices. Provide plaster rings, as required, to provide proper opening for device.

G. Wall Mounted Telephone Outlet Boxes: 4-11/16 inches square by 2-1/8 inches deep, unless otherwise noted on the drawings.

H. Light Fixture Boxes: 4-inch diameter by 1.5-inch-deep minimum for ceiling and interior bracket fixtures with concealed conduits. Plaster covers for bracket fixtures to have 3-inch diameter openings. Screw joint boxes with canopy seat for ceiling and interior bracket fixtures with exposed conduits.

I. Grounding Terminal: Provide a grounding terminal in each box with circuits serving motor driven equipment or receptacles for grounding to a green equipment ground conductor. Grounding terminal shall be green colored washer-in-head machine screw.

2.5 PULLBOXES

A. Minimum NEC requirements unless larger box is noted. As specified for outlet boxes with blank cover for pullboxes with internal volume not more than 150 cubic inches. As specified for cabinets for pullboxes with internal volume over 150 cubic inches, except covers to have same thickness as box with corrosion resistant screw or bolt attachment.

2.6 FLOOR BOXES

A. Heavy duty, cast, adjustable type, suitable for the device or application indicated, unless noted. Provide carpet flanges in carpet areas.

PART 3 – EXECUTION

3.1 CONDUIT INSTALLATION

A. Conduit Systems: Conduit shall be provided for all wiring circuits. Material shall be exposed or concealed as required by the Drawings. Rigid Steel conduit, IMC, EMT or Rigid Non-Metallic conduit unless noted. Install rigid steel conduits for underground runs, when specifically noted on the drawings, runs in concrete, feeder circuits and where required by the NEC for mechanical protection, etc. Use flexible conduit only for equipment connections and then only to the extent of

minimum lengths required for connections (Typically 1'-0", maximum length 4'-0"). Install flexible conduit connections at all resilient mounted equipment. Provide liquid tight flexible conduit in exterior, wet or damp locations and for connections to all motors, dry type transformers and wet pipe mechanical systems. Aluminum conduit may be used only if specifically called for. Conduit and tubing shall be kept at least 6 inches from parallel runs of hot water or steam pipes. PVC conduit may be used only for runs below grade or in slab. Concrete encasement is required under all paved areas. Rigid steel, galvanized elbows shall be used for all bends and risers. No PVC shall be extended above grade or slab. Ground wires, sized in accordance with NEC, shall be installed in all conduit runs, except where used for telephone conductors.

B. Conduit Installation: Install concealed conduit and EMT in as direct lines as possible. Install exposed conduits and EMT parallel to or at right angles to the lines of the building. Right angle bends in exposed conduit and EMT runs shall be made with standard elbows, screw jointed conduit fittings or conduit bent to radii no less than those of standard elbows. Exposed conduits below the five (5) foot level shall be galvanized rigid conduit.

C. Concealed Conduits: Install conduit systems concealed where possible unless otherwise noted. Conduit systems may be exposed in unfinished utility areas, ceiling cavities and where specifically approved by the Engineer. No conduit shall be run on roof or exposed face of building unless specifically shown on plans or approved by Engineer.

D. Conduit in Concrete: Conduits shall not be installed in floor slabs poured on grade. Conduits under slab shall be installed a minimum 6" below slab, covered with earth. PVC coated rigid steel conduit may be embedded in above grade concrete providing the outside diameter does not exceed 1/3 thickness of concrete slab, wall, or beam, is located entirely within the center third of the member and lateral spacing of conduit is not less than 3 diameters.

E. Conduit in Ground: PVC schedule 40 non-metallic conduit may be utilized for all underground runs unless noted otherwise on the drawings. Installation and use of PVC shall comply with Article 347 of NEC. All conduit sizes, shown on the plans, shall be increased to accommodate the installation of the equipment grounding conductor. All joints shall be made with solvent cement per manufacturer's recommendations and shall be watertight. Plastic conduit runs stubbing up to above grade junction boxes or conduit runs shall be converted to PVC plastoid coated rigid steel conduit by installing a female adapter, 90-degree PVC coated rigid steel elbow and a PVC coated rigid steel nipple of length as required to stub conduit up. No plastic conduit shall be installed above grade. Plastic conduit shall be used for straight runs only. PVC coated rigid steel conduit shall be used for all bends, ells, and offsets. Where rigid galvanized steel conduit is in contact with dirt, soil, fill or earth, conduits shall be field wrapped with one layer of 3M Scotch 50 plastic tape with a 50% overlap, including all joints or couplings, or shall be coated with a bonded, 20 mil minimum thickness PVC, permanently fused at the factory, Pittsburgh Standard Co. "PlastiBond," or approved equal. All fittings, couplings, ells, etc., used with PVC coated conduit shall have same factory applied PVC coating. An equipment grounding

conductor, in accordance with NEC, shall be installed in all conduits. Minimum burial depth of conduits or ducts shall be as follows:

Power: Primary (above 600v.), 42"
Secondary (below 600v.), 36"
Telephone: 24"

F. Conduit Bends: In any conduit or EMT run, the number of quarter bends or equivalent between termination's at cabinets or boxes shall not exceed four bends. Conduit runs between cabinets or boxes shall not exceed 200 feet for straight runs nor 100 feet for runs with maximum number of bends. Bends in telephone and data conduits shall be long sweeping bends.

G. Conduit Openings: Protect all vertical runs of conduits or EMT terminating in the bottoms of boxes or cabinets, etc., from the entrance of foreign material prior to installation of conductors.

H. Roof Penetrations: All roof penetrations shall be sealed as called for in the architectural plans and specifications.

I. Pull Cords: The Contractor shall furnish and install a full length, 3/32" nylon pull cord in every "empty" conduit installed hereunder to facilitate the future installation of wires. Identify each terminus of pull wire with linen tags with complete information as to service and location of the terminus of the cord.

J. Sealing Fittings: Install where required by the NEC, where conduits pass from warm to cold locations and where otherwise indicated.

K. Sleeves for Conduit: Install sleeves for conduit where shown or as required. Conduit sleeves not used shall be plugged with recessed type plugs. Sleeve all conduit passing through walls. Sleeves that are used shall be caulked tight with lead yarn.

L. Identification: Identify all exposed raceways according to the system carried. Identify exposed conduits 3/4 inch or larger in diameter by means of painted-on stencils, and conduits less than 3/4 inch in diameter with enameled-on metal tags. Provide legible lettering in contrasting colors. Abbreviate only when approved. Identification shall be placed at maximum intervals of twenty feet on straight conduit runs, close to all terminations, adjacent to all change in directions and where conduits pass through walls or floors. In general, use yellow color. Painting shall be in accordance with DIVISION 9 - FINISHES.

3.2 CONDUIT SUPPORTS

A. Supports: Provide supports for horizontal conduits and EMT not more than 8 feet apart with not less than two supports for each 10-foot straight length and one support near each elbow or bend including runs above suspended ceilings and within 3 feet of all junction boxes, switches, fittings, etc.

B. Straps: Install one-hole pipe straps on conduits 1.5 inch or smaller. Install individual pipe hangers for conduits larger than 1.5 inch. Spring steel fasteners with hanger rods may be used in dry locations in lieu of pipe straps.

C. Trapezes: Install multiple (trapeze) pipe hangers where two or more horizontal conduits or EMT run parallel and at the same elevation. Secure each conduit or EMT to the horizontal hanger member by a U-bolt, one-hole strap or other specially designed and approved fastener.

D. Hanger Rods: Install 1/4-inch diameter or larger galvanized steel rods for trapezes, spring steel fasteners, clips, and clamps. Wire or perforated strapping shall not be used for the support of any conduit or EMT.

E. Fastening: Fasten pipe straps and hanger rods to concrete by means of inserts or expansion bolts to brickwork by means of expansion bolts and to hollow masonry by means of toggle bolts. Wooden plugs and shield shall not be used. Power driven fasteners may be used to attach pipe straps and hanger rods to concrete only where approved by the Engineer.

F. All conduits not embedded in concrete shall be firmly secured by means of pipe clamps, hangers, etc., equal to Caddy fasteners of ERICO Products, Inc. Wire wrapped around conduits and supporting members will not be accepted.

G. On Roof: All conduits laid on roof shall be supported on 4" redwood blocks, mopped into roof and spaced at 5'-0" on center.

H. Lay-in Ceiling: Conduits routed above acoustical "lay-in" ceilings shall be anchored to the building structure and not laid on the ceiling. Wire shall not be used to anchor boxes to structure. If ceiling support system is adequate, one 3/4" maximum conduit may be supported by a Caddy Clip to hanger wire. Multiple runs of conduit shall be racked on trapeze hanger. All support materials shall be rustproof. Perforated tape or soft iron wire shall not be used.

3.3 CONDUIT STUB-UPS

A. Conduits run under floor shall be stubbed up to a coupling set flush with floor. This excludes conduits stubbed up in walls and feeder conduits. Install flush plug until after floor is finished, then complete connections to boxes or equipment.

3.4 OUTLET BOXES

A. Outlet Boxes: Outlet boxes, covers and fittings, according to the particular use for which they are required, shall be provided in the locations marked on the drawings by symbols, and/or for use to facilitate the installation of the electrical systems. When necessary, outlets shall be relocated so that when fixtures of other fittings are installed, they will be symmetrically located according to the room layout and will not interfere with other work or equipment required by the drawings and/or specifications.

B. Installation: Unless otherwise specified or shown on the drawings, outlet boxes shall be flush mounted and the front edges of the boxes or plaster covers shall

be flush with the finished wall or ceiling line or if installed in walls and ceilings of incombustible construction, not more than 1/4 inch back of same. Mount boxes with the long axes of devices vertical, unless otherwise specified. Boxes in plastered walls and ceilings shall be provided with plastic covers. A multiple of box extensions and/or covers will not be permitted. Install in a rigid and satisfactory manner with suitable metal bar hangers, box cleats, adjustable box hangers, etc. Use wood screws on wood, expansion shields on masonry and machine screws on steel work.

C. Mounting Heights: The mounting height of a wall mounted outlet box shall be construed to mean the height from the finished floor to the horizontal center line of the cover plate. On exposed tile, block or brick construction, mount outlet boxes at the nearest bed joint to the mounting height indicated. Wall Mounted Switch, Receptacle and Signal Outlets: On columns, pilasters, etc., mount so the centers of the columns are clear for future installation of partitions. Install outlet boxes near doors or windows close to trim. Install outlet boxes near the doors on the lock sides (see architectural drawings for correct door swings).

D. Identification: Identify all exposed junction boxes according to the system carried by means of painted-on stencils or labels with legible letters and contrasting colors and without abbreviations. In general, use yellow color. Painting shall be in accordance with DIVISION 9 - FINISHES.

3.5 PULLBOXES

A. Provide additional pullboxes wherever necessary to meet requirements for maximum length of conduit runs and maximum numbers of bends.

3.6 FLOOR BOXES

A. Install level with top covers adjusted flush with finished floor or floor tile.

3.7 FIXTURE CONNECTIONS

A. Recessed or surface light fixtures in lay-in or accessible ceilings shall be connected with minimum 1/2-inch flexible metallic conduit, 4 to 6 feet long with grounding provisions.

3.8 CLOSING OF OPENINGS

A. Wherever slots, sleeves or other openings are provided in floors or walls for the passage of conduits or other forms of raceway, such openings, if unused, or the spaces left in such openings, shall be filled, or closed in an approved manner.

3.9 IDENTIFICATION

A. Refer to Section 260500 - General Electrical Provisions for identification requirements for raceways and boxes.

END OF SECTION 260533

SJC EXTENSION OFFICE

SECTION 262416

PANELBOARDS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including General and Special Conditions and the General Requirements, apply to the work specified in this section.

1.2 DESCRIPTION OF WORK

A. Furnish and install complete, all panelboards.

1.3 RELATED WORK IN OTHER SECTIONS

A. Cabinets; Motor & Circuit Disconnects; Fuses; Service and Distribution; Grounding; Conductors, Raceways, Boxes and Fittings.

1.4 SUBMITTALS

A. Submit complete shop drawings with outline dimensions, descriptive literature and complete descriptions of the frame size, trip setting, class, and interrupting rating of all overcurrent devices. Identify available spaces. Complete description of physical layout of panelboards showing conformance with drawings.

PART 2 – PRODUCTS

2.1 GENERAL

A. Dead front, safety type, with voltage and amperage ratings as scheduled. Panelboards shall be of the type required for the short circuit and duty ratings indicated on the drawings or specified. All panelboards shall have a neutral bus and an insulated ground bus. Panelboards shall be as manufactured by General Electric, Cutler-Hammer or Square D and shall be as scheduled.

2.2 CABINETS

A. Each panelboard shall be enclosed in a sheet metal cabinet with front doors, catches, locks, etc., as specified in Section 262716 - Cabinets.

B. Door-in-Door: Both surface and flush panels shall be door-in-door. The door over the interior of the panel shall be provided with hinges and combined lock and latch. The outside door over the panel gutters shall be provided with hinge(s) on one side and combined lock and latch. Machine screws into threaded holes in the panelboard cabinet, in lieu of combined lock and latch, to secure the outside door are not acceptable.

2.3 CIRCUIT BREAKER PANELBOARDS

A. Panelboard interiors shall be constructed on pre-drilled and tapped channel rails. Main busses shall be pre-drilled and tapped to accommodate any combination of circuit breaker units without further modification. All panelboards shall be complete with doors. Units shall be complete with combination latch and cylinder locks. All locks shall be keyed alike. All bussing shall be of the "sequence type". All connections shall be bolted.

B. Circuit breakers shall be molded case type (minimum 10,000-amp interrupting capacity, larger as required). All multi-pole breakers shall have a common trip and all breakers shall be interchangeable in any combination of poles with the same frame size. All branch circuit straps shall have the capacity of the maximum breaker size in the frame space (i.e., 100-amp strap for 100-amp frame). Minimum 100-amp straps will be accepted.

C. All main and branch breakers shall be of the size and have the interrupting rating scheduled on the Drawings. All incoming and outgoing terminals shall have solderless lugs. Provide, where required, lug landing to accommodate number and size conductors shown on the Power Riser. Panelboards shall be factory assembled.

D. Single pole circuit breakers shall be suitable for switching duty and marked "SWD".

E. Bolted Type: Circuit breaker current carrying connections to the bus shall be of the bolted type, factory assembled. Stab in type not permitted. Provide bus bars for three phase panelboards of the sequence phased type connection and arranged for 3 phase, 4 wire mains, unless otherwise indicated on the drawings.

F. Space Only: Where "space only" is noted on the drawings, provide necessary connectors, mounting brackets, etc., for the future insertion of an overcurrent device. Provide blank cover for each space.

G. Directories: Provide typewritten circuit descriptions referencing permanent room numbering assigned in lieu of the room numbering shown on the drawings.

H. Spare Conduit: Provide three spare 1" conduits for each panel. Extend empty conduit with pullwire into accessible ceiling space and stub-out for future use.

2.4 NAMEPLATE

A. Labels for identifying the breakers shall be engraved laminated plastic strips attached by screws (see "Nameplates" Specifications in Section 260500) or labels supplied by Panel Manufacturer.

B. Nameplates on Panelboards shall give voltage characteristics phase and number of wires. Example: Panel A, 120/208V, 3 phase, 4W.

C. Individual circuit breakers or switches, panelboards, disconnect means and motor starters shall have nameplate showing the load served.

D. Blank name plates shall be mounted on each "spare" unit or on "space" in distribution panels.

2.5 SKIRTS

A. Where noted on the drawings, panelboards shall be skirted with complete metal enclosures and barriers separating the panel interior.

2.6 BUS BARS

A. All bus bars shall be copper. Use of aluminum bus bars will not be permitted.

2.7 CONNECTORS AND LUGS

A. Contractor shall review one-line and other Drawings to assure that proper lugs are provided in termination equipment such as switches, panels, switchboards, mechanical equipment, etc. Due to voltage drop conductor sizes and/or numbers may not be accommodated by the equipment affected. If manufacturer cannot provide the proper number and size of lugs within their equipment the Contractor shall provide enclosures and properly sized terminals to convert the oversized cable, number and size that is compatible to the equipment affected.

PART 3 – EXECUTION

3.1 PANELBOARDS

A. Panelboards shall be located where indicated on the drawings. Panelboards shall have neatly typed circuit directories behind clear plastic. Identify circuits by area designations and use. "Spare" and "Space" shall be indicated with erasable pencil, not typed.

B. Circuiting of all branch circuits shall be as designated on the drawings. Breaker and switch arrangement in panels shall be exactly as specified and all circuits will terminate in the positions indicated.

3.2 PHASE ROTATION

A. Phase A, left bus; phase B, center bus; phase C, right bus (front viewing).

END OF SECTION 262416

SJC EXTENSION OFFICE

SECTION 262716

CABINETS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including General and Special Conditions and General Requirements, apply to the work specified in this section.

1.2 DESCRIPTION OF WORK

A. Furnish and install cabinets for panelboards, telephone, and communication systems as required.

1.3 RELATED WORK IN OTHER SECTIONS

A. Panelboards, sound systems, telephone systems.

PART 2 – PRODUCTS

2.1 GENERAL

A. Sheet steel code gauge, galvanized cabinets with painted fronts and trim. Those exposed to wet or rain conditions shall be "raintight" unless otherwise noted. Cabinets without through feeder wiring shall be arranged to provide a wiring gutter not less than 4 inches wide for branch circuit panelboards served by feeders up to 4/0. Panelboards served by feeders in excess of 4/0, up to and including 750 kcmil, shall be provided with top, bottom, and side gutters 8 inches wide. Cabinets shall be of standard make and shall bear the Underwriters Laboratories label. All outside surfaces of trim and doors shall be given a factory finish coat of No. 61 ANSI gray paint, or approved manufacturer's standard. Cabinets for telephone and communications systems shall have 5/8-inch exterior grade, one-face B-grade or equal flame proofed plywood backboard inside with maximum height and width.

2.2 FEED-THROUGH GUTTERS

A. Where feeders go through panelboard cabinets to serve panelboards above or beyond, the wiring gutters in panelboard cabinets shall be a minimum of 8 inches on sides, top and bottom.

2.3 TRIM

A. One-piece, sheet steel trim with hinged door with catch and lock. One piece sheet steel with 3/4 inch flange around all edges shaped to cover edge of box. For telephone or communication cabinets trims with captive nuts or clamps. Trims shall be furnished with indicating adjustable trim clamps for panelboards.

2.4 DOORS

A. Doors shall close against a rabbet placed all around the inside edge of the frame with a close fitting joint between door and frame. The doors shall be fitted with substantial flush hinges placed not over 24 inches apart, nor more than six inches from ends of doors, and fastened permanently to the door and frame with round-headed rivets or spot welds, or with concealed flush piano hinges. Fastening screws or clamps or trims shall be set not over 24 inches apart. Doors over 48 inches in height shall be equipped with a vault handle and a three-point catch.

2.5 LOCKS

A. Furnish each cabinet with a combination catch and flat key lock. The telephone, electrical and signal cabinet locks shall be fitted to separate keying for each system. Furnish two keys for each cabinet.

2.6 GROUND BAR

A. Each cabinet, for a panelboard, shall be provided with a copper interior ground bar suitably braced or bolted to the cabinet wall. The equipment ground bar shall be equivalent in current carrying capacity to the incoming feeder ground conductor and shall have approved pressure connector terminations for the associated feeders, branch circuits, etc.

PART 3 – EXECUTION

3.1 CABINETS

A. Cables installed in the wiring gutters of cabinets shall be neatly bundled, routed, and supported. Minimum bending radii as recommended by the cable manufacturer shall not be reduced. Lighting and power cabinets shall be installed with tops 6'-6" above floor and bottoms not less than 12 inches above floor.

END OF SECTION 262716

SJC EXTENSION OFFICE

SECTION 262726

WIRING DEVICES AND PLATES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions for the Contract, including General and Special Conditions and the General Requirements, apply to the work specified in this section.

1.2 DESCRIPTION OF WORK

A. Furnish and install all wiring devices and plates as required for the complete installation and operation of all systems throughout the project.

1.3 RELATED WORK IN OTHER SECTIONS

A. Conductors, Conduit, Boxes and Fittings.

PART 2 - PRODUCTS

2.1 WALL SWITCHES

A. Unless otherwise specified, each wall switch (flush tumbler-toggle) shall be of the A.C. General use type for mounting in a single gang spacing, fully rated 20 amperes minimum at 120/277 volts, conforming to minimum requirements of the latest revision of the Underwriter's Laboratories, Inc., UL 20 Fifth Edition Standard Snap Switches and further requirements herein specified. Specification grade, heavy duty, single pole, 3-way or 4-way, of the maintained, momentary or lock type as indicated on the drawings. Switches shall operate in any position and shall be fully enclosed cup type with entire body of molded phenolic, urea or melamine with cover of molded phenolic, urea or melamine. Fiber, paper, or similar insulating material shall not be used for body or cover. Ivory color handles unless otherwise indicated. Silver or silver alloy contacts. A.C. 120/277 volt general use snap switches shall be capable of withstanding tests as outlined in NEMA Publications and shall be as follows unless otherwise noted:

Switch	Hubbell	P & S	Bryant	Leviton
1P	1221-I	20-AC-1-I	4901-I	1221-I
2P	1222-1	20-AC-2-I	4902-I	1222-I
3-Way	1223-I	20-AC-3-I	4903-I	1223-I
4-Way	1224-I	20-AC-4-I	4904-I	1224-I
3-pos. 2 cct maintained	1385-I	1225-I	4922-I	
3-pos. 2 cct momentary	1557-I	1251-I	4921-I	
Lighted handle pilot lgt.	1221-PL	2251-SP	4901-PL	1220-PL

2.2 RECEPTACLES

A. General: Configuration and requirements for all connector or outlet receptacles shall be in accordance with NEMA Publications. Fire resistant, non absorptive, hot welded, phenolic composition or equal bodies and bases with metal plaster ears (integral with the supporting member). Single or duplex as shown or noted on drawings. Ivory color unless otherwise noted on the drawings. Double grip contacts for each prong.

B. Grounding Type: All receptacles shall be grounding type with a green colored hexagonal equipment ground screw of adequate size to accommodate an insulated grounding jumper (based on Table 250-95 of the NEC with minimum size No. 14 AWG). Grounding terminals of all receptacles shall be internally connected to the receptacle mounting yoke. Unless otherwise noted, receptacles shall be as follows:

Receptacle	Hubbell	P & S	Bryant
20A-125V AC 2P 3W	5362-I	6300-I	5362-I
20A-208V AC 4P 4W	7250	7250	7250
30A-250V AC 3P 3W	9350	L1030R	9303
30A-600V AC 4P 4W	3430	3430	3430
Special	Receptacles for special applications shall be as indicated on the drawings.		

2.3 PLUG CAPS

A. Except for duplex receptacles, and cleaning combination receptacles one matching plug cap shall be provided for each receptacle. No plug caps are required for duplex receptacles. Provide watertight, male plug caps in damp locations or where exposed to weather.

2.4 DEVICE PLATES

A. General: Provide plates for each switch, receptacle, signal and telephone outlet and special purpose outlet. Do not use sectional gang plates. Provide multi gang outlet plates for multi gang boxes. All plates on finished walls shall be Leviton #84000-40 series, stainless steel. Screws shall be of metal with countersunk heads with finish to match the finish of the plate. Device plates shall be of the one-piece type, of suitable shape for the device to be covered.

B. Exposed: Plates for exposed screw jointed fittings shall match the fittings with edges of plates flush with edges of fittings. To be heavy cadmium plates, steel, with gasket. Plates for cast type boxes at locations subject to wet or rain conditions, shall be of the cast, vapor tight type. Provide hinged lift covers for devices.

C. Communications: Plates for telephone and signal outlets shall each have a 3/8-inch bushed opening in the center. Wall plates for push button and buzzer outlets shall have openings to suit the push buttons and buzzers.

D. Plates for special purpose outlets shall be of a design suitable for the particular application.

PART 3 - EXECUTION

3.1 OUTLET LOCATIONS

A. Shall be as indicated on the drawings. Align devices and plates horizontally and vertically.

E. It shall be the responsibility of the Contractor to determine from the architectural drawings and by actual determination on the site, the exact location of each and every outlet. The outlet locations shall be modified from those shown on the plans to accommodate changes in door swings or to clear other interferences that may arise from job construction details as well as modifications within room spaces. These modifications shall be made with no change in contract price and shall be a matter of job coordination at the expense of the Contractor. The Contractor shall check these conditions throughout the entire job and shall notify the Architect/Engineer of discrepancies as they occur before proceeding with the installation of the work to verify the modifications, if any. Wall boxes shall be set in advance of wall construction, shall be blocked in place and secured. All wall boxes shall be set flush with finished building construction and the Contractor shall furnish and install extension sleeves as required to extend boxes to the finished surfaces of special furring. No switches shall be located behind doors without specific written authorization by the Architect.

3.2 YOKES

A. Wiring device yokes shall be installed in physical contact with the plaster ring. Where the above contact cannot be obtained, a green covered bonding conductor shall be installed.

3.3 PLATES

A. Shall be installed with all four edges in continuous contact with finished wall surface without the use of mats or similar devices. Plaster fillings will not be permitted. Plates shall be installed vertically and with an alignment tolerance of 1/16".

B. Device cover plates for each and every device shall be furnished and installed by this Contractor.

3.4 RECEPTACLES

A. Shall have a separate ground wire from the grounding screw to a grounding stud in the outlet box. All receptacles shall be installed with the "U" slot in the upper position. Substitutions for duplex convenience outlets as listed in 16140 - 2.2 shall only be considered if rated as “Specification Grade”.

END OF SECTION 262726

SJC EXTENSION OFFICE

SECTION 262800

MOTOR AND CIRCUIT DISCONNECTS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including General and Special Conditions and the General Requirements, apply to the work specified in this section.

1.2 DESCRIPTION OF WORK

A. Furnish and install complete motor and circuit disconnects for various items requiring them for this project.

1.3 RELATED WORK IN OTHER SECTIONS

A. Conductors, motors, motor starters, motor control centers, panelboards, grounding.

PART 2 – PRODUCTS

2.1 DISCONNECTING MEANS

A. Safety Switches: Fusible Type HD quick break safety switches of the sizes and capacities indicated or required. NEMA 4 Raintight enclosures at locations exposed to the weather.

B. Separately Enclosed Motor Snap Switches: Motor snap switches may be used for motor disconnect means, controller, and motor overcurrent protection when applicable. These devices shall be horsepower rated and shall contain motor running overcurrent protection.

2.2 SAFETY TYPE DISCONNECTING SWITCHES

A. Heavy duty, quick make, quick break type, 250, 480 or 600 volt rating as required for the application. Number of poles and ampacity as noted or required for application, or required by code. Fusible with fuse clips suitable for Buss fuses. Short circuit rating of 200,000 RMS Amperes with Class R rejection feature installed in fuseholders. NEMA 1 enclosures for dry locations. NEMA 4 enclosures for wet locations or where exposed to weather unless otherwise noted.

B. Fuses shall be provided for all switches. Fuses for switches at motors shall be Bussman Fusetrons, sized for heavy service motor running protection. Fuses in other locations shall be as designated on the drawings or indicated in Section 262813 of these specifications. Proper fuse amp ratings shall be indicated on inside of switch cover, through the use of "Tapewriter" and should read "Use Fusetrons Only" (indicate amperage size as shown on plans). See Section 262813 for other labeling requirements.

PART 3 – EXECUTION

3.1 DISCONNECT MEANS

A. Install in each location indicated on the drawings and elsewhere as required by NEC.

B. Switches installed outdoors shall be raintight and shall be suitably supported, independently of the item to be served (by unistrut rack) unless sufficient unobstructed flat surface exists on the unit to properly support the electrical equipment.

END OF SECTION 262800

SJC EXTENSION OFFICE

SECTION 262813

FUSES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including General and Special Conditions and the General Requirements, apply to the work specified in this section.

1.2 DESCRIPTION OF WORK

A. Furnish and install all fuses required for the various electrical systems required for this project.

1.3 RELATED WORK IN OTHER SECTIONS

A. Panelboards, motor control centers, motor and circuit disconnects.

PART 2 – PRODUCTS

2.1 FUSES

A. General: Dual element, time delay type, based on heavy service, Buss Fusetron, or equal, unless otherwise noted or required for installation. For individual motor circuit protection, provide fuse sized approximately 125 percent of full load current with 200,000 amperes interrupting capacity.

B. Current-Limiting Fuses: Provide where indicated on the drawings. For non-motor feeder protection in conjunction with fused switches, install NEMA Class L or K Buss Limitron fuses sized 125 percent of load current or as required for coordination with air and molded case circuit breakers.

1. Above 600 amps: Class L, "Hi-Cap" as manufactured by Bussman.

2. Below 600 amps, as required by short circuit duty, Class RK-1, "Limitron" or Class RK-1, "Low Peak" or Class RK-5, "Fusetron" as manufactured by Bussman.

3. All switches having current limiting fuses installed shall have a Lamicoid nameplate with white lettering on red background reading:

WARNING, REPLACE ONLY WITH CURRENT LIMITING FUSES AS ORIGINALLY INSTALLED

C. All fuses shall be rated 200,000 AIC and be of the rejection feature type.

2.2 COORDINATION

A. Coordinate the low voltage fuses required for the project to provide basic selective protection and properly coordinate with the other associated protective equipment.

2.3 FUSE CABINET

A. Provide one wall mounted cabinet for storing all spare fuses. The cabinet shall have a hinged door with latch, with the word "FUSES" stenciled on the front.

PART 3 – EXECUTION

3.1 COORDINATION

A. Coordinate the low voltage fuses required for the project to provide basic selective protection and properly coordinate with the other associated protective equipment.

3.2 SPARE FUSES

A. Furnish one complete spare set (3) of each size and type of fuse required on this project for panelboards, safety switches, and switchboards. Deliver to Owner in the original boxes and store in the fuse cabinet furnished under this Contract.

END OF SECTION 262813

SECTION 264300

SURGE SUPPRESSION PROTECTION DEVICES

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. General requirements for both type 1 and type 2 surge protective devices (SPDs) for the protection of electrical power circuits not exceeding 1000 V.

B. Type 1 surge protective devices (SPD's) for the protection of electrical power circuits not exceeding 1000 V.

C. SPDs for the protection of signal, data, antenna, and control lines.

1.2 SUBMITTALS

A. Submit the following:

1. Catalog Data: Submit catalog data describing SPDs. Include data substantiating that proposed products comply with specified requirements.

2. Installation Instructions: manufacturer's manual.

3. Field Test Reports: Written reports of tests specified in Part 3 of this Section. Include the following:

   a) Test procedures used.
   b) Test results that comply with requirements.
   c) Failed test results and corrective action taken to achieve requirements.

4. Maintenance Data: For surge protective devices to include in maintenance manuals

5. Manufacturer's Warranty: Provide manufacturer's warranty covering repair or replacement of surge protective devices showing evidence of failure due to defective materials or workmanship.

1.3 QUALITY ASSURANCE

A. Comply with the *National Electrical Code* (NEC), and NFPA 780 – *Standard for the Installation of Lightning Protection Systems* for installation requirements, where applicable.

B. Provide SPDs that are listed by a Nationally Recognized Testing Laboratory (NRTL). Listing standard shall be the following, as applicable:

1. ANSI/UL 1449 – Standard for Safety for Surge Protective Devices.

2. UL 497B – Standard for Safety for Protectors for Data Communications and Fire Alarm Circuits.

3. UL 497C – Standard for Safety for Protectors for Coaxial Communications Circuits.

C. Provide SPDs suitable for use at a nominal altitude of 5,500 ft, or elevation commensurate with the project location.

1.4 RECEIVING, STORING, AND PROTECTING

A. Receive, store, protect, and handle products according to the manufacturer's instructions and NECA 1 *Standard Practices for Good Workmanship in Electrical Construction*.

1.5 COORDINATION

A. Coordinate location of field-mounted surge protective devices to allow adequate clearances for maintenance.

1.6 WARRANTY

A. General Warranty: Special warranties specified in this Article shall not deprive Government of other rights Government may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Special Warranty: Written warranty, executed by manufacturer agreeing to repair or replace components of surge protective devices that fail in materials or workmanship within five years from date of Substantial Completion.

C. Special Warranty for Plug-in Cord-Connected Surge Suppressors: Written warranty, executed by manufacturer agreeing to repair or replace electronic equipment connected to circuits protected by surge protective devices.

PART 2 PRODUCTS

2.1 PRODUCT OPTIONS AND SUBSTITUTIONS

A. Alternate products may be accepted; Submit under provisions of Division 26 Section and Division 01 Section "General Requirements."

2.2 GENERAL SPD REQUIREMENTS FOR POWER APPLICATIONS

A. NRTL listed to UL 1449.

B. SPD shall provide surge current paths for at least the following modes of protection:

1. L-N, L-G, and N-G for wye-connected systems.

2. L-L, L-G in delta-connected systems.

C. Provide each individual SPD intended for mounting internal to the electrical assembly with a NEMA enclosure suitable for the installation location and environment.

1. NEMA 1, 12, 3R, and 4 enclosures: powder-coated steel.

2. NEMA 4X enclosures: polycarbonate or Type 304 stainless steel.

D. Each SPD shall pass the manufacturing and production line tests required in UL 1449 latest Edition.

2.3 Type 1 SPD

A. AC Power SPDs shall have a UL 1449 Short Circuit Current Rating (SCCR) not less than the following:

System Voltage	Circuit Size	Minimum Surge Current Capability
480Y/277	Any	200 kA
480 Delta	Any	200 kA
208Y/120	Greater than 400 A	200 kA
208Y/120	400 A and less	100 kA
120/240	Any	100 kA

B. SPD shall be suitable for use without external or supplemental overcurrent protection. Every suppression component of every mode shall be protected by internal overcurrent and thermal over-temperature controls. SPDs relying upon external or supplementary overcurrent protection will not be considered.

C. SPD shall have a UL 1449 nominal discharge current rating (I_n) of not less than 20 kA.

D. Suppression components shall be thermally-protected 32 mm or larger metal-oxide varistors (MOVs).

E. AC Power SPDs minimum surge current capability (single pulse rated) per phase shall be as indicated for the following applications:

1. Service Equipment:

System Voltage	Equipment Size	Minimum Surge Current Capability
480Y/277	Any	240 kA
480 (ungrounded)	Any	240 kA
208Y/120	Greater than 400 A	240 kA
208Y/120	400 A and less	100 kA
120/240	Any	100 kA

2. Panelboards and MCCs that supply one or more electrical circuits that leave the structure to supply another structure and the conductors extend more than 100 feet:

System Voltage	Minimum Surge Current Capability
480Y/277	150 kA
480 (ungrounded)	150 kA
208Y/120	100 kA
120/240	100 kA

3. Panelboards and MCCs that supply one or more electrical circuits that leave the structure to supply equipment that is exposed to lightning (e.g. roof mounted HVAC equipment, parking lot lighting):

System Voltage	Minimum Surge Current Capability
480Y/277	150 kA
480 (ungrounded)	150 kA
208Y/120	100 kA
120/240	100 kA

F. AC Power SPDs UL 1449 Voltage Protection Rating (VPR) shall not exceed the following:

System Voltage	L-N	L-G	L-L	N-G
480Y/277	1200V	1200V	2000V	1200V
480 (ungrounded)	--	1800V	2000V	--
208Y/120	700V	700V	1200V	700V
120/240	700V	800V	1200V	700V

G. UL 1449 Maximum Continuous Operating Voltage (MCOV) rating shall be not less than the following:

System Voltage	Allowable System Voltage Fluctuation (%)	MCOV
480Y/277	15%	320V
480 (ungrounded)	15%	550V
208Y/120	25%	150V
120/240	25%	150V

H. AC Power SPDs shall include not less than the following monitoring and diagnostic features that report the protection status of the SPD:

1. One green LED (protected) indicator per phase and one red (not protected) LED.

2. For SPDs with a surge current capacity greater than 100 kA provide an audible alarm with on/off silence function, and one set of NO/NC contacts that change state under any fault condition.

I. Where indicated on the Drawings or specified in other Sections, provide SPDs that are factory installed and integrated within the protected electrical switchboards.

J. Manufacturers:

1. Advanced Protection Technologies:

a) Surge Current Capability over 100 KA: "XAS" series,
b) Surge Current Capability 100 KA or less: "XDS" series.

2. Eaton:

a) Surge Current Capability over 100 KA: "SPD" series,
b) Surge Current Capability 100 KA or less: "CVX100" series.

3. Siemens:

a) Surge Current Capability over 100 KA: "TPS3 01," TPS3 05", "TPS3 06," "TPS3 12."
b) Surge Current Capability 100 KA or less: "TPS3 11."

4. Square D:

a) Surge Current Capability over 100 KA: "IMA" and "EMA" series,
b) Surge Current Capability 100 KA or less: "IMA" and "EMA" series.

5. Current Technology:

a) Surge Current Capability over 100 KA: "SL3" and "TG3" series
b) Surge Current Capability 100 KA or less: "SL3" and "TG3" series

6. Other "prior approved" manufacturers

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify mounting area is ready for SPDs.

B. Verify that circuit rough-in is at correct location.

3.2 INSTALLATION

A. Install SPDs as specified below, according to the manufacturer's instructions, NFPA 780, and the *National Electrical Code*. The manufacturer's installation instructions shall be available at the construction site.

B. Service Equipment:

1. Install SPD that is factory installed and integrated into each low-voltage service equipment.

2. Provide a means of connection for the SPD, as recommended by the manufacturer. This might be a sub-feed connection block, or it might by a dedicated circuit breaker.

C. Connect SPDs to protect each ungrounded (line) and grounded (neutral) conductor. Externally mounted SPD's require full-size (100%) neutral and ground conductors.

D. Install each SPD so it will be accessible for inspection and maintenance.

E. Install SPDs in a manner that will not limit the use of through-feed lugs, sub-feed lugs, or sub-feeder circuit breakers in panelboards.

F. Install each SPD with conductor length according to the manufacturer's instructions.

1. Twist conductors tightly together and keep runs as straight as possible with no sharp bends or kinks.

3.3 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A.

3.4 FIELD QUALITY CONTROL

A. Provide final protection and maintain conditions to ensure that coatings and finishes are without damage or deterioration at final inspection.

B. Repair damage to paint finishes with matching touch-up coating recommended by the manufacturer.

C. Verify that each SPD is correctly connected and that all condition monitoring indicators operate properly.

D. Verify mechanical integrity of each conductor connection

E. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including piping and electrical connections. Report results in writing.

1. Verify that electrical wiring installation complies with manufacturer's installation requirements.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Government's maintenance personnel to adjust, operate, and maintain surge protective devices.

1. Train owner's maintenance personnel on procedures and schedules for maintaining surge protective devices.

2. Review data in maintenance manuals.

3. Schedule training with owner with at least ten days' advance notice.

END OF SECTION 264300

SJC EXTENSION OFFICE

SECTION 265119

LED INTERIOR LIGHTING

PART 1 – GENERAL

1.1 Conform with applicable provisions of the General Conditions, Supplementary Conditions and General Requirements.

1.2 RELATED WORK IN OTHER SECIONS

260500	GENERAL ELECTRICAL PROVISIONS
260519	LOW VOLTAGE CONDUCTORS
260526	GROUNDING
260533	RACEWAYS, BOXES, AND FITTINGS
262726	WIRING DEVICES AND PLATES

1.3 SECTION INCLUDES:

A. Interior solid-state luminaires that use LED technology.

B. Lighting fixture supports.

C. Construction and installation requirements.

1.4 DEFINITIONS

A. CCT: Correlated color temperature.

B. CRI: Color Rendering Index.

C. Fixture: See "Luminaire".

D. IP: International Protection of Ingress Protection Rating.

E. LED: Light-emitting diode.

F. Lumen: Measured output of lamp and luminaire, or both.

G. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.5 SUBMITTALS

A. Product Data: For each type of product, arranged by designation.

B. Product Schedule: For luminaires and lamps. Use same designation indicated on Drawings.

C. Refer to Section 260500 for additional requirements.

1.6 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plan(s) and other details, drawn to scale and coordinated with each other, using input from installers of the items involved.

B. Product Certificates: For each type of luminaire.

C. Sample warranty.

1.7 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.8 WARRANTY

A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.

B. Warranty Period: Five year(s) from date of Substantial Completion.

PART 2 – PRODUCTS

2.1 LUMINAIRE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Recessed Fixtures: Comply with NEMA LE 4.

C. CRI and CCT shall be as scheduled on contract documents.

D. Rated lamp life of 50,000 hours.

E. Lamps dimmable from 100 percent to 0 percent of maximum light output.

F. Internal driver.

G. Nominal Operating Voltage: as specified on the drawings.

H. Housings:

1. Extruded-aluminum housing and heat sink.

2. Clear powder-coat finish.

3. Lens Thickness: At least 0.125 inch minimum unless otherwise indicated.

2.2 MATERIALS

A. Metal Parts:

1. Free of burrs and sharp corners and edges.

2. Sheet metal components shall be steel unless otherwise indicated.

3. Form and support to prevent warping and sagging.

B. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

B. Diffusers and Globes:

1. Prismatic acrylic.

2. Acrylic: One hundred percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

3. Lens thickness: At least 0.125 inch minimum unless otherwise indicated.

C. Housings:

1. Extruded-aluminum housing and heat sink.

2. Clear powder-coat finish.

2.3 METAL FINISHES

A. Variations in finishes are unacceptable in the same piece. Variations in finishes of adjoining components are acceptable if they are within the range of approved Samples and if they can be and are assembled or installed to minimize contrast.

2.4 LUMINAIRE SUPPORT COMPONENTS

A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.

B. Single-Stem Hangers: ½-inch steel tubing with swivel ball fittings and ceiling canopy. Finish same as luminaire.

C. Wires: ASTM A 641/A 641 M, Class 3, soft temper, zinc-coated steel, 12 gage.

D. Rod Hangers: 3/16-inch minimum diameter, cadmium-plated, threaded steel rod.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Comply with NECA 1.

B. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.

C. Install lamps in each luminaire.

D. Supports: Sized and rated for luminaire weight.

E. Flush-Mounted Luminaire Support: Secured to outlet box.

F. Ceiling-Mounted Luminaire Support:

1. Ceiling mount with two 5/32-inch-diameter aircraft cable supports adjustable to 120 inches in length. Brace to limit sway or swinging.

G. Suspended Luminaire Support:

1. Pendants and Rods: Where longer than 48 inches, brace to limit swinging or sway.

2. Stem-Mounted, Single-Unit Luminaires: Suspend with twin-stem hangers. Support with approved outlet box and accessories that hold stem and provide damping of luminaire oscillations. Support outlet box vertically to building structure using approved devices.

3. Do not use ceiling grid as support for pendant luminaires. Connect support wires or rods to building structure.

H. Ceiling-Grid-Mounted Luminaires:

1. Secure to any required outlet box.

2. Secure luminaire using approved fasteners in a minimum of four locations, spaced near corners of luminaire.

L. Comply with requirements in Division 26 for Power Conductors and Cables for wiring connections.

J. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Division 26 for Identification for Electrical Systems.

3.2 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.

2. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and retransfer to normal.

B. Luminaire will be considered defective if it does not pass operation tests and inspections.

C. Prepare Test and inspection reports.

END OF SECTION 265119

SJC EXTENSION OFFICE

SECTION 270000

COMMUNICATIONS INDEX

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

A. All bids shall be based on the equipment as specified herein. The specifying authority must approve any alternate system.

B. Bidders wishing to submit alternate equipment shall submit to the specifying authority, at least 10 days prior to bid opening, the equipment proposed to provide a precise functional equivalent system to meet specifications. Bidder shall provide adequate information prior to bid date such as specification sheets, working drawings, shop drawings, and a demonstration of the system. Alternate supplier-contractor must also provide a list to include six installations of the identical system proposed which have been in operation for a period of two years.

C. Final approval of the alternate system shall be determined at the time of job completion. Failure to provide the "precise functional equivalent" shall result in the removal of the alternate system at the contractor's expense.

1.2 RELATED DOCUMENTS

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

B. Requirements of the following Division 26 Sections apply to this Section:

1. Basic Electrical Requirements.

2. Basic Electrical Materials and Methods.

1.3 COMMUNICATIONS DIVISION INDEX

270526	GROUNDING AND BONDING FOR COMMUNICATIONS SYSTEMS
270528.1	PATHWAYS FOR COMMUNICATION SYSTEMS
270553	IDENTIFICATION FOR COMMUNICATION SYSTEMS
271116	CABINETS, RACKS, FRAMES, AND ENCLOSURES
271543	FACEPLATES AND CONNECTORS

END OF SECTION 270000

SJC EXTENSION OFFICE

SECTION 270526

GROUNDING AND BONDING FOR COMMUNICATION SYSTEMS

PART 1 – GENERAL

1.1 SCOPE OF WORK

A. The Contractor is held responsible to be familiar with the provisions contained herein and with other Sections of this Specification as applicable to the completion of the installation. The Contractor is held responsible to be familiar with the provisions contained herein and is assumed to possess the knowledge, manpower, and materials necessary for the completion of the installation.

B. Work covered by this Section shall consist of furnishing all labor, equipment, supplies, materials, and testing otherwise specified, and performing the following operations recognized as necessary for the complete installation, termination, and labeling of ground and bonding infrastructure as described on the Drawing and /or required by these specifications.

C. Listed manufacturers and products are required. UNM IT Networks approved equivalent products and systems are also acceptable with the prior written approval of submittals.

1.2 RELATED SECTIONS

A. Division 26 - Electrical Division
B. Division 27 - Communicants Systems.
C. Division 28 - Electronic Safety and Security

PART 2 – PRODUCTS

2.1 GROUNDING BUSBARS

A. Telecommunications Grounding Main Grounding Busbar (TMGB).

1. Predrilled, copper, non-anodized BICSI/TIA/EIA/ANSI approved (4"W **x** 1/4"H **x** 12"L) ground bus bar with insulators and standoffs. (Chatsworth 40153-012 or UNM IT approved equivalent)

2.2 GROUNDING JOINTS AND SPLICES

A. Grounding conductor joints/ splices shall be mechanical type, copper alloy, with a minimum of two bolts and a spade section for each conductor.

B. Grounding conductor terminations (lugs) shall be a single barrel, mechanical screw type, copper alloy with machined contact surfaces.

2.3 BONDING CONDUCTORS

A. Cable Tray Bonding Conductor.

1. Green # 6 AWG insulated bonding jumper with appropriate lugs or manufactured braided copper grounding jumper.

B. Equipment Fame Bonding Conductor.

1. Chatsworth TRGK672 Telecommunications Rack Grounding Kit or UNM IT approved equivalent.

C. Bonding Conductor (BC)

1. Green insulated copper bonding conductor, size as required by NEC.

2. The BC shall be, as a minimum the same as the TBB.

D. Telecommunications Bonding Backbone (TBB)

1. Green insulated copper conductor, a minimum size of #6 AWG. The TBB shall be sized at 2 kcmil per linear foot of conductor length up to a maximum size of 3/) AWG Insulation shall meet fire ratings of its pathway or be in conduit.

SEE TABLE 1 BELOW

TABLE 1			
Sizing of Telecommunication Bonding Backbone (TBB)			
TBB length FT	Grounding Conductor Size (AWG)	DC Resistance Per 100 Ft (Copper Conductor)	Short-Time Rating (A)
< 13 Ft	6	0.0491	621
14 - 20 Ft	4	0.0308	988
21 -26 Ft	3	0.0245	1245
27 - 33 Ft	2	0.194	1571
34 - 41 Ft	1	0.0154	1981
42 - 52 Ft	1/O	0.0122	2499
53 - 66 Ft	2/O	0.00967	3150
> 66 FT	3/O	0.00766	3972
	4/O	0.00608	5008
	kcmil		
	250	0.00515	5917
	300	0.00429	7101
	350	0.00367	8284
	400	0.00321	9467
	500	0.00258	11834
	AWG = American Wire Gauge		
	DC = Direct Current		
	kcmil = Thousand circular mils		

PART 3 - EXECUTION

3.1 TELECOMMUNICATIONS INSTALLATION

A. Bonding and grounding all conduits, cable trays, enclosures, cables, protectors, and other conductive infrastructure as per the requirements of the NEC and TIA 607 to main building ground.

1. Nonconductive coatings (such as paint, lacquer, and enamel) on equipment to be grounded shall be removed from threads and other contact surfaces to ensure good electrical continuity or be connected utilizing fittings designed to make such removal unnecessary.

B. Installation of the TMGB in ER/TR.

1. Install the TMGB at the bottom of the plywood backboard near the entrance conduits within the ER/TR Room.

2. TMGB shall be installed so that the BC is as short and straight as possible, with the proper bend radius.

3. The BC shall be a green insulated conductor installed exposed per Table 1.

4. Connection at TMGB from the main electrical service ground shall be installed to meet NEC 250.94 and TIA/EIA requirements type. Ground resistance shall not exceed 2 ohms unless approved by the Architect or Engineer.

5. Busbar shall be predrilled for future connections. (Chatsworth 40153-012 or approved equal.)

6. Provide a label (Do Not Disconnect) on the connection to the main electrical service ground.

C. Installation of the TBB.

1. Installation mechanical type, copper alloy, with a minimum of two bolts and separate sections for each conductor or copper compression type with two (2) indents

D. Installation of Grounding Conductor Joints/Splices.

1. Install manufactured insulating cover or heavy tape insulation over joints/splices.

E. Grounding of Cable Tray/Ladder Rack/Basket Tray

1. Install Green #6 AWG bonding jumper (12 inches max) with appropriate lugs at each cable tray joint or install a manufactured braid copper grounding jumper. In place of bonding jumpers, use manufactures

approved grounding type connectors to connect sections of cable trays will be permitted.

2. Install Green #6 AWG grounding conductor with appropriate lugs from the side of the cable tray down to TMGB or TGB. Drill the side of the cable tray and install a ¼" fine thread appropriate length bolt, making sure that the bolt does extend into the wire management part of the tray.

F. Ground of Equipment Frame.

1. Install Telecommunications Rack Grounding Kit approved by the Architect or Engineer, from equipment frame to ground cable tray, TMGB or TGB.

G. Grounding of Telecommunications Duct banks.

1. Provide a continuous # 4/0 bare-stranded copper conductor within the concrete at the bottom of all Duct banks. Terminate the bonding ribbon in telecommunications maintenance holes.

H. Grounding of Telecommunications Maintenance Holes and Handholes.

1. Provide bonding jumper to reinforcing steel in each section.

2. Install a bonding ribbon horizontally around the bottom of each maintenance hole and attached it to all the cable racks and metallic hardware within the maintenance hole. Continue installation vertically between the bonding clamps so both the top and bottom halves are bonded together on each side. (The bonding ribbon will be used to bond and ground all future splice cases and hardware placed within the maintenance hole).

3. Provide a ground rod near a corner within 6" of the corner in each maintenance hole and handhole. Bond to the ribbon in the maintenance hole.

END OF SECTION 270526

SJC EXTENSION OFFICE

SECTION 270528.1

PATHWAYS FOR COMMUNICATIONS SYSTEMS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including General and Special Conditions and the General Requirements, apply to the work specified in this section.

1.2 DESCRIPTION OF WORK

A. Furnish and install a complete telephone/data system, including cabinets, conduit, outlet boxes, jacks, cabling, and device plates, as shown on the drawings.

1.3 RELATED WORK IN OTHER SECTIONS: General Provisions, Raceways, Boxes and Fittings, Conductors, Wiring Devices and Plates, Cabinets, Grounding.

1.4 TELEPHONE/DATA SYSTEMS, GENERALLY: The telephone/data system shall be as indicated on the drawings and specified here-in with all service runs in concrete encased underground duct system. The main service shall terminal at the main telephone equipment board.

PART 2 – PRODUCTS

2.1 TERMINAL BOARDS

A. Telephone and data equipment shall share a common mounting board which shall be ¾" plywood secured to the walls where indicated on the drawings (or as noted).

2.2 OUTLETS

A. Telephone/data wall outlets shall consist of 4" square box, 2-1/8" deep, one RJ45 jack for telephone and one RJ45 jack for data, one device cover, up 18" unless noted otherwise on the drawings. Device plate finish shall be as specified for switches and receptacles.

PART 3 – EXECUTION

3.1 TELEPHONE CABLE: Install 4-pair, Category 6, 23 gauge. solid plenum rated cable from each telephone jack to terminal board and terminate on punch down blocks.

3.2 TELEPHONE PUNCHDOWN BLOCKS: Type 110 unless noted otherwise.

3.3 DATA CABLE: Install 4-pair, unshielded Category 6/6A/6E plenum rated 23 gauge. Terminate per TIA-568a from each data jack to the terminal board and terminate on data cross connect blocks.

3.4 DATA CROSS CONNECT BLOCKS: Hubbell type 110 12 port cross connect block unless noted otherwise.

3.5 GROUNDING: Install No. 6 ground wire in 1/2-inch conduit from the telephone equipment board to the nearest cold water pipe unless otherwise noted.

3.6 COORDINATION, DETAILS: Exact locations and arrangement of the telephone/data facilities shall be coordinated with and as recommended and approved by the local telephone company. This includes the location and orientation of lights, receptacles, service entrance conduits and conduit stubs in the equipment room.

END OF SECTION 270528.1

SJC EXTENSION OFFICE

SPECIFICATION 270553

IDENTIFICATION FOR COMMUNICATION SYSTEMS

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. Work covered by this Section shall consist of furnishing labor, equipment, supplies, materials, and testing unless otherwise specified, and in performing the following operations recognized as necessary for the labeling of the telecommunications infrastructure as described on the Drawings and/or required by these specifications.

B. The University intends to create a Class 3 system of administration as per current ANSI/TIA/EIA 606 Standards. As such, all elements must be labeled with unique identifiers as described in the following sections. Labels shall be color coded as per TIA/EIA 568 Standards.

C. This section includes minimum requirements for the following:

1. Labeling Communications Cabling

2. Labeling Closet Hardware

3. Labeling Work Stations

1.2 RELATED SECTIONS

270528.1	PATHWAYS FOR COMMUNICATION SYSTEMS.
270553	IDENTIFICATION FOR COMMUNICATION SYSTEMS.
271116	CABINETS, RACKS, FRAMES, AND ENCLOSURES.

PART 2 - PRODUCTS

2.1 LABELS

A. The size, color, and contrast of all labels should be selected to ensure that the identifiers are easily read.

B. All labels are to be mechanically printed, no hand-printed labels are allowed for any component.

C. Labels should be visible during the installation of and normal maintenance of the infrastructure. Labels should be resistant to the environmental conditions at the point of installation (such as moisture, heat, or ultraviolet light) and should have a design life equal to or greater than that of the labeled component.

D. Provide vinyl substrate with a white printing area and black print. If the cable jacket is white, provide a cable label with a printing area that is any other color

than white, preferably orange or yellow – so that the labels are easily distinguishable.

E. Labels shall be flexible vinyl or other substrates that apply easily and flex as cables are bent.

F. Labels shall use aggressive adhesives that stay attached even to the most difficult jacketing.

PART 3 - EXECUTION

3.1 LABELING INSTALLATION

A. Horizontal Copper Cable Labeling:

1. All horizontal cables shall be labeled with self-laminating marking tape, Brady ID-Pro labeler, Panduit LS7 labeler, Rhino, or equivalent labeling system. Identification shall be as follows:

2. At the TR end, the cables shall be labeled with the location of where the other end of the cable is terminated including room number, TO number, and jack position. Place a label on a visible part of the cable within 6 inches of the termination point for ease of identification after termination.

a) Example: Two cables going to room 114, first TO, first jack position would be labeled as 114-1A1. The second cable in the second TO, and the third jack position would be 114-2A3.

Cable	1	114-1A1	

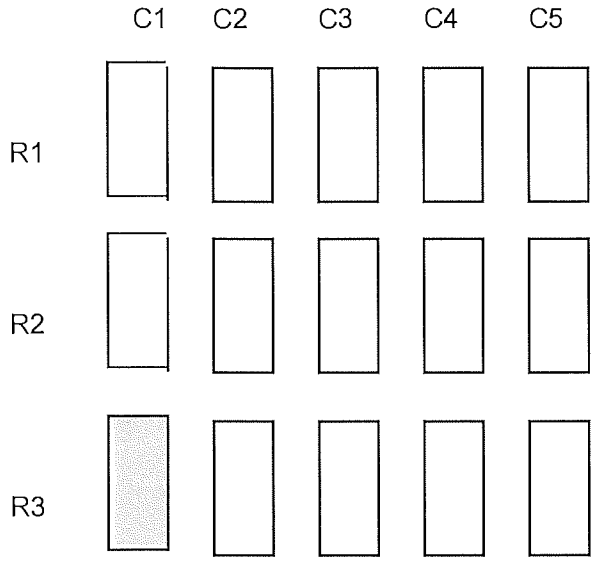
Cable	2	114-2A3	

3. At the TO end, the cables shall be labeled 4 inches from termination with the following: Data. TR. Rack. Patch Panel. Port. This shall be visible by removing the outlet cover plate.

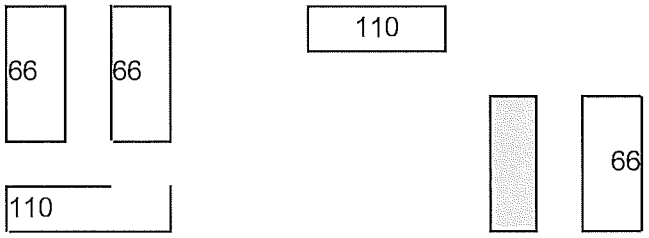
a) Example: Data, TR Room 114, rack 1, patch panel 1, port 03 would be: D.114. 1.1.03.

b) For voice cabling in an older building with separate voice closets and no patch panels, include the TR and as much information as practical such as column, row, block number, and port number or pairs.

1) Example: TR room 105, on a 66 block in the first column, third row down, port 4 would be: V.105.1.3.04



2) Example: TR room 105, no discernable pattern of columns or rows or ports, and/or mixed environment of 110 and 66 blocks, the label could be: V.105.E wall.24/25.



4. For CATV coaxial drop cables, at the splitter or tap, the cables shall be labeled with the location where the other end of the cable is terminated including room number, TO number, and jack position. If not collocated with a TO, indicate the room number at a minimum. Place a label on a visible part of the cable within 12 inches of the termination point for ease of identification after termination

   a) Example: A cable going to room 114, first TO, sixth jack position would be labeled as C.114.1A6.

   b) Generally speaking, coaxial cables will be in the sixth position when collocated with a standard TO.

5. For coaxial cables at the TO, they shall be labeled 4 inches from termination with the words "From Room" and the room number where the splitter or tap is. This shall be visible by removing the outlet cover plate.

a) Example: Room 115 would simply be: From Rm. 115.

CATV	From Rm 115

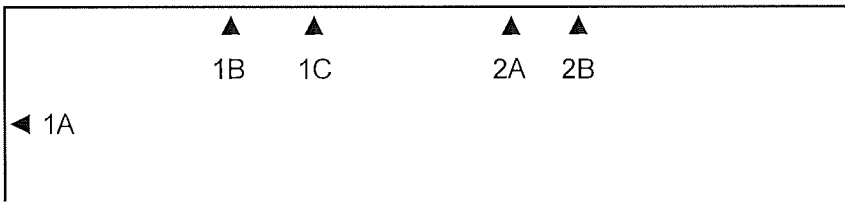
B. Telecommunications Outlet (TO) Labeling Scheme:

1. TO's are labeled alphanumerically in a clockwise rotation around the room. Typically, the first TO located to the left of the main entrance of the room is labeled 1A, followed by 2A, 3A, etc. Where two entrances are present, designate one as the main entrance and label it accordingly.

   a) The intent is to have unique identification for each TO. The starting point and nomenclature of the TOs are irrelevant to the location inside the room.

2. Floor box TOs shall be prefaced with "FB" to read FB1A, FB2A, etc. Wireless Access Point TO's in ceilings are to be prefaced with "WAP" to read WAP1, WAP2, etc. Elevators shall be prefaced with "Elev" to read Elev1. Audio Visual Projectors are to be prefaced with "AV" to read AV1.

3. On subsequent TO installations, the TO will be labeled alphanumerically depending on the new TOs location. If the new TO is between 1A and 2A, the new TO would be labeled as 1B. If another one is later added between 1B and 2A, it would be labeled 1C. If it is after the last TO in the room, 3A, it would be labeled:



4. Seek clarification from UNM IT for any labeling issues that arise.

C. Faceplate Labels:

1. Faceplates will be labeled using the plastic insert to cover a printed identification tag. Each of the 2 labels in a faceplate is meant to have 2 lines for a total of 4 individual lines per faceplate.

2. The TO label will vary slightly depending on whether a unified cabling platform is used where all cables go to one TR, or separate voice and data closets are used.

3. See addendum 1 for an example of the UNM IT labeling on a faceplate.

4. See addendum 2 for an example of the UNM IT labeling on a faceplate with unified cabling.

5. See addendum 3 (1) for an example spreadsheet in MS Excel with dimensions for the labels.

    a) Line 1 contains the preface "D" for Data, the specific TR, rack, patch panel, and the range of ports used for termination. In the case of separate voice and data closets, only the data information is conveyed here.

        1) Example: For cables going to TR Room 114, rack 1, patch panel 1, ports 3-5, line 1 would read: D.114.1.1.03/05.

    b) Line 2 also contains information regarding where cables are terminated in the closet, but is used for subsequent cable installations to that specific TO.

        1) Example: Another 3 cables were added to the same TO at a later date. For cables that go to TR Room 114, rack 3, patch panel 3, ports 22, 23, and 24, line 2 would read: D.114.3.3.22/24

    c) Line 3 is only used if separate voice and data closets are being used. Line 3 contains the preface "V" for Voice, the TR, and the TO number and jack position.

    d) Line 4 is the unique identifier for the TO.

D. Horizontal 110 and 66 Block Labeling for voice:

1. For 110 blocks, if the cables are for room terminations label the space for the port with the room number, TO, and jack position.

    a) Example: A cable going to room 114, first TO, first jack position would be labeled as 114-1A1. A cable in the second TO, and third jack position would be 114-2A3.

2. For 66 type blocks, if the cables are for room terminations tag the cable with the room number, TO, and jack position with a loose paper tag with a string that is easily accessible and readable.

    a) Example: A cable in room 114, first TO, first jack position would be labeled as 114-1A1. A cable in the second TO, and third jack position would be 114- 2A3.

3. If the 110 block is for the tie cable between the voice patch panel in the rack and the wallboard, label the space corresponding to the port with the rack, patch panel, and port information as per section 4.01.E.2. For tie cables between the rack and wallboard a 110 block shall be used.

    a) Example: Rack 1, patch panel 1, would be: Rack1 Voice PP1.

    b) See addendum 3 (2) for an example label.

E. Patch Panel Labeling:

1. For station cabling going to a TO, label each port on the patch panel with the room number, TO, and jack position.

    a) Example: A cable in room 114, first TO, first jack position would be labeled as 114-1A1. A cable in the second TO, and third jack position would be 114- 2A3.

2. Example: A cable going to a floor box TO labeled FB1A in room 114 in the second jack position would be labeled as 114-FB1A2 For voice patch panels connected to a 110 block within the TR, label each port on the voice patch panel with the corresponding 110 block source information as per section 4.01.D.3.

    a) Example: A 110 block in the first column, third row down, port 4 would be: 1.3.04

3. Due to the amount of space allocated for TO designation on patch panels, place the room number on top and TO on the bottom.

    a) See addendum 3 (3) for an example label.

F. Equipment Room:

1. Equipment Racks shall be labeled with a one-inch self-laminating marking tape, Brady ID-Pro labeler, Brother P-touch labeler, Rhino, or equivalent labeling system at the base of the rack. Starting in front of the equipment rack, left to right, identification shall be as follows: Rack 1, Rack 2, and Rack 3.

2. All patch panels shall be labeled with a 3/8 inch self-laminating marking tape, Brady ID-Pro labeler, Brother P-touch labeler, or equivalent labeling system. Starting from top to bottom in sequence. Place the label on the left side of the patch panel vertically, identification shall be as follows: PP 1, PP 2, PP3, and so on.

G. Vertical/Riser/Intrabuilding Copper Cable Labeling:

1. All riser cables shall be labeled with self-laminating marking tape, Brady ID-Pro labeler, Panduit LS7 labeler, Rhino, or an equivalent labeling system.

2. At the TR, the copper riser cables shall be labeled with from/to, cable count, and pair information on both ends. Place a label on a visible part of the cable close to the wiring block for ease of identification after termination.

    a) Example: From ER B065 to TR 114, first of 2, 100 pair cables would be: ER B065 to TR114 1-100. The second 100-pair cable between the rooms would be ER B065 to TR114 101-200.

3. Label cabling on each side of wall penetrations.

H. Vertical/Riser/Intrabuilding Fiber Cable Labeling:

1. All riser cables shall be labeled with self-laminating marking tape, Brady ID-Pro labeler, Panduit LS7 labeler, or equivalent labeling system. Identification shall be as follows:

2. At the TR, the fiber riser cables shall be labeled with from/to, fiber type, and fiber count on both ends. Place a label on a visible part of the cable and innerduct close to the fiber distribution unit (FDU) for ease of identification after termination.

a) Example: From ER B065 to TR 114, the first cable would be: ER B065 to TR114 24SM/24MM.

b) If a second fiber bundle between the rooms is installed with the same fiber count, place an (F2) and the end of the label.

1) Example: From ER B065 to TR 114, the second cable, would be: ER B065 to TR114 24SM/24MM. (F2)

3. Label cabling on each side of wall penetrations.

I. Vertical/Riser/Intrabuilding 110-Block Labeling:

1. At the ER and TR, voice riser cables are terminated on their respective 110 blocks. Label each pair on each row of 110 blocks with the matching pair count information.

2. Place the entire cable label of "from/to" in the center of the 110 block label as per section 4.01.G.

3. See addendum 3 (4) for an example label.

J. Coax Trunk Labeling (CATV):

1. CATV coaxial trunk cables shall be labeled at each termination point with information indicating the location of the next termination point of the cable, such as an amplifier, DCT, splitter, or tap.

K. Vertical/Riser/Intrabuilding and Campus Fiber FDU labels:

1. Labels shall indicate the type of fiber (single mode or multi-mode 50µm or 62.5 µm), "from/to" information, pair count, loss for each strand, and length of cable.

2. See addendum 3 (5) for an example label.

L. Interbuilding/Campus/Backbone Copper and Fiber Cable Labeling:

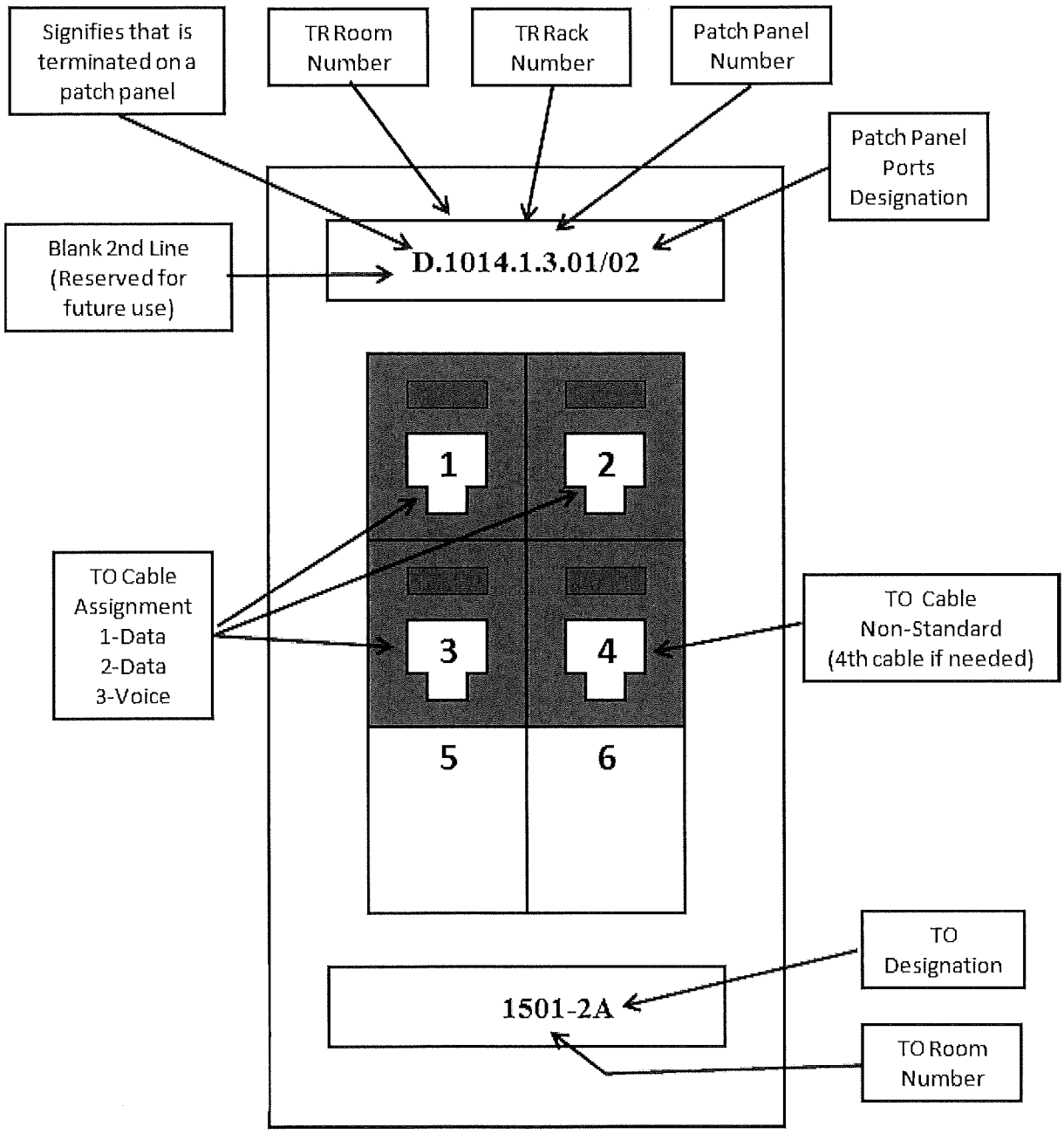
1. All interbuilding cables shall be labeled permanently with "from/to" information, cable type and size, installation date, and installing contractor at each end.

   a) Example: From Bldg. 256 to Bldg. 203, a 200-pair copper cable, installed by Lobo Enterprises on September 22, 2008, would be: From Bldg. 256 to Bldg. 203 (200 Pair) Lobo Enterprises 9/08.

   b) An as-built is to be provided to Owner of which manhole and pull-boxes the cable passes through. Provide butterfly drawings after installation is complete.

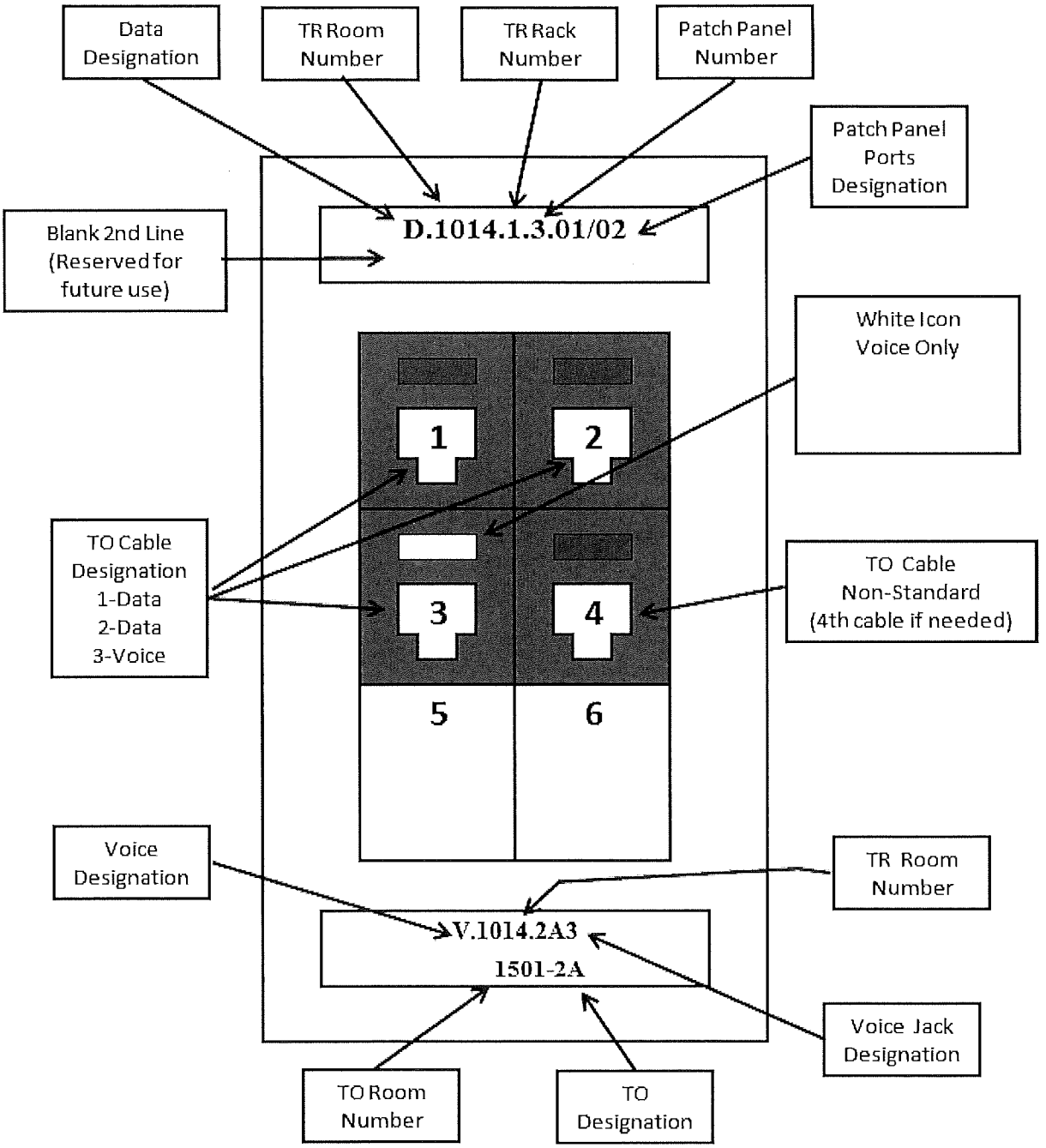
Addendum 1

Telecommunications Outlet Unified Labeling Scheme



Addendum 2

Telecommunications Outlet Labeling Scheme



Addendum 3 (1)

MS Excel with dimensions for the TO labels. Dimensions: Row = 16, Column = 21, Font Arial 11
Alignment: Rows 1 and 3 vertical bottom, horizontal center Alignment: Rows 2 and 4 vertical top, horizontal center

1	D.101.1.1.12/13	D.101.1.1.14/15	D.101.1.1.16/17	D.101.1.1.18/19
2	D.101.1.2.03		D.101.1.2.04	
3	V.101.1A3	V.101.2A3	V.101.3A3	V.101.4A3
4	255-114-1A	255-114-2A	255-114-3A	255-114-4A

Addendum 3 (2): 110 block labeling for voice patch panels.

	1-1	1-2	2-1	2-2	3-1	3-2	4-1	4-2	5-1	5-2	6-1	6-2	7-1	7-2	8-1	8-2	9-1	9-2	10-1	10-2	11-1	11-2	12-1	12-2		
									Rack 1 Voice P/P 1																	
	13-1	13-2	14-1	14-2	15-1	15-2	16-1	16-2	17-1	17-2	18-1	18-2	19-1	19-2	20-1	20-2	21-1	21-2	22-1	22-2	23-1	23-2	24-1	24-2		

Addendum 3 (3): Patch panel labeling.

B110 3A3	B110 3A4	B110 4A1	B110 4A2	B110 4A3	B110 4A4
B100 Elev 1A1	B100 Elev 2A1	B100 Elev 3A1	B100 Elev 4A1	B100 Elev 5A1	B100 Elev 6A1

B120 1A1	B130 1A1	B140 1A1	B140 1A2	B150 3A1	B150 4A1
Timeclock 1A1	Timeclock 1A2	Timeclock 2A1	Timeclock 2A2	B110 WAP1A1	B110 WAP1A2

Addendum 3 (4): Copper riser labeling

	001 001-200	002	003	004	005	006	007	008	009	010	011	012	013	014	015	016	017	018	019	020	021	022	023	024	025	
									ER B110 to TR B220 - C01, 001-100																
	026	027	028	029	030	031	032	033	034	035	036	037	038	039	040	041	042	043	044	045	046	047	048	049	050	

	051 001-200	052	053	054	055	056	057	058	059	060	061	062	063	064	065	066	067	068	069	070	071	072	073	074	075	
									ER B110 to TR B220 - C01, 001-100																
	076	077	078	079	080	081	082	083	084	085	086	087	088	089	090	091	092	093	094	095	096	097	098	099	100	

Addendum 3 (5): High pair count labeling

	001 001-1800	002	003	004	005	006	007	008	009	010	011	012	013	014	015	016	017	018	019	020	021	022	023	024	025	
	026	027	028	029	030	031	032	033	UIMH-Pavilion (286) to CRTC (227) - C01, 001-300 034	035	036	037	038	039	040	041	042	043	044	045	046	047	048	049	050	

	051 001-1800	052	053	054	055	056	057	058	059	060	061	062	063	064	065	066	067	068	069	070	071	072	073	074	075	
	076	077	078	079	080	081	082	083	UIMH-Pavilion (286) to CRTC (227) - C01, 001-300 084	085	086	087	088	089	090	091	092	093	094	095	096	097	098	099	100	

Building Name: Castetter Hall

Building #: 64 Wiring Closet Room #: 2/1/09

Date: 4/20/2009 Key Code: 36665

Workorder: 48288-1

Company: XYZ

Technician: Do all

Room #	Plate	1	Port	2	Port	3	Port	4	Port	5	Port	6	Port
1012	1A	D.1.4.08		D.1.4.09		D.1.4.10							
1013	1A	D.1.4.11		D.1.4.12		D.1.4.13							
1014	1A	D.1.4.14		D.1.4.15		D.1.4.16							
1014	2A	D.1.4.17		D.1.4.18		D.1.4.19							
1014	2B	D.1.4.20		D.1.4.21		D.1.4.22							
1014	3A	D.1.4.23		D.1.4.24		D.1.4.25							

END OF SECTION 270553

SECTION 271116

CABINETS, RACKS, FRAMES, AND ENCLOSURES

PART 1 – GENERAL

1.1 SCOPE OF WORK

A. The Contractor are held responsible to be familiar with the provisions contained herein and with other Sections of this Specification as applicable to the completion of the installation. The approved vendor or designated agent is held responsible to be familiar with the provisions contained herein and is assumed to possess the knowledge, manpower, and material to the completion of the installation.

B. Work covered by this Section shall consist of furnishing all labor, equipment, supplies, materials, and testing unless otherwise specified, and in performing the following operations recognized as necessary for the installation of the Information Technology Cabinets, Racks, Frames and Enclosures described on the Drawings and/or required by these specifications.

C. The extent of the Information Technology Cabinets, Racks, Frames, and Enclosures Installation (The Project) will be as shown in the project drawings or as specified.

1.2 RELATED SECTIONS

A. The project's architects, engineers, contractors, manufacturers, and designers are responsible to be knowledgeable about the provisions contained within the following and other related sections of these standards of the Owner's IT department as they apply to the completion of the project's installation and design.

1. Division 26 Electrical.

2. Division 27 Communications.

3. Division 28 Electronic Safety and Security.

B. Design, manufacture, test, and install the project's data cabling systems following the Owner's guidelines and standards, industry standards, and manufacturer's requirements and following NFPA 70 (National Electric Code), state codes, local codes, requirements of authorities having jurisdiction, and particularly the most recent editions of the following standards and specifications.

1. National Fire Protection Association

2. National Electrical Code

3. National Electrical Safety Code

4. This Technical Specification and Associated Drawings

5. ANSI/TIA-568-C.0, Generic Telecommunications Cabling for Customer Premises, and its published addenda.

6. ANSI/TIA-568-C.1, Commercial Building Telecommunications Cabling Standard, and its published addenda.

7. ANSI/TIA-568-C.2, Copper Cabling Components Standard, and its published addenda.

8. ANSI/TIA-568-C.3, Optical Fiber Cabling Components Standard, and its published addenda.

9. ANSI/TIA/EIA-569-B, Commercial Building Standard for Telecommunications Pathways and Spaces, and its published addenda.

10. ANSI/TIA/EIA-606-A, Administration Standard for the Telecommunications Infrastructure of Commercial Buildings, and its published addenda.

11. ANSI/J-STD-607-A, Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications, and its published addenda.

12. Building Industries Consulting Services International (BICSI) Telecommunications Distribution Methods Manual (TDMM).

13. ANSI/TIA-942, Telecommunications Infrastructure Standard for Data Centers, and its published addenda.

14. Product manufacturer's published specifications and instructions.

15. BICSI TDMM and associated standards.

PART 2 – PRODUCTS

2.1 PRODUCTS EQUIPMENT FRAMES

A. Approved four-post equipment racks (frames) are:

1. Chatsworth Adjustable Quadra Rack™, 4-Post Frame for data equipment black unless otherwise specified.

2. Frames shall be manufactured from aluminum and/or steel extrusion.

3. Each frame will have two L-shaped top angles, two L-shaped base angles, a top and bottom pan, and four C-shaped equipment-mounting channels (a front and rear pair). The rack will assemble with nut and bolt hardware. The base angles and bottom pan will be pre-punched for attachment to the floor. The top pan will be pre-punched for attaching the ladder rack with J-bolts.

4. Frames shall be manufactured from aluminum and/or steel extrusion and sheet.

5. Each frame will have two L-shaped top angles, two L-shaped base angles, a top and bottom pan, and four C-shaped equipment-mounting channels (a front and rear pair). The rack will assemble with nut and bolt hardware. The base angles and bottom pan will be pre-punched for attachment to the floor. The top pan will be pre-punched for attaching the ladder rack with J-bolts.

6. Equipment mounting channels will be 3" deep and punched on the front and rear flange with the EIA-310-D Universal hole pattern to provide 45 rackmount spaces for equipment. Each mounting space will be marked and numbered on the mounting channel.

7. When assembled with top and bottom pans and angles, equipment-mounting channels will be spaced to allow attachment of 19" EIA rack-mount equipment. Attachment points will be threaded with 12-24 roll-formed threads. The frame will include assembly and equipment-mounting hardware. Frames will include 100 each combination pan head, pilot point, and mounting screws.

8. The assembled frame will measure 19"w X 29" D X 7'. There will be 29" between the front and rear mounting surfaces of the two pairs of mounting channels. The sides (webs) of the equipment-mounting channels will be punched to allow attachment of vertical cable managers along the sides of the frame or for frame-to-frame or frame-to-rack baying (frames must be able to bay with a 2-post relay rack). Special Part number TS1051925 includes 4 post racks, a Horizontal Ground bar, and Rack Isolation Kit. Black is the standard color, but other colors may be requested.

9. The frame will be rated for 2,000 lb. of equipment.

10. The finish is standard Black.

B. Approved two post equipment racks (frames) are:

1. Chatsworth Universal Rack™, free-standing, 2-post rack, 19" inch x 7 feet high black.

2. Install 2 post free-standing racks when specified and approved by the Architect or Engineer.

3. Racks shall be manufactured from aluminum and/or steel extrusions.

4. Each rack will have two L-shaped top angles, two L-shaped base angles, and two C-shaped equipment-mounting channels. The rack will assemble with bolt hardware. Equipment-mounting channels will be threaded for easy assembly. The base angles will be pre-punched for attachment to the floor.

5. Equipment mounting channels will be 3" deep and punched on the front and rear flange with the EIA-310-D Universal hole pattern to provide 45 rackmount spaces for equipment. Each mounting space will be marked and numbered on the mounting channel.

6. When assembled with top and bottom angles, equipment-mounting channels will be spaced to allow attachment of 19" EIA (or 23" only when specified and approved by the Owner) rack-mount equipment. Attachment points will be threaded with 12-24 roll-formed threads. The rack will include assembly and equipment- mounting hardware. Each rack will include 50 combination pan heads, and pilot point mounting screws.

7. The assembled rack will measure 7' (84") high, 20.3" wide, and 15" deep. The sides (webs) of the equipment-mounting channels will be punched to allow the attachment of vertical cable managers along the sides of the rack or for rack-to- rack baying.

8. The rack will be rated for 1,500 lb. of equipment.

9. The rack will be UL Listed.

10. The finish shall be an epoxy-polyester hybrid powder coat in the color of black.

C. Racks are to be joined vertically using the Chatsworth Global Vertical cabling solution part number 12831-703 (6") and/or 12834-703 (10") prior approved equivalent. One unit shall be installed on both sides of the racks.

D. For racks mounted "slab on grade" use Chatsworth Rack Base Insulator Kit.

E. The junction plate at top of the equipment frame shall be Chatsworth 10595-704.

F. Equipment Cabinets and Wall Mount Equipment Cabinets as specified and only when approved by the Owner.

G. Wall Mount Equipment Racks and Cabinets are permitted only with prior approval from the Owner.

2.2 VERTICAL WIRE MANAGEMENT

A. A. Vertical Cable Management for Racks/Frames (CCS Combination Cabling Section)

1. Every rack/frame will have a minimum of one vertical cable manager plus one additional per row. The vertical cable manager will create a space for storing and organizing cables and patch cords along the side of the rack/frame. The cable manager will maintain separation between patch/equipment/jumper cords and premise cables.

2. The cable manager will be 12831-703 (6") and/or 12834-703 (10") installations as per required.

3. A single vertical cable manager shall be used in between bayed racks/frames.

4. The vertical cable manager will match the height of the rack(s)/frame(s).

5. The vertical cable manager will bolt to the side of racks/frames with included hardware.

6. The manufacturer of the vertical cable manager will sell compatible racks/frames.

7. The front cover will be removable.

8. The front of the vertical cable manager will have cable openings along both sides of the trough. The openings will be formed by evenly-spaced T-shaped cable guides. The T-shaped cable guides will be made from a composite plastic material (not metal) and will have rounded edges to protect the cables. When the cable manager is attached to a rack/frame, each cable opening will align with a rack-mount space (RMU) on the rack/frame. Each opening will pass a minimum of 24 each .25" OD patch cords.

9. The cable manager will be delivered individually boxed, and available in several widths as specified below and in the contract documents. 9. The vertical cable manager shall be manufactured from sheet aluminum and composite materials. 10. Finish shall be a black epoxy-polyester hybrid powder coat paint. Edge protectors, T-shaped cable guides, and latch hardware are black. Channels, Double-Sided, 10" Wide x 84" High x 14.6" Deep, Black.

2.3 EQUIPMENT

A. **THERE ARE NO NOTABLE EXCEPTIONS TO THE AFOREMENTIONED PRODUCT STANDARDS WITHOUT A WRITTEN CHANGE REQUEST SUBMITTED AND APPROVED BY THE OWNER.**

END OF SECTION 271116

SJC EXTENSION OFFICE

SECTION 271543

FACEPLATES AND CONNECTORS

PART 1 – GENERAL

1.1 SCOPE OF WORK

A. Work covered by this Section shall consist of furnishing all labor, equipment, supplies, materials, and testing unless otherwise specified, and in performing the following operations recognized as necessary for the installation, termination, and labeling of faceplates and connectors as described on the Drawings and/or required by these specifications.

1.2 RELATED SECTIONS

270528.1	PATHWAYS FOR COMMUNICATION SYSTEMS
270553	IDENTIFICATION FOR COMMUNICATION SYSTEMS
271116	CABINETS, RACKS, FRAMES, AND ENCLOSURES

PART 2 – PRODUCTS

2.1 PRODUCTS STANDARD

A. The materials and products specified herein reflect the minimum acceptable standards of fabrication and manufacture. All materials and products supplied by the Contractor and specified herein are to be new, unused, of first quality, and in original packaging or shipping containers or as shown on drawings and described in Item 3.01.

B. New buildings and major renovations will be treated differently than minor remodels in existing buildings.

1. Match existing cabling systems and termination hardware for all adds moves and changes with a minimum of Category 6 (Superior Essex Series 66 or as specified) termination hardware including voice and data unless directed otherwise by the Owner, even those areas where separate voice and data closets are utilized.

2. New building construction and renovations will utilize a minimum of Category 6 termination hardware or as specified by the Owner.

C. Contact the Owner for approval of cabling systems before installation. Verify exact cabling requirements with the Architect/Engineer.

D. The Owner will provide patch cords and make all connections to the campus network and phone system unless otherwise specified.

E. The standard work area outlets consist of 2 Category 6 ports.

F. Wall phones shall consist of 1 Category 6 connector to be installed within a single gang, modular one-port stainless steel faceplate.

G. Wireless TOs mounted in ceilings have 2, Category 6 connectors.

2.2 STANDARD TELECOMMUNICATIONS OUTLET (TO)

A. Standard work area Telecommunications Outlets (TO) shall utilize blue modules/inserts with 45°-degree angled jacks and faceplates and blanks shall be white or shall match the color of electrical faceplates. Floor boxes require flat jacks.

B. Approved Manufacturers and products shall be:

1. Ortronics

2. Leviton

3. Siemen

4. Or as specified

C. Horizontal Fiber Terminations:

1. At the TO and in the TR, use the manufacturer's matching module and the type of connector as required by the application, LC mechanical connectors, or match existing.

2. The link Loss budget shall meet all manufacturers' specifications.

D. Existing Copper TO Locations:

1. Where new jacks are being installed in existing TO locations, match with the existing connector hardware and patch panel manufacturer.

E. CATV Terminations

1. Coaxial RG-6 Cable Installations

a) Terminate all RG-6 cables with F-type crimp or compression connectors and correctly sized tools.

2. CATV outlet within a TO shall utilize F type insert module.

PART 3 – EXECUTION

3.1 GENERAL

A. This Section describes the installation locations for the products and materials, as well as methods and Standards associated with the IT Installation portions of

the Project. These Specifications, along with the drawings and other specifications shall be followed during the installation.

B. The contractor is required to be currently listed as an approved manufacturer registered Certified Installer and provide personnel for IT installations who are certified and meet warranty requirements established by the manufacturer.

C. The Contractor is instructed to coordinate his efforts with the other tradesmen who may be working within the same vicinity to avoid conflict and lost time.

D. The Contractor is required to supply all necessary tools, equipment, accessories, safety equipment, protective clothing, etc., as customary for the craft and necessary for the installation.

E. The Contractor shall verify space requirements and locations with the Owner and/or the Architect/Engineer before starting cable installations and terminations.

F. All terminations are to use TIA T568B wiring standards.

G. Terminate according to the manufacturer's instructions

3.2 TERMINATIONS

A. Twisted pair cable.

1. All twisted pair cables shall be terminated as specified by the manufacturer with the proper tools.

B. Coax Cable

1. All Coax cables shall be terminated using connectors matching cable type and application, tool assembly matching connector type for crimp or compression type connectors, and follow Manufacturer procedures for termination.

C. Optical Fiber Cable.

1. Optical Fiber terminated at the desktop will be with LC connectors following the manufacturer's instructions. Optical fiber terminated in TR/ER shall be fusion type LC connectors or fusion spliced pigtails using LC connectors when specified, on all new projects, and existing projects where optical fiber is being added confirm in writing the connector type with the Architect/Engineer.

3.3 EQUIPMENT INSTALLATION AND CABLE TERMINATIONS

A. All equipment shall be installed in a neat and workmanlike manner, arranged for convenient operation, testing, and future maintenance.

B. All telecommunications cables, faceplates, and connectors shall be installed and terminated by manufacturer-certified technicians experienced in the installation and termination of telecommunications items listed herein.

C. The contractor shall provide licensed manufacturer-certified technicians and installers.

3.4 AS-BUILT INFORMATION

A. The Contractor shall provide 1 set of preliminary as-built information to the Owner, along with all test result information 2 weeks before occupancy or substantial complication. Partial as-builts shall be submitted as cabling is completed. A final as-built shall be submitted with all corrections made a maximum of 30 days after the cabling installation is complete.

B. As-built information shall be in electronic DWG and PDF format. Indicate the location of all TOs, pathways, distribution cable trays, junction boxes, and all additions and deletions related to telecommunications. Include correct TO labeling next to all telecom symbols.

C. If construction drawings are not utilized, the contractor shall provide all telecommunications location information on an accurate and scaled floor plan.

3.5 SYSTEM WARRANTY REQUIREMENTS

A. The Contractor shall perform all labeling requirements and provide testing documentation for verification as described herein.

B. The Contractor shall submit cable records to reflect all moves, adds, and changes.

C. The Contractor shall provide floor plans showing the locations of all telecommunication outlets and spaces.

D. The Contractor shall perform these requirements for category 6 and 6A permanent link configurations and submit to the hardware manufacturer such paperwork and test results as necessary to obtain a minimum 20-year system performance guarantee as defined by the cable and hardware manufacturers. The 20-year minimum system warranty shall be provided to the Owner before final payment for this work.

END OF SECTION 271543

SJC EXTENSION OFFICE

SECTION 280000

ELECTRONIC SAFETY AND SECURITY INDEX

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including General Special Conditions and the General Requirements, apply to the work specified in this section.

1.2 DESCRIPTION OF WORK

A. Furnish all labor, equipment, materials, service tools, etc., which are required for the complete installation of all Electronic Safety and Security work, as indicated on the Drawings and specified herein. Electronic Safety and Security work indicated on the Drawings and/or specifications covering other trades shall conform to Division 28 of these Specifications.

B. Work or equipment not indicated or specified, which is necessary for the complete and proper operation of the Electronic Safety ad Security systems, shall be accomplished without additional cost to the Owner.

1.3 ELECTRONIC SAFETY AND SECURITY DIVISION INDEX

283000 FIRE ALARM SYSTEMS

PART 2 - PRODUCTS – (Not Used.)

PART 3 - EXECUTION – (Not Used.)

END OF SECTION 280000

SJC EXTENSION OFFICE

SECTION 283000

FIRE ALARM SYSTEMS

PART 1 – GENERAL

1.1 DESCRIPTION

A. This section of the specification includes the furnishing, installation, connection and testing of the microprocessor controlled, intelligent reporting fire alarm equipment required to form a complete, operative, coordinated system. It shall include, but not be limited to, alarm initiating devices; alarm notification appliances, Fire Alarm Control Panel (FACP), auxiliary control devices, annunciators, and wiring as shown on the drawings and specified herein.

B. The fire alarm system shall comply with requirements of NFPA Standard No. 72 for protected premises signaling systems except as modified and supplemented by this specification. The system shall be electrically supervised and monitor the integrity of all conductors.

C. The fire alarm manufacturer shall be of the highest caliber and insist on the highest quality. The system shall be manufactured by an ISO 9001 certified company and meet the requirements of BS EN9001 ANSI/ASQC Q9001-1994.

D. The FACP and peripheral devices shall be manufactured 100% by a single U.S. manufacturer (or division thereof).

E. The system and its components shall be Underwriters Laboratories, Inc. listed under the appropriate UL testing standard as listed herein for fire alarm applications and shall be in compliance with the UL listing.

F. Each designated zone shall transmit separate and different alarm, supervisory and trouble signals to the Fire Command Center (FCC) and designated personnel in other buildings at the site via a multiplex communication network.

G. The system shall be an active/interrogative type system where each transponder is repetitively scanned, causing a signal to be transmitted to the main fire alarm control panel (FACP) indicating that the transponder and its associated initiating device and notification appliance circuit wiring is functional. Loss of this signal at the main FACP shall result in a trouble indication as specified hereinafter for the particular input.

H. The system shall be arranged such that not less than 20 percent additional transponders may be inserted into any network communication loop.

I. The installing company shall employ NICET (minimum Level II Fire Alarm Technology) technicians on site to guide the final check-out and to ensure the systems integrity.

1.2 SCOPE

A. A new intelligent reporting, microprocessor-controlled fire detection and emergency voice alarm communication system shall be installed in accordance with the specifications and drawings.

B. Existing fire detection equipment may be reused where the equipment

1. Meets this specification section,

2. Is approved by a recognized national agency (UL,FM, etc.),

3. Is verified as compatible with new equipment being installed,

4. Is verified as operable through testing and inspection,

5. And is approved by the local Authority Having Jurisdiction (AHJ).

C. Basic Performance

1. Alarm and trouble signals from each transponder shall be digitally encoded by listed electronic devices onto an NFPA Style 6 looped multiplex communication system.

2. Alarm, trouble, and supervisory signals from all intelligent reporting devices shall be encoded onto NFPA Style 6 Signaling Line Circuits.

3. Initiation Device Circuits (IDC) shall be wired Class A (NFPA Style D).

4. Digitized electronic signals shall employ check digits or multiple polling.

5. A single ground or open on any system signaling line circuit, initiating device circuit, or notification appliance circuit shall not cause system malfunction, loss of operating power or the ability to report an alarm.

6. Alarm signals arriving at the main FACP shall not be lost following a power failure (or outage) until the alarm signal is processed and recorded.

D. BASIC SYSTEM FUNCTIONAL OPERATION

1. When a fire alarm condition is detected and reported by one of the system initiating devices or appliances, the following functions shall immediately occur

a) The System Alarm LED shall flash.
b) A local piezo-electric signal in the control panel shall sound.
c) The 80-character LCD display shall indicate all information associated with the fire alarm condition, including the type of alarm point and its location within the protected premises.

d) Printing and history storage equipment shall log the information associated with the fire alarm control panel condition, along with the time and date of occurrence.

e) All system output programs assigned via control-by-event equations to be activated by the particular point in alarm shall be executed, and the associated system outputs (alarm notification appliances and/or relays) shall be activated.

E. The Contractor shall coordinate the requirements of interconnected systems including sprinkler systems, HVAC Fire/Smoke Damper Detectors and HVAC Duct Detectors. The contract drawings may not show all sprinkler waterflow and supervisory switch connections. All waterflow, supervisory switches, HVAC Fire/Smoke Damper Detectors and HVAC Duct Detectors shall be connected to the Fire Alarm System at no additional cost to the owner.

1.3 SUBMITTALS

A. General

1. All substitute equipment proposed as equal to the equipment specified herein, shall meet or exceed the following standards. For equipment other than that specified, the contractor shall supply proof that such substitute equipment does in fact equal or exceed the features, functions, performance, and quality of the specified equipment.

2. Quantity of copies of all submittals shall be submitted to the Architect/Engineer for review as called for in the architectural specifications.

B. Shop Drawings

1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.

2. Provide scaled reproducible shop drawings that include manufacturer's name(s), model numbers, ratings, power requirements, equipment layout, device arrangement, complete wiring point-to-point diagrams, and conduit layouts and wiring requirements. These drawings shall only contain information regarding the Fire Alarm System.

3. Show annunciator layout and main control panel module layout, configurations, and terminations.

C. Manuals

1. Submit simultaneously with the shop drawings, complete operating and maintenance manuals listing the manufacturer's name(s) including technical data sheets.

2. Wiring diagrams shall indicate internal wiring for each item of equipment and the interconnections between the items of equipment.

3. Provide a clear and concise description of operation which gives, in detail, the information required to properly operate the equipment and system.

4. Approvals will be based on complete submissions of manuals together with shop drawings.

D. Software Modifications

1. Provide the services of a factory trained and authorized technician to perform all system software modifications, upgrades, or changes. Response time of the technician to the site shall not exceed 4 hours.

2. Provide all hardware, software, programming tools and documentation necessary to modify the fire alarm system on site. Modification includes addition and deletion of devices, circuits, zones and changes to system operation and custom label changes for devices or zones. The system structure and software shall place no limit on the type or extent of software modifications on-site. Modification of software shall not require power-down of the system or loss of system fire protection while modifications are being made.

E. Certifications Together with the shop drawing submittal, submit a certification from the major equipment manufacturer indicating that the proposed supervisor of installation and the proposed performer of contract maintenance is an authorized representative of the major equipment manufacturer. Include names and addresses in the certification.

1.4 GUARANTY

A. All work performed and all material and equipment furnished under this contract shall be free from defects and shall remain so for a period of at least one (1) year from the date of acceptance. The full cost of maintenance, labor and materials required to correct any defect during this one-year period shall be included in the submittal bid.

1.5 POST CONTRACT MAINTENANCE

A. Complete maintenance and repair service for the fire alarm system shall be available from a factory trained authorized representative of the manufacturer of the major equipment for a period of five (5) years after expiration of the guaranty.

B. As part of the submittal, include a quote for a maintenance contract to provide all maintenance, test, and repair described below. Include also a quote of unscheduled maintenance/repair, including hourly rates for technicians trained on this equipment and response travel costs. Submittals which do not identify all post contract maintenance costs will not be accepted. The rates and costs shall be valid for the period of five (5) years after expiration of the guaranty.

C. Maintenance and testing shall be as required by the local AHJ. A preventive maintenance schedule shall be provided by the contractor which shall describe the

plan for preventive maintenance of all devices and subassemblies requiring regular maintenance. The schedule shall include

1. Systematic examination, adjustment and cleaning of all detectors, manual fire alarm stations, control panels, power supplies, relays, water flow switches and all accessories of the fire alarm system.

2. Each circuit in the fire alarm system shall be tested semiannually.

3. Each smoke detector shall be tested in accordance with the requirements of NFPA 72, Chapter 7.

1.6 POST CONTRACT EXPANSIONS

A. The contractor shall provide parts and labor to expand the system specified, if so requested, for a period of five (5) years from the date of acceptance.

B. As part of the submittal include a quotation for all parts and material, and all installation and test labor as needed to increase the number of intelligent or addressable devices by ten percent (10%). This quotation shall include intelligent smoke detectors, intelligent heat detectors, addressable manual stations, addressable monitor modules and addressable control modules equal in number to one tenth of the number required to meet this specification (list actual quantity of each type).

C. Quotation shall include installation and test labor and labor to reprogram the system for this 10% expansion. If additional loop interface hardware is required, include the material and labor necessary to install this hardware.

D. Do not include cost of conduit or wire or the cost to install conduit or wire except for labor to make final connections at the FACP and at each intelligent, addressable device. Do not include cost of conventional peripherals or the cost of initiating devices or notification appliances connected to the addressable monitor/control modules.

E. Submittals which do not include this estimate of post contract expansion cost will not be accepted.

1.7 APPLICABLE PUBLICATIONS The publications listed below form a part of this specification. The publications are referenced in text by the basic designation only.

A. National Fire Protection Association (NFPA) – USA

1. No. 70 National Electric Code (NEC)

2. No. 72-1993 National Fire Alarm Code

3. No. 101 Life Safety Code

B. Underwriters Laboratories Inc. (UL) – USA

1. No. 50 Cabinets and Boxes
2. No. 268 Smoke Detectors for Fire Protective Signaling Systems
3. No. 864 Control Units for Fire Protective Signaling Systems
4. No. 268A Smoke Detectors for Duct Applications
5. No. 521 Heat Detectors for Fire Protective
6. No. 228 Door Closers-Holders for Fire Protective Signaling Systems
7. No. 464 Audible Signaling Appliances
8. No. 38 Manually Actuated Signaling Boxes
9. No. 346 Waterflow Indicators for Fire Protective Signaling Systems
10. No. 1481 Power supplies for Fire Protective Signaling Systems
11. No. 1076 Control Units for Burglar Alarm Proprietary Protective Signaling Systems
12. No. 1971 Visual Notification Appliances

C. Local and State Building Codes.

D. All requirements of the Authority Having Jurisdiction (AHJ).

1.8 APPROVALS

A. The system must have proper listing and/or approval from the following nationally recognized agencies

1. UL Underwriters Laboratories Inc.
2. FM Factory Mutual
3. ULC Underwriters Laboratories Canada
4. MEA Material Equipment Acceptance (NYC)
5. CSFM California State Fire Marshal

B. The Fire Alarm Control Panel and all transponders shall meet the modular labeling requirements of Underwriters Laboratories, Inc. Each subassembly, including all printed circuits, shall include the appropriate UL modular label. Systems which do

not include modular labels may require return to the factory for system upgrades and are not acceptable.
Systems that do not include modular labels are not acceptable and may require return to the factory for upgrades.

PART 2 – PRODUCTS

2.1 EQUIPMENT AND MATERIAL, GENERAL

A. All equipment and components shall be new, and the manufacturer's current model. The materials, appliances, equipment, and devices shall be tested and listed by a nationally recognized approvals agency for use as part of a protected premises protective signaling (fire alarm) system. The authorized representative of the manufacturer of the major equipment, such as control panels, shall be responsible for the satisfactory installation of the complete system.

B. All equipment and components shall be installed in strict compliance with each manufacturer's recommendations. Consult the manufacturer's installation manuals for all wiring diagrams, schematics, physical equipment sizes, etc. before beginning system installation. Refer to the riser/connection diagram for all specific system installation/termination/wiring data.

C. All Equipment shall be attached to walls and ceiling/floor assemblies and shall be held firmly in place. (e.g., detectors shall not be supported solely by suspended ceilings). Fasteners and supports shall be adequate to support the required load.

2.2 CONDUIT AND WIRE

A. Conduit

1. Conduit shall be in accordance with the National Electrical Code (NEC), local and state requirements.

2. Where possible, all wiring shall be installed in conduit or raceway. Conduit fill shall not exceed 40 percent of interior cross-sectional area where three or more cables are contained within a single conduit.

3. Cable must be separated from any open conductors of Power, or Class 1 circuits, and shall not be placed in any conduit, junction box or raceway containing these conductors, as per NEC Article 760-29.

4. Wiring for 24-volt control, alarm notification, emergency communication, and similar power-limited auxiliary functions may be run in the same conduit as initiating and signaling line circuits. All circuits shall be provided with transient suppression devices and the system shall be designed to permit simultaneous operation of all circuits without interference or loss of signals.

5. Conduit shall not enter the fire alarm control panel, or any other remotely mounted control panel equipment or backboxes, except where conduit entry is specified by the FACP manufacturer.

6. Conduit shall be 3/4-inch (19.1 mm) minimum.

7. Class A conduit per NFPA 72.

B. Wire

1. All fire alarm system wiring must be new. Existing wiring shall not be reused. All existing wiring shall be removed.

2. Wiring shall be in accordance with local, state, and national codes (e.g., NEC Article 760) and as recommended by the manufacturer of the fire alarm system. Number and size of conductors shall be as recommended by the fire alarm system manufacturer, but not less than 18 AWG (1.02 mm) for Initiating Device Circuits and Signaling Line Circuits, and 14 AWG (1.32 mm) for Notification Appliance circuits.

3. All wire and cable shall be listed and/or approved by a recognized testing agency for use with a protective signaling system.

4. Wire and cable not installed in conduit shall have a fire resistance rating suitable for the installation as indicated in NFPA 70 (e.g., FPLR).

5. Wiring used for the multiplex communication loop shall be twisted and shielded and installed in conduit unless specifically excepted by the fire alarm equipment manufacturer. The system should permit use of IDC and NAC wiring in the same conduit with the communication loop.

6. All field wiring shall be completely supervised.

C. Terminal Boxes, Junction Boxes and Cabinets All boxes and cabinets shall be UL listed for their intended purpose.

D. Initiating circuits shall be arranged to serve like categories (manual, smoke, waterflow). Mixed category circuitry shall not be permitted except on signaling line circuits connected to intelligent reporting devices.

E. The main fire alarm control panel shall be connected to a separate dedicated branch circuit, maximum 20 amperes. This circuit shall be labeled at the main power distribution Panel as FIRE ALARM. Fire alarm control panel primary power wiring shall be 12 AWG. The control panel cabinet shall be grounded securely to either a cold-water pipe or grounding rod.

2.3 MAIN FIRE ALARM CONTROL PANEL

A. The main FACP Central Console shall be a NOTIFIER Model AM2020 and shall contain a microprocessor based central processing unit (CPU). The FACP shall communicate with and control the following types of equipment used to make up the system intelligent detectors, addressable modules, transponders, local and remote operator terminals, printers, annunciators, emergency voice communication systems and other system-controlled devices.

B. The main FACP shall perform the following functions:

1. Supervise and monitor all intelligent/addressable detectors and monitor modules connected to the system for normal, trouble and alarm conditions.

2. Supervise all initiating signaling and notification circuits throughout the facility by way of connection to transponders.

3. Detect the activation of any initiating device and the location of the alarm condition. Operate all notification appliances and auxiliary devices as programmed.

4. Visually and audibly annunciate any trouble, supervisory or alarm, condition on operator's terminal, panel display, and annunciators.

C. System Capacity and General Operation

1. The control panel shall provide, or be capable of expansion to, 198 intelligent/addressable devices per loop plus 2048 annunciation points per system.

2. The fire alarm control panel shall include a full featured operator interface control and annunciation panel which shall include a Bake lite Liquid Crystal Display (LCD), individual, color coded system status LEDs, and an alpha-numeric keypad for field programming and control of the fire alarm system.

3. All programming or editing of the existing program in the system shall be achieved without special equipment and without interrupting the alarm monitoring functions of the fire alarm control panel.

4. The system shall include emergency voice communications utilizing distributed amplification and intelligence such that loss of operation by the main FACP will not result in the loss of evacuation signal throughout the balance of the building.

5. The FACP shall provide the following features

a)	Block Acknowledge	Printer Interface
b)	Charger rate Control	CRT Display Interface
c)	Control-by-Time	Non-Alarm Module Reporting
d)	Day/Night Sensitivity	Periodic Detector Test
e)	Device Blink Control	Remote Page
f)	Drift Compensation	Trouble Reminder
g)	NFPA 72, Sensitivity Test	Upload/Download to PC computer
h)	System Status Reports	Verification Counters
i)	Security Monitor Points	Walk Test
j)	Alarm Verification	Maintenance Alert

D. Central Processing Unit (CPU)

1. The Central Processing Unit shall communicate with, monitor, and control all other modules within the control panel. Removal, disconnection, or failure of any control panel module shall be detected and reported to the system display by the central processing unit.

2. The CPU shall contain and execute all control-by-event programs for specific action to be taken if an alarm condition is detected by the system. Control-by-event programs shall be held in non-volatile programmable memory and shall not be lost even if system primary and secondary power failure occurs.

3. The Central Processing Unit shall also provide a real-time clock for time annotation of all system displays. The Time-Of-Day and date shall not be lost if system primary and secondary power supplies fail.

E. Display

1. The system display shall provide all the controls and indicators used by the system operator and may also be used to program all system operational parameters.

2. The display assembly shall contain, and display as required, custom alphanumeric labels for all intelligent detectors, addressable modules, and software zones.

3. The system display shall provide an 80-character back-lit alphanumeric Liquid Crystal Display (LCD). It shall also provide 5 light-emitting-diodes (LEDs), which will indicate the status of the following system parameters AC POWER, SYSTEM ALARM; SYSTEM TROUBLE, DISPLAY TROUBLE, and SIGNAL SILENCE.

4. The system display shall provide a 25-key touch keypad with control capability to command all system functions, entry of any alphabetic or numeric information, and field programming. Two different password levels will be accessible through the display interface assembly to prevent unauthorized system control or programming.

5. The system display shall include the following operator control switches SIGNAL SILENCE, LAMP TEST, RESET, SYSTEM TEST, and ACKNOWLEDGE

F. Signaling Line Circuit (SLC) Interface Board

1. The SLC board shall monitor and control a minimum of 198 intelligent addressable devices. This includes 99 intelligent detectors (Ionization, Photoelectric, or Thermal) and 99 monitor or control modules.

2. The SLC interface board shall contain its own microprocessor and shall be capable of operating in a local mode (any SLC input activates all or specific SLC outputs) in the unlikely event of a failure in the main CPU.

3. The SLC interface board shall not require any jumper cuts or address switch settings to initialize operations.

4. The SLC interface board shall provide power and communicate with all intelligent addressable detectors and modules on a single pair of wires. This SLC Loop shall be capable of operating as a NFPA Style 7 (Class A) circuit.

5. The SLC interface board shall receive analog information from all intelligent detectors and shall process this information to determine whether normal, alarm, or trouble conditions exist for that particular detector. The SLC interface board software shall include software to automatically maintain the detector's desired sensitivity level by adjusting for the effects of environmental factors, including the accumulation of dust in each detector. The analog information may also be used for automatic detector testing and for the automatic determination of detector maintenance requirements.

G. Serial Interface Board (SIB)

1. The Serial Interface Board shall provide the EIA-232 interface between the fire alarm control panel and UL-Listed Electronic Data Processing (EDP) peripherals.

2. The SIB shall allow the use of multiple printers, CRT monitors, and other peripherals connected to the EIA-232 ports.

3. The Serial Interface Board shall provide one EIA-485 port for the serial connection of the optional annunciator and control subsystem components.

4. The SIB shall include LEDs which indicate that it is in regular communication with the annunciators and other EIA-485 connected peripheral devices.

5. All EIA-232 circuits shall be optically isolated and power limited.

H. Enclosures

1. The control panels shall be housed in UL listed cabinets suitable for surface or semi-flush mounting. Cabinets shall be corrosion protected, given a rust-resistant prime coat, and manufacturer's standard finish.

2. The back box and door shall be constructed of .060 steel with provisions for electrical conduit connections into the sides and top.

3. The door shall provide a key lock and include a transparent opening for viewing all indicators. For convenience, the door shall have the ability to be hinged on either the right or left-hand side.

4. The control unit shall be modular in structure for ease of installation, maintenance, and future expansion.

I. The CPU shall be capable of being programmed on site without requiring the use of any external programming equipment. Systems that require the use of external programmers or change of EPROMs are not acceptable.

J. The CPU and associated equipment are to be protected so that they will not be affected by voltage surges or line transients consistent with UL864 standards.

K. Each peripheral device connected to the CPU shall be continuously scanned for proper operation. Data transmissions between the CPU and peripheral devices shall be reliable and error free. The transmission scheme used shall employ dual transmission or other equivalent error checking techniques.

L. Power Supply

1. The Main Power Supply shall operate on 120 VAC, 60 Hz, and shall provide all necessary power for the FACP.

2. It shall provide 3.0 amps of usable notification appliance power, using a switching 24 VDC regulator.

3. It shall be expandable, for additional notification appliance power, in 3.0 ampere increments.

4. It shall provide a battery charger for 24 hours of standby using dual-rate charging techniques for fast battery recharge. It shall charge up to 55 Amp Hour batteries with-in a 48-hour period.

5. It shall provide a very low frequency sweep earth detect circuit, capable of detecting earth faults on sensitive addressable modules.

6. It shall be power limited per 1995 UL864 requirements.

7. It shall provide meters to indicate battery voltage and charging current.
8. The power supply shall be capable of charging NICAD batteries up to 32 Amp Hours.

M. Universal Digital Alarm Communicator Transmitter (UDACT). The UDACT is an interface for communicating digital information between a fire alarm control panel and a UL-Listed central station.

1. The UDACT shall be compact in size, mounting in a standard module position of the fire alarm control cabinet. Optionally, the UDACT shall have the ability for remote mounting, up to 6,000 feet from the fire alarm control panel. The connection between the UDACT and the control panel shall be completely supervised.

2. The UDACT shall include connections for dual telephone lines (with voltage detect), per UL/NFPA requirements. It shall include the ability for split reporting of panel events.

3. The UDACT shall be completely field programmable from a built-in keypad and 4 character red, seven segment display.

4. The UDACT shall be capable of transmitting events in at least 9 different formats. This ensures compatibility with existing and future transmission formats. Accepted formats include

   a) 3+1 Standard - 4+1 Standard
   b) Ademco Contact ID - 4+1 and 4+2 Ademco

5. Communication shall include vital system status such as

   a) Independent Zone (Alarm, trouble, non-alarm)
   b) Independent Zone Supervisory Signal
   c) AC (Mains) Power Loss
   d) Low Battery and Earth Fault
   e) System Off Normal
   f) 12 and 24 Hour Test Signal
   g) Abnormal Test Signal (per UL requirements)
   h) EIA-485 Communications Failure

6. The UDACT shall support independent zone/point reporting when used in the Contact ID format. In this format the UDACT shall support transmission of up to 2,040 points. This enables the central station to have exact details concerning the origin of the fire or response emergency.

N. Field Charging Power Supply the FCPS is a device designed for use as either a remote 24-volt power supply or used to power Notification Appliances.

1. The FCPS shall offer up to 6.0 amps (4.0 amps continuous) of regulated 24-volt power. It shall include an integral charger designed to charge 7.0-amp hour batteries and to support 60-hour standby.

2. The Field Charging Power Supply shall have two input triggers. The input trigger shall be a Notification Appliance Circuit (from the fire alarm control panel) or a relay. Four outputs (two Style Z or Y) shall be available for connection to the Notification devices.

3. The FCPS shall include an attractive surface mount backbox.

4. The Field Charging Power Supply shall include the ability to delay the AC fail delay per 1993 NFPA requirements.

5. The FCPS include power limited circuitry, per 1995 UL standards.

O. System Circuit Supervision

1. The FACP shall supervise all circuits to intelligent devices, annunciators and conventional peripherals and annunciate loss of communications with these devices. The CPU shall continuously scan above devices for proper system operation and upon loss of response from a device shall sound an audible trouble, indicate that device or devices are not responding and print the information on the printer.

2. Sprinkler system valves, standpipe control valves, PIV and main gate valves shall be supervised for off-normal position.

P. Field Wiring Terminal Blocks: For ease of service, all wiring terminal blocks shall be the plug-in type and have sufficient capacity for 18 to 12 AWG wire. Fixed terminal blocks are not acceptable.

Q. Operators Terminal
Provide the following functions in addition to any other functions required for the system.

1. Acknowledge (ACK/STEP) Switch

a) Activation of the control panel Acknowledge switch in response to a single new Alarm and/or trouble condition shall silence the local panel piezo electric signal and change the system alarm or trouble LED from flashing mode to steady-ON mode. If additional new Alarm or Trouble conditions exist or are detected and reported in the system, depression of this switch shall advance the 80-character LCD display to the next alarm or trouble condition.
b) Depressing the acknowledge switch shall also silence all remote annunciator piezo sounders.

2. Signal Silence Switch

a) Activation of the signal silence switch shall cause all programmed alarm notification appliances and relays to return to the normal condition after an alarm activation. The selection of notification circuits and relays which are silenceable by this switch shall be fully field programmable within the confines of all applicable standards.

3. System Reset Switch

a) Activation of the system reset switch shall cause all electronically latched initiating devices, appliances, or software zones, as well as all associated output devices and circuits, to return to their normal condition.
b) If an alarm condition(s) still exists, or if they reoccur in the system after system reset switch activation, the system shall then resound the alarm conditions.

4. System Test Switch.

   a) Activation of the system test switch shall initiate an automatic test of all Intelligent/Addressable detectors in the system. The system test shall activate the electronics in each intelligent sensor, simulating an alarm condition and causing the transmission of the alarm condition from that sensor to the fire alarm control panel. The fire alarm control panel shall interpret the data from each sensor installed in the system. A report summarizing the results of this test shall be displayed automatically on the system LCD, and on any CRTs or printers in the system.

5. Lamp Test Switch

   a) Activation of the lamp test switch shall sequentially turn on all LED indicators, system liquid crystal display and local piezo signal, and then automatically return the fire alarm control panel to the previous condition.

R. Remote Transmissions

1. Provide local energy or polarity reversal or trip circuits as required.

2. The system shall be capable of operating a polarity reversal or local energy or fire alarm transmitter for automatically transmitting fire information to the fire department.

3. Provide capability and equipment for transmission of zone alarm and trouble signals to remote operator's terminals, system printers and annunciators.

4. Transmitters shall be compatible with the systems and equipment they are connected to such as timing, operation, and other required features.

S. System Expansion Design the main FACP and transponders so that the system can be expanded in the future (to include the addition of twenty percent more circuits or zones) without disruption or replacement of the existing control panel. This shall include hardware capacity, software capacity and cabinet space.

T. Field Programming

1. The system shall be programmable, configurable, and expandable in the field without the need for special tools or electronic equipment and shall not require field replacement of electronic integrated circuits.

2. All programming shall be accomplished through the standard FACP keyboard or through the video display terminal.

3. All field defined programs shall be stored in non-volatile memory.

4. The programming function shall be enabled with a password that may be defined specifically for the system when it is installed. Two levels of password protection shall be provided in addition to a key-lock cabinet. One level is used for status level changes such as zone disable or manual on/off commands. A second (higher-level) is used for actual change of program information.

U. Specific System Operations

1. Smoke Detector Sensitivity Adjust Means shall be provided for adjusting the sensitivity of any or all analog intelligent smoke detectors in the system from the system keypad or from the keyboard of the video terminal. Sensitivity range shall be within the allowed UL window.

2. Alarm Verification Each of the intelligent addressable smoke detectors in the system may be independently selected and enabled to be an alarm verified detector. The FACP shall keep a count of the number of times each detector has entered the verification cycle. These counters may be displayed and reset by the proper operator commands.

3. System Point Operations

   a) Any device in the system may be enabled or disabled through the system keypad or video terminal.
   b) Any system output point may be turned on, or off, from the system keypad or the video terminal.

4. Point Read The system shall be able to display the following point status diagnostic functions without the need for peripheral equipment. Each point will be annunciated for the parameters listed.

   a) Device Status.
   b) Device Type.
   c) Custom Device Label.
   d) Software Zone Label.
   e) Device Zone Assignments.
   f) Detector Analog Value.
   g) All Program Parameters.

5. System Status Reports Upon command from a password-authorized operator of the system, a status report will be generated, and printed, listing all system status.

6. System History Recording and Reporting The fire alarm control panel shall contain a History Buffer that shall be capable of storing up to 400 system output/input/control activations. Each activation will be stored, and time and date stamped with the actual time of the activation, until an operator requests that the contents be either displayed or printed. The contents of the History Buffer may be manually reviewed, one event at a time, and the actual number of activations may also be displayed and or printed.

7. The history buffer shall use non-volatile memory. Systems which use volatile memory for history storage are not acceptable.

8. Automatic Detector Maintenance Alert The fire alarm control panel shall automatically interrogate each intelligent system detector and shall analyze the detector responses over a period of time.

9. If any intelligent detector in the system responds with a reading that is below or above normal limits, then the system will enter the Trouble Mode, and the particular Intelligent Detector will be annunciated on the system display and printed on the optional system printer. This feature shall in no way inhibit the receipt of alarm conditions in the system, nor shall it require any special hardware, special tools, or computer expertise to perform.

2.4 SYSTEM COMPONENTS

A. Programmable Electronic Sounders

1. Electronic sounders shall operate on 24 VDC nominal.

2. Electronic sounders shall be field programmable without the use of special tools, to provide slow whoop, continuous, or interrupted tones with an output sound level of at least 90 dBA measured at 10 feet from the device.

3. Shall be flush or surface mounted as shown on plans.

B. Strobe Lights shall be combination strobe-mini sounder units.

1. Shall operate on 24 VDC nominal.

2. Shall meet the requirements of the ADA as defined in UL standard 1971 and shall meet the following criteria.

a) The maximum pulse per UL 1971.
b) Candela intensity shall meet the requirements of UL 1971.
c) The flash rate shall meet the requirements of UL 1971.
d) The appliance shall be placed 80 in (2,030 mm) above the highest floor level within the space, or 6 in (152 mm) below the ceiling, whichever is lower.
e) Where two or more strobes may be viewed those strobes shall be synchronized.
f) The design intent with the strobe and strobe/horn units is to meet ADA and NFPA requirements regarding unit candela rating. The contractor shall provide the corresponding strobe in the respective areas. The intent of this requirement is to minimize power supplies. Contractor shall show these candela ratings on shop drawings.

C. Audible/Visual Combination Devices

1. Shall meet the applicable requirements of Section A listed above for audibility.

2. Shall meet the requirements of Section B listed above for visibility.

D. Addressable Devices – General

1. Addressable devices shall provide an address-setting means using rotary decimal switches.

2. Addressable devices shall use simple to install and maintain decade (numbered 1 to 10) type address switches. Devices which use a binary address setting method, such as a dip switch, which are difficult to install and subject to installation error. This type of device is not an allowable substitute.

3. Detectors shall be Intelligent and Addressable, and shall connect with two wires to the fire alarm control panel Signaling Line Circuits.

4. Addressable smoke and thermal detectors shall provide dual (2) alarm and power LEDs. Both LEDs shall flash under normal conditions, indicating that the detector is operational and in regular communication with the control panel, and both LEDs shall be placed into steady illumination by the control panel, indicating that an alarm condition has been detected. If required, the flashing mode operation of the detector LEDs shall be optional through the system field program. An output connection shall also be provided in the base to connect an external remote alarm LED.

5. Smoke detector sensitivity shall be set through the Fire Alarm Control Panel and shall be adjustable in the field through the field programming of the system. Sensitivity may be automatically adjusted by the panel on a time-of-day basis.

6. Using software in the FACP, detectors shall automatically compensate for dust accumulation and other slow environmental changes that may affect their performance. The detectors shall be listed by UL as meeting the calibrated sensitivity test requirements of NFPA Standard 72, Chapter 7.

7. The detectors shall be ceiling-mount and shall include a separate twist-lock base which includes a tamper proof feature. An optional base shall be available with a built-in (local) sounder rated at 85 DBA minimum.

8. The detectors shall provide a test means whereby they will simulate an alarm condition and report that condition to the control panel. Such a test may be initiated at the detector itself (by activating a magnetic switch) or initiated remotely on command from the control panel.

9. Detectors shall also store an internal identifying type code that the control panel shall use to identify the type of device (ION, PHOTO, THERMAL).

E. Addressable Pull Box (manual station)

1. Addressable pull boxes shall, on command from the control panel, send data to the panel representing the state of the manual switch and the

addressable communication module status. They shall be double-action and shall use a key operated test-reset lock, and shall be designed so that after actual emergency operation, they cannot be restored to normal use except by the use of a key.

2. All operated stations shall have a positive, visual indication of operation and utilize a key type reset.

3. Manual stations shall be double action and constructed of Lexan with clearly visible operating instructions provided on the cover. The word FIRE shall appear on the front of the stations in raised letters, 1.75 inches or larger.

4. Stations shall be suitable for surface mounting or semi flush mounting as shown on the plans, and shall be installed not less than 42 inches, nor more than 48 inches above the finished floor.

F. Intelligent Photoelectric Smoke Detector

1. The detectors shall use the photoelectric (light-scattering) principal to measure smoke density and shall, on command from the control panel, send data to the panel representing the analog level of smoke density.

G. Intelligent Ionization Smoke Detector

1. The detectors shall use the dual-chamber ionization principal to measure products of combustion and shall, on command from the control panel, send data to the panel representing the analog level of products of combustion.

H. Intelligent Thermal Detectors

1. Thermal detectors shall be intelligent addressable devices rated at 135 degrees Fahrenheit (58 degrees Celsius) and have a rate-of-rise element rated at 15 degrees F (9.4 degrees C) per minute. It shall connect via two wires to the fire alarm control panel signaling line circuit. Up to 99 intelligent heat detectors may connect to one SLC loop.

I. Intelligent Duct Smoke Detector

1. The in-duct smoke detector housing shall accommodate either an intelligent ionization detector or an intelligent photoelectric detector, of that provides continuous analog monitoring and alarm verification from the panel.

2. When sufficient smoke is sensed, an alarm signal is initiated at the FACP, and appropriate action taken to change over air handling systems to help prevent the rapid distribution of toxic smoke and fire gases throughout the areas served by the duct system.

3. Fire alarm addressable duct detectors and fire alarm addressable relays for fan shutdown shown on the HVAC equipment will be addressed as follows:

   a) Duct detectors shall be provided by the division 16 contractor and installed by the division 15 contractor. Fan shutdown relay shall be provided and installed by the division 16 contractor. Division 15 controls contractor shall connect the relay for fan shutdown. The division 16 special systems contractor shall monitor both devices.

J. Addressable Dry Contact Monitor Module

1. Addressable monitor modules shall be provided to connect one supervised IDC zone of conventional alarm initiating devices (any N.O. dry contact device) to one of the fire alarm control panel SLC loops.

2. The monitor module shall mount in a 4-inch square, 2-1/8-inch-deep electrical box.

3. The IDC zone may be wired for Style D or Style B operation. An LED shall be provided that shall flash under normal conditions, indicating that the monitor module is operational and in regular communication with the control panel.

4. For difficult to reach areas, the monitor module shall be available in a miniature package and shall be no larger than 2-3/4-inch x 1-1/4-inch x 1/2-inch. This version need not include Style D or an LED.

K. Two Wire Detector Monitor Module

1. Addressable monitor modules shall be provided to connect one supervised IDC zone of conventional 2-wire smoke detectors or alarm initiating devices (any N.O. dry contact device).

2. The two-wire monitor module shall mount in a 4-inch square, 2-1/8-inch-deep electrical box or with an optional surface backbox.

3. The IDC zone may be wired for Class A or B (Style D or Style B) operation. An LED shall be provided that shall flash under normal conditions, indicating that the monitor module is operational and in regular communication with the control panel.

L. Addressable Control Module

1. Addressable control modules shall be provided to supervise and control the operation of one conventional NACs of compatible, 24 VDC powered, polarized audio/visual notification appliances. For fan shutdown and other auxiliary control functions, the control module may be set to operate as a dry contract relay.

2. The control module shall mount in a standard 4-inch square, 2-1/8-inch-deep electrical box, or to a surface mounted backbox.

3. The control module NAC may be wired for Style Z or Style Y (Class A) with up to 1 amp of inductive A/V signal, or 2 amps of resistive A/V signal operation, or as a dry contact (Form-C) relay. The relay coil shall be magnetically latched to reduce wiring connection requirements, and to ensure that 100% of all auxiliary relay or NACs may be energized at the same time on the same pair of wires.

4. Audio/visual power shall be provided by a separate supervised power loop from the main fire alarm control panel or from a supervised, UL listed remote power supply.

5. The control module shall be suitable for pilot duty applications and rated for a minimum of .6 amps at 30 VDC.

M. Isolator Module

1. Isolator modules shall be provided to automatically isolate wire-to-wire short circuits on an SLC loop. The isolator module shall limit the number of modules or detectors that may be rendered inoperative by a short circuit fault on the SLC Loop. At least one isolator module shall be provided for each floor or protected zone of the building.

2. If a wire-to-wire short occurs, the isolator module shall automatically open-circuit (disconnect) the SLC loop. When the short circuit condition is corrected, the isolator module shall automatically reconnect the isolated section.

3. The isolator module shall not require any address-setting, and its operations shall be totally automatic. It shall not be necessary to replace or reset an isolator module after its normal operation.

4. The isolator module shall mount in a standard 4-inch-deep electrical box or in a surface mounted backbox. It shall provide a single LED that shall flash to indicate that the isolator is operational and shall illuminate steadily to indicate that a short circuit condition has been detected and isolated.

N. LCD Alphanumeric Display Annunciator

1. The alphanumeric display annunciator shall be a supervised, locally, or remotely located back-lit LCD display containing a minimum of eighty (80) characters for alarm annunciation in clear English text.

2. The LCD annunciator shall display all alarm and trouble conditions in the system.

3. Up to 32 LCD annunciators may be connected to a specific (terminal mode) EIA 485 interface. LCD annunciators shall not reduce the annunciation

capacity of the system. Each LCD shall include vital system wide functions such as, System Acknowledge, Silence and Reset.

4. LCD display annunciators shall mimic the main control panel 80-character display and shall not require special programming.

2.5 BATTERIES AND EXTERNAL CHARGER

A. Battery

1. Shall be 12-volt, Gel-Cell type.

2. Battery shall have sufficient capacity to power the fire alarm system for not less than twenty-four hours plus 5 minutes of alarm upon a normal AC power failure.

3. The batteries are to be completely maintenance free. No liquids are required. Fluid level checks refilling, spills and leakage shall not be required.

B. External Battery Charger

1. Shall be completely automatic, with constant potential charger maintaining the battery fully charged under all service conditions. Charger shall operate from a 120-volt 60 hertz source.

2. Shall be rated for fully charging a completely discharged battery within 48 hours while simultaneously supplying any loads connected to the battery.

3. Shall have protection to prevent discharge through the charger.

4. Shall have protection for overloads and short circuits on both AC and DC sides.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Installation shall be in accordance with the NEC, NFPA72, local and state codes, as shown on the drawings, and as recommended by the major equipment manufacturer.

B. All conduit, junction boxes, conduit supports, and hangers shall be concealed in finished areas and may be exposed in unfinished areas. Smoke detectors shall not be installed prior to the system programming and test period. If construction is ongoing during this period, measures shall be taken to protect smoke detectors from contamination and physical damage.

C. All fire detection and alarm system devices, control panels and remote annunciators shall be flush mounted when located in finished areas and may be surface mounted when located in unfinished areas.

3.2 TYPICAL OPERATION

A. Actuation of any manual station, smoke detector, heat detector or water flow switch shall cause the following operations to occur unless otherwise specified.

1. Activate all programmed speaker circuits.

2. Actuate strobe units until the panel is reset.

3. Light the associated indicators corresponding to active speaker circuits.

4. Release all magnetic door holders to doors to adjacent zones on the floor from which the alarm was initiated.

5. Return all elevators to the primary or alternate floor of egress.

6. A smoke detector in any elevator lobby shall, in addition to the above functions, return all elevators to the primary or alternate floor of egress.

7. Smoke detectors in the elevator machine room or top of hoistway shall return all elevators in to the primary or alternate floor. Smoke detectors or heat detectors installed to shut down elevator power shall do so in accordance with ANSI A17.1 requirements and be coordinated with the electrical contractor.

8. Duct type smoke detectors shall, in addition to the above functions, shut down the ventilation system or close associated control dampers as appropriate.

9. Activation of any sprinkler system low pressure switch, on valve tamper switch, shall cause a system supervisory alarm indication.

3.3 TEST

A. Provide the service of a competent, factory-trained engineer or technician authorized by the manufacturer of the fire alarm equipment to technically supervise and participate during all of the adjustments and tests for the system.

1. Before energizing the cables and wires, check for correct connections and test for short circuits, ground faults, continuity, and insulation.

2. Close each sprinkler system flow valve and verify proper supervisory alarm at the FACP.

3. Verify activation of all flow switches.

4. Open initiating device circuits and verify that the trouble signal actuates.

5. Open signaling line circuits and verify that the trouble signal actuates.

6. Open and short notification appliance circuits and verify that trouble signal actuates.

7. Ground initiating device circuits and verify response of trouble signals.

8. Ground signaling line circuits and verify response of trouble signals.

9. Ground notification appliance circuits and verify response of trouble signals.

10. Check alert tone and prerecorded voice message to all alarm notification devices.

11. Check installation, supervision, and operation of all intelligent smoke detectors using walk test.

12. Each of the alarm conditions that the system is required to detect should be introduced on the system. Verify the proper receipt and the proper processing of the signal at the FACP and the correct activation of the control points.

13. When the system is equipped with optional features, the manufacturer's manual should be consulted to determine the proper testing procedures. This is intended to address such items as verifying controls performed by individually addressed or grouped devices, sensitivity monitoring, verification functionality and similar.

3.4 FINAL INSPECTION

A. At the final inspection, a factory trained representative of the manufacturer of the major equipment shall demonstrate that the systems function properly in every respect.

3.5 INSTRUCTION

A. Provide instruction as required for operating the system. "Hands-on" demonstrations of the operation of all system components and the entire system including program changes and functions shall be provided.

B. The contractor and/or the systems manufacturer's representatives shall provide a typewritten "Sequence of Operation" to the Owner.

END OF SECTION 283000

SECTION 31 0513
SOILS FOR EARTHWORK

PART I - GENERAL

1.1 SUMMARY

A. Section includes grading, excavation, fill, backfill, compaction, and other earthwork required for construction of roads and parking areas, landscape areas, site utilities, and other site construction including building pads.

B. Related Sections: 31 2002, 32 1123, 32 216

1.2 RELATED DOCUMENTS:

A. Drawing and general provisions of Contract, including General and Supplementary Provisions Division-1 Specification sections, and the geotechnical engineering report, as prepared by Geomat, Inc. apply to work of this section.

1.3 DESCRIPTION OF WORK:

A. Extent of earthwork is indicated on drawings.

B. Fill construction shall consist of constructing embankment including the preparation of the areas upon which they are to be placed, the placing and compacting of approved material within areas where unsuitable material has been removed; the placing and compacting of material in holes, pits and other depressions.

C. Preparation of subgrade for walks and pavements is included as part of this work.

D. Backfilling of trenches within building lines is included as part of this work.

E. Excavation for Mechanical/Electrical Work: Excavation and backfill required in conjunction with underground mechanical and electrical utilities, and buried mechanical and electrical appurtenances is included as work of this section.

F. Definition - "Excavation" consists of removal of material encountered to subgrade elevations indicated and subsequent disposal of materials removed.

1.4 QUALITY ASSURANCE:

A. Codes and Standards: Perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction.

B. Testing and Inspection Service: Employ, at Contractor's expense, testing laboratory to perform soil testing and inspection service for quality control testing during earthwork operations.

1.5 SUBMITTALS:

A. Testing Reports-Excavating: Submit following reports directly to the Architect/Engineers from the testing services, with copy to Contractor.

Test reports on borrow material.
Inspection of subgrade to check actual soil conditions relative to those described in the Geotechnical Report.

Field density test reports.

One optimum moisture-maximum density curve for each type of soil encountered.

Report of testing performed to determine suitability of materials used.

1.6 JOB CONDITIONS:

A. Site Information: Data on indicated subsurface conditions are not intended as representations or warranties of accuracy or continuity between soil bearings. It is expressly understood that Owner will not be responsible for interpretations or conclusions drawn therefrom by Contractor. Data are made available for convenience of Contractor.

B. Additional test borings and other exploratory operations may be made by Contractor at no cost to Owner.

C. Existing Utilities: Locate existing underground utilities in areas of work. If utilities are to remain in place, provide adequate means of support and protection during earthwork operations.

D. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for directions., Cooperate with Architect/Engineer and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.

E. Do not interrupt existing utilities serving facilities occupied and used by Owner or others, during occupied hours, except when permitted in writing by the Architect/Engineer and then only after acceptable temporary utility services have been provided.

F. Provide minimum of 48-hour notice to the Architect/Engineer, and receive written notice to proceed before interrupting any utility.

G. Use of Explosives: The use of explosives is not permitted.

H. Protection of Persons and Property: Barricade open excavations occurring as part of this work and post with warning lights.

I. Operate warning lights as recommended by authorities having jurisdiction.

J. Protect structures, utilities, sidewalks, pavements and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.

PART II - PRODUCTS

2.1 SOIL MATERIALS:

A. Definitions:

Satisfactory soil materials are defined in the geotechnical engineering report as prepared by Geomat, Inc.

Unsatisfactory soil materials are defined in the geotechnical engineering report as prepared by Geomat, Inc.

B. Backfill and Fill Materials: Satisfactory soil materials as outlined in the geotechnical engineering report, as prepared by Geomat, Inc.

PART III - EXCAVATION

3.1 EXCAVATION:

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

B. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of the Architect/Engineer. Unauthorized excavation, as well as remedial work directed by the Architect/Engineer, shall be at Contractor's expense.

C. Under retaining walls, fill unauthorized excavation by extending indicated bottom elevation of footing or base to excavation bottom, without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position, when acceptable to the Architect/Engineer.

D. Elsewhere, backfill and compact unauthorized excavations as specifies for authorized excavations of same classification, unless otherwise directed by the Architect/Engineer.

E. Additional Excavation: When excavation has reached required subgrade elevations, notify Architect/Engineer who will make an inspection of conditions.

If unsuitable bearing materials are encountered at required subgrade elevations, carry excavations deeper and replace excavated material as directed by Architect/Engineer and/or as outlined in the geotechnical engineering report.

F. Stability of Excavations: Slope sides of excavations to comply with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated.

Maintain sides and slopes of excavations in safe conditions until completion of backfilling.

G. Dewatering: Prevent surface water an subsurface or ground water from flowing into excavations and from flooding project site and surrounding area.

Do not allow water to accumulate in excavations. Remove water to prevent soil changes detrimental to stability of subgrades. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away form excavations. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavations to collecting or run-off areas. Do not use trench excavations as temporary drainage ditches.

H. Material Storage: Stockpile satisfactory excavated materials where directed, until required for backfill or fill. Place, grade and shape stockpiles for proper drainage.

Locate and retain soil materials away from edge of excavations. Do not store within drip line of trees indicated to remain.

Dispose of excess soil material and waste materials as herein specified.

I. Excavation of Pavements: Cut surface under pavements to comply with cross-sections, elevations and grades as shown.

J. Excavation for Trenches: Dig trenches to the uniform width required for particular item to be installed, sufficiently wide to provide ample working room. Coordinate with Division 33 Utilities Section and Division 26 Electrical.

Excavate trenches to depth indicated or required. Carry depth of trenches for piping to establish indicated flow lines and invert elevations. Beyond building perimeter, keep bottoms of trenches sufficiently below finish grade to avoid freeze-ups.
For pipes or conduit 5" or less in nominal size and for flat-bottomed multiple-duct conduit units, do not excavate beyond indicated depths. Hand excavate bottom cut to accurate elevations and support pipe or conduit on undisturbed soil.

For pipes or conduit 6" or larger in nominal size, tanks and other mechanical/electrical work indicated to receive sub-base, excavate to sub-base depth indicated, or, if not otherwise indicate, to 6" below bottom or work to be supported.

Except as otherwise indicated, excavate for exterior water-bearing piping (water, steam, condensate, drainage so top of piping is not less than 3'-6" below finished grade.

Grade bottoms of trenches as indicated, notching under pipe bells to provide solid bearing for entire body of pipe.

Concrete is specified in Division 3.

Do not backfill trenches until tests and inspections have been made and backfilling authorized by the Architect/Engineer. Use care in backfilling to avoid damage or displacement or pipe systems.

K. Cold Weather Protection: Protect excavation bottoms against freezing when atmospheric temperature is less than 35°F (1°C).

3.2 COMPACTION:

A. General: Control soil compaction during construction providing minimum percentage of density specified for each area classification as outlined in the geotechnical engineering report.

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

Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing or pulverizing until moisture content is reduced to a satisfactory value.

3.3 BACKFILL AND FILL:

A. General: Place acceptably soil material in layers to required subgrade elevations, for each areas classification listed below, as outlined in the geotechnical engineering report as prepared by Geomat, Inc.

B. In excavation, use satisfactory excavated or borrow material.

C. Under grassed areas, use satisfactory excavated or borrow material.

D. Under walks and pavements, use sub-base material, or satisfactory excavated or borrow material, or combination of both.

E. Under steps, use sub-base material.

F. Under piping and conduit, use sub-base material where sub-base is indicated under piping or conduit; shape to fit bottom 90° of cylinder.

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

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

Inspection, testing, approval and recording locations of underground utilities.
Removal of concrete formwork.

Removal of trash and debris.

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

H. Ground Surface Preparation: Remove vegetation, debris, unsatisfactory soil material, obstructions and deleterious materials from ground surface prior to placement of fills. Plow, strip or bread-up sloped surfaces steeper than 1 vertical to 4 horizontal so that fill material will bond with existing surface.

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

I. Placement and Compaction: Place backfill and fill materials in layers not more than 8" in loose depth for material compacted by heavy compaction equipment, and not more than 4" in loose depth for material compacted by hand-operated tampers. Coordinate with requirements as outlined in the geotechnical engineering report as prepared by Geomat, Inc.

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

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

3.4 GRADING:

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

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

C. Finish surfaces free from irregular surface changes, and as follows:

D. Lawn or Unpaved Areas: Finish areas to receive topsoil to within not more than 0.10' above or below required subgrade elevations.

E. Walks: Shape surface or areas under pavement to line, grade and cross-section, with finish surface not more than 0.10' above or below required subgrade elevation.

F. Compaction: After grading, compact subgrade surfaces to the depth and indicated percentage of maximum or relative density for each areas classification as outlined in the geotechnical engineering report as prepared by Geomat, Inc.

G. See Division-03 for paving specifications – geotechnical report as prepared by Geomat, Inc.

H. Grade Control: During construction, maintain lines and grades including crown and cross-slope of sub-base course.

I. Placing: Place sub-base course material on prepared subgrade in layers of uniform thickness, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting sub-base material during placement operations.

When a compacted sub-base course is shown to be 6" thick or less, place material in a single layer. When shown to be more than 6" thick, place material in equal layers, except no single layer more than 6" or less than 3" in thickness when compacted.

3.5 FIELD QUALITY CONTROL:

A. Earthwork Construction: Minimum of 1 test per 1,000 C.Y. of embankment per 8" lift.

B. Concrete Tests: Complete concrete tests consisting of air content, slump, and 3 compressive test specimens shall be taken for each concrete pour and for each 50 C.Y. of any one pour greater than 50 C.Y. Also a slump test shall be taken on each mixer truck load of fresh concrete.

C. Trench Backfill: Minimum of 1 test per each drainage structure location per 12" lift.

3.6 MAINTENANCE:

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

Repair and re-establish grades in settled, eroded and rutted areas to specified tolerances.

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

C. Settling: Where settling is measurable or observable at excavated areas during general project warranty period, remove surface (pavement, lawn or other finish), add backfill material, compact and replace surface treatment. Restore appearance, quality and condition of surface or finish to match adjacent work and eliminate evidence of restoration to greatest extent possible.

3.7 DISPOSAL OF EXCESS AND WASTE MATERIALS:

A. Removal from Owner's Property: Remove waste materials, including unacceptable and/or excess excavated material, trash and debris and dispose of it off Owner's property.

END OF SECTION 31 0513

SECTION 31 1000
SITE CLEARING

PART 1 GENERAL

1.1 WORK INCLUDED

A. The drawings, specifications, the AIA General Conditions, and other Division 1 sections, and the geotechnical engineering report as prepared by Geomat, Inc.

1.2 DESCRIPTION OF WORK

A. The site clearing work includes, but is not limited to:

Protection of existing trees not designated for removal.
Removal of trees and other vegetation.
Topsoil stripping.
Clearing and grubbing.
Removing above-ground improvements.
Removing below-ground improvements.
Erection of a temporary construction perimeter fence.

1.3 JOB CONDITIONS

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

B. Protection of Existing Improvements: Provide protection necessary to prevent damage to existing improvements indicated to remain in place.

Protect improvements on adjoining properties and on Owner property.

Restore damaged improvements to their original condition, as acceptable to all parties having jurisdiction.

C. Protection of Existing Trees and Vegetation: Protect existing trees and other vegetation indicated to remain in place against unnecessary cutting, breaking,
or skinning of roots, skinning and bruising of bard smothering of trees by stockpiling construction materials or excavated materials within drip lines, excess foot or vehicular traffic, or parking of vehicles within drip line. Provide temporary guards to protect trees and vegetation to be left standing.

Water trees and other vegetation to remain within limits of contract work as required to maintain their health during the course of construction operations.

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

Repair or replace trees and vegetation indicated to remain which are damaged by construction operations, in a manner acceptable to the Contracting Officer. Employ licensed arborist to repair damages to trees and shrubs.

PART 2 PRODUCTS

A. Not applicable to work of this section.

PART 3 EXECUTION

3.1 SITE CLEARING

A. General: Remove trees, shrubs, grass, and other vegetation, improvements, or obstructions interfering with installation of new construction. Remove such items elsewhere on-site or premises as specifically indicated. Removal includes digging out stumps and roots.

Carefully and cleanly cut roots and branches of trees indicated to be left standing, where such roots and branches obstruct new construction.

B. Clearing and Grubbing: Clear site of trees, shrubs, and other vegetation, except for those indicated to be left standing.

Completely remove stumps, roots, and other debris protruding through ground surface.

Use only hand methods for grubbing inside drip line of trees indicated to be left standing.

Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.

C. Removal of Improvements: Remove existing above-grade and below-grade improvements necessary to permit construction and other work as indicated.

Abandonment or removal of certain underground pipe or conduits may be shown on mechanical or electrical drawings, and is included under work of those sections. Removal of abandoned underground piping or conduit interfering with construction is included under this section. Coordinate below-grade removal with Section 310513 - Soils for Earthwork.

3.2 DISPOSAL OF WASTE MATERIALS

A. Burning on Owner's Property: Burning is not permitted on Owner's property.

B. Removal from Owner's Property: Remove waste materials and unsuitable and excess topsoil from Owner's property and dispose of off-site in legal manner.

3.3 TEMPORARY CONSTRUCTION PERIMETER FENCE

A. The Contractor shall erect a six-foot (6') high temporary construction perimeter fence for security purposes, or as required by the Owner.

END OF SECTION 31 1000

SECTION 31 2002
SUBGRADE PREPARATION

PART I GENERAL

1.1 DESCRIPTION OF WORK

A. This section shall govern the preparation of natural or excavated areas prior to the placement of subbase or base material, pavement, curbs, and gutters, driveways, sidewalks, or other structures in accordance with the geotechnical engineering report as prepared by Geomat, Inc.

1.2 REFERENCES

ASTM

D 1557 D 4254

PART II MATERIALS

Not applicable to this section.

PART III EXECUTION

3.1 PREPARATION OF SUBGRADE

A. With the exception of areas where compacted fills have been constructed as specified in areas where new construction is required, the subgrade and surfaces thereof shall be prepared as noted on the plans and/or in accordance with the geotechnical engineering report as prepared by Geomat, Inc.

3.2 RELATIVE COMPACTION

A. All soft and unstable material and other portions of the subgrade which will not compact readily or serve the intended purposes shall be removed and replaced with suitable material from the excavation or borrow or suitable materials shall be added and, by manipulations, be incorporated into the subgrade to produce a material meeting subgrade requirements.

B. The top portion of embankments and the bottom of excavations which form the subgrade under all paved areas, including the areas under sidewalks, driveways, and curbs and gutters shall be compacted to the following degrees and depths of compaction.

C. Each layer shall be compacted to a density as specified in each respective geotechnical engineering report as prepared by Geomat, Inc.

In roadway and parking lot areas the density of the upper 8 inches shall as specified in the geotechnical report as prepared by Geomat, Inc.

D. Subgrade compaction as specified shall extend a minimum of one foot on either side of all structures, as defined in Subsection 312002 1.1, as well as under all pavement, or one foot beyond the shoulder when curb and gutter is not required.

3.3 SUBGRADE TOLERANCE

A. Subgrade upon which pavement, sidewalk, curb and gutter, driveways, or other structures are to be placed shall not vary more than +1/4 inch or -1/2 inch per 10 foot in any direction from the specified grade and cross section. Subgrade upon which subbase or base material is to be placed shall not vary more than +1/2 inch or -1 inch per 10 foot in any direction from the specified grade and cross section. Variations within the above specified tolerance shall be compensating so that the average grade and cross section specified are met.

3.4 GRADING OF AREAS NOT TO BE PAVED

A. Areas where "grade only" is called for on the plan shall be graded to meet the tolerances from the subgrade where subbase or base material is to be placed. The surface shall be constructed to a straight grade from the finished pavement elevations or top of curb elevations shown on the plans to the elevation of the existing ground at the extremities of the area to be graded or to the property line or as directed by the ENGINEER, but in no case less than 4 inches above top of curb or edge of pavement elevation (where no curbs are constructed).

END OF SECTION 31 2002

SECTION 31 23 16
EXCAVATION

PART 1 - **GENERAL**

1.1 SUMMARY

A. Section Includes:
1. Excavation for slabs-on-grade
2. Excavating for foundations.
3. Excavating for site structures.

B. Related Sections:
1. Section 31 23 17 – Trenching.
2. Section 31 23 23 - Fill.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Excavating Soil Materials:
1. Basis of Measurement: By cubic yard.
2. Basis of Payment: Includes general excavating to required elevations, loading and removing from site.

1.3 REFERENCES

A. ASTM International:
1. ASTM D1557 - Test Method for Laboratory Compaction Characteristics of Soil.

B. Local utility standards when working within 24 inches of utility lines.

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Excavation Protection Plan: Describe sheeting, shoring, and bracing materials and installation required to protect excavations and adjacent structures and property.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with State of New Mexico, and local regulations.

B. Field inspection shall be performed by the Soils Engineer in accordance with the applicable specifications.

C. The Soils Engineer shall be called with a minimum of 48 hour notice to inspect all exposed bearing, surface, and native materials to be stockpiled and re-used as fill materials.

D. Special inspections shall be performed as required by the 2021 International Building Code and as outlined on sheet S4 of the contract documents.

PART 2 - **EXECUTION**

2.1 PREPARATION

A. Call Local Utility Locate Information service at not less than three working days before performing Work.
   1. Request underground utilities to be located and marked within and surrounding construction areas.

B. Identify required lines, levels, contours, and datum.

C. Notify utility company to remove or relocate utilities if necessary.

D. Protect utilities indicated to remain from damage.

E. Protect plant life, lawns, rock outcroppings and other features remaining as portion of final landscaping.

F. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

2.2 SOIL DENSIFICATION

A. Densify existing subsoils to densities specified in the project drawings.
   1. Densify subsoils to a minimum depth of 1 foot to the specified density.

B. Densification Equipment:
   1. Provide machinery appropriate to provide the specified densities to the applicable soils at the required soil moisture contents.

2.3 EXCAVATION

A. Underpin adjacent structures which may be damaged by excavation work.

B. Excavate subsoil to accommodate foundations, utilities, construction operations, and over-excavation as required by conditions or as noted in the plans.

C. Compact disturbed load bearing soil in direct contact with foundations to specified densities. Slope banks with machine to angle of repose.

D. Do not interfere with 45 degree bearing splay of foundations.

E. Grade top perimeter of excavation to prevent surface water from draining into excavation.

F. Trim excavation. Remove loose matter.

G. Remove lumped subsoil, boulders, and rock up to 1/3 cu yd measured by volume.

H. Notify Architect/Engineer of unexpected subsurface conditions.

I. Correct areas over excavated with structural fill specified in Section 31 23 23.

J. Remove excess and unsuitable material from site and legally dispose.

K. Repair or replace items indicated to remain damaged by excavation.

2.4 FIELD QUALITY CONTROL

A. Request visual inspection of bearing surfaces by the Soils Engineer before installing subsequent work.

2.5 PROTECTION

A. Prevent displacement or loose soil from falling into excavation; maintain soil stability.

B. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.

C. Protect structures, utilities and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth operations.

D. Protect excavations from surface run-off water.

END OF SECTION

SECTION 31 23 17

TRENCHING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Excavate trenches for utilities.

B. Compacted bedding under fill over utilities to sub-grade elevations.

C. Backfilling and compaction for utilities.

1.2 RELATED SECTIONS

A. Testing Laboratory Services: Testing fill compaction.

B. Construction Facilities and Temporary Controls: Water control in excavations.

C. Section 03 30 00 - Cast-in-Place Concrete: Concrete materials.

D. Section 31 22 13 - Rough Grading: Topsoil and subsoil removal from site surface.

E. Section 31 23 16 – Excavation.

F. Section 31 23 18 - Rock Removal: Removal of rock during excavating.

G. Section 31 23 23 – Backfill: General Backfilling.

H. Section 33 11 13 - Public Water Distribution Systems.

I. Section 33 31 00 - Sanitary Sewer Systems.

J. Section 33 42 14 - HDPE Corrugated Drain Pipe.

1.3 REFERENCES

A. American Association of State Highway and Transportation Officials:
   1. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 10-lb Rammer and an 18-in. Drop.

B. ANSI/ASTM C136 - Method for Sieve Analysis of Fine and Coarse Aggregates.

C. ANSI/ASTM D1556 - Test Method for Density of Soil in Place by the Sand-Cone Method.

E. ANSI/ASTM D698 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures.

1.4 SUBMITTALS

A. Materials Source: Submit name of imported fill materials suppliers.

B. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with applicable New Mexico state standards and specifications of the utility provider.

B. Perform Work in accordance with applicable OSHA trench safety standards.

C. Special inspections shall be performed as required by the 2021 International Building Code and as outlined on sheet S4 of the contract documents.

1.6 FIELD MEASUREMENTS

A. Verify that survey benchmark and intended elevations for the Work are as shown on Drawings.

B. Verify field measurements prior to fabrication.

1.7 COORDINATION

A. Verify Work associated with lower elevation utilities is complete before placing higher elevation utilities.

PART 2 - PRODUCTS

2.1 FILL MATERIALS

A. Types A, C, E, F materials as specified in Section 31 23 23

2.2 BED MATERIALS

A. Type C Material: Natural river or bank sand; free of silt, clay, loam, friable or soluble materials, or organic matter; graded per ANSI/ASTM C136, within the following limits:

Sieve Size	Percent Passing
No. 4	100
No. 14	10 to 100
No. 50	5 to 90
No. 100	4 to 30
No. 200	0

B. Type E: As specified in Section 31 23 23.

C. Concrete: Lean concrete with a compressive strength of 1500 psi.

2.3 ACCESSORIES

A. Geotextile Fabric. To be approved by the Engineer for each specific application.

PART 3 - EXECUTION

3.1 EXAMINATION

A. The Soils Engineer shall verify fill materials to be used acceptable.

B. Lay pipes to lines and grades indicated on Drawings.

1. Engineer reserves right to make changes in lines, grades, and depths of utilities when changes are required for Project conditions.

3.2 PREPARATION

A. Call "One Call" and local utilities not less than three working days before performing Work.
   1. Request underground utilities to be located and marked within and surrounding construction areas.

B. Identify required lines, levels, contours, and datum.

C. Maintain and protect existing utilities remaining, which pass through work area.

D. Protect plant life, lawns, rock out-cropping and other features remaining as a portion of final landscaping.

E. Protect bench marks, existing structures, fences, sidewalks, paving, and curbs from excavation equipment and vehicular traffic.

F. Protect above and below grade utilities which are to remain.

G. Cut out soft areas of sub-grade not capable of in-situ compaction. Backfill with Type F fill and compact to density equal to or greater than requirements for subsequent backfill material.

H. Establish temporary traffic control and detours when trenching is performed in public right-of-way. Relocate controls and reroute traffic as required during progress of Work.

3.3 EXCAVATION

A. Cut trenches to width indicated on Drawings, providing at least 6 inches of clear space between the trench face and the outside diameter of the pipe. The maximum permissible width of the trench shall be the outside diameter of the pipe (or distance between pipes plus pipe diameters in the event that two pipes are buried in the same trench) plus 24 inches, unless permission in writing to use a greater width is obtained from the Engineer.

B. Intercept and divert surface drainage and precipitation away from excavation through use of dikes, curb walls, ditches, pipes, or other means.

C. Dewater and maintain substantially dry subgrade during pipe installation.
   1. Remove groundwater by pumping to keep excavations dry.
   2. Comply with Colorado state standards and requirements for dewatering to any watercourse, prevention of stream degradation, and erosion and sediment control.
   3. If a separate bid item is not included on the Bid Form for dewatering, the cost thereof will be considered incidental to the cost of trenching and utility installation.

D. Excavate trenches to depth indicated on Drawings. Provide uniform and continuous bearing and support for bedding material and pipe.

E. When subsurface materials at bottom of trench are loose or soft, excavate to greater depth as directed by the Soils Engineer until suitable material is encountered.

F. Cut out soft areas of subgrade not capable of compaction in place. Backfill with Fill Type B material and compact to density equal to or greater than requirements for subsequent backfill material.

G. Correct over excavated areas with compacted backfill as specified for authorized excavation or replace with fill concrete as directed by the Soils Engineer.

H. Remove excess subsoil not intended for reuse, from site.

I. Do not leave more than 50 feet of trench open at end of working day.

J. Protect open trench to prevent danger to the public and to wildlife.

K. Excavation shall not interfere with normal 45 degree bearing splay of foundations.

L. Hand trim excavation. Hand trim for bell and spigot pipe joints. Remove loose matter.

M. Remove lumped subsoil, boulders, and rock up to the size that would require special equipment beyond conventional machinery used for trenching, in which case the Engineer should be notified immediately.

N. Do not advance open trench more than 100 feet ahead of installed pipe.

P. Correct unauthorized excavation at no cost to Owner.

Q. Correct areas over-excavated by error.

R. Stockpile excavated material to be reused in area designated on site and legally remove and dispose excess material not being used from site.

S. Excavate subsoil required for utilities.

3.4 BEDDING

A. Support utilities during placement and compaction of bedding fill.

3.4 SHEETING AND SHORING

A. Sheet, shore, and brace excavations to prevent danger to persons, structures and adjacent properties and to prevent caving, erosion, and loss of surrounding subsoil.

B. Support trenches more than 5 feet deep excavated through unstable, loose, or soft material. Provide sheeting, shoring, bracing, or other protection to maintain stability of excavation.

C. Design sheeting and shoring to be removed at completion of excavation work. If the Engineer orders the sheeting to be left in place for the protection of the work, a payment will be allowed only for the actual cost of the timber left in place.

D. Repair damage caused by failure of the sheeting, shoring, or bracing and for settlement of filled excavations or adjacent soil.

E. Repair damage to new and existing Work from settlement, water or earth pressure or other causes resulting from inadequate sheeting, shoring, or bracing.

3.5 BACKFILLING

A. Backfill trenches to contours and elevations with unfrozen materials.

B. See Section 31 23 23 - Backfill, Articles 3.3 and 3.4 for general backfill requirements, as well as trench backfill and bedding requirements around pipelines.

C. Systematically backfill to allow proper compaction. Do not backfill over porous, wet, frozen or spongy sub-grade surfaces.

D. Use geotextile fabric when required to stabilize material not able to be compacted prior to placing the first lift of fill.

E. Structural Fill: Place and compact materials in continuous layers not exceeding 8 inches loose depth. Compact to 90% of ASTM D-1557.

F. Select Fill: Place and compact material in continuous layers not exceeding 12 inches loose depth. Compact to 90% of ASTM D-1557.

G. Employ a placement method that does not disturb or damage foundation perimeter drainage and sealed utilities in the trench.

H. Maintain optimum moisture content of backfill materials to attain required compaction density.

I. Remove surplus backfill materials from site.

J. Refer to the 'Typical Piping and Trenches at Foundations' detail in the plans for additional requirements where utility trenches are adjacent to foundations.

3.6 TOLERANCES

A. Top Surface of Backfilling: Plus or minus one inch from required elevations.

B. Top Surface of General Backfilling: Plus or minus one inch from required elevations.

3.7 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of the specifications.

B. Tests and analysis of fill material will be performed in accordance with ANSI/ASTM D1556 and with the specifications.

C. Compaction testing will be performed in accordance with ANSI/ASTM D1556 ANSI/ASTM D-1557 and with the specifications.

D. If tests indicate work does not meet specified requirements, remove work, replace and retest at no cost to Owner.

E. Frequency of Tests: one test per 50 linear feet of trench per each lift of backfill.

F. Compaction testing shall be done to the extent such that the Owner and Engineer can be reasonably assured that the backfill has been placed in accordance with the requirements of the Contract Documents, or as required by the utility for which the trenching is being provided, whichever is the more stringent. When a testing allowance is established on the Bid Form, the Owner and Engineer will determine the testing

frequency to be used throughout the project. If no allowance is included, the frequency of testing shall be at least once every 400 linear feet of trenching.

3.8 PROTECTION OF FINISHED WORK

A. Protect finished Work under provisions of the specifications.

B. Scarify and re-compact fills subjected to vehicular traffic.

END OF SECTION

SECTION 31 23 25
STRUCTURAL BACKFILL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Backfilling building perimeter to subgrade elevations.
2. Backfilling site structures to subgrade elevations.
3. Fill under slabs-on-grade and grade beams.
4. Fill under paving.
5. Fill for over-excavation.
6. Pipe bedding material.

B. Related Sections:
1. Section 03 30 00 - Cast-In-Place Concrete.
2. Section 31 23 16 - Excavation.
3. Section 31 23 17 - Trenching.
4. Section 32 91 19 - Landscape Grading: Filling of topsoil to finish grade elevation.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Fill Type: Subsoil
1. Include supplying fill materials, stockpiling, scarifying substrate surface, placing where required, and compacting.

B. Structural Fill: Type A through G
1. Basis of Measurement: By cubic foot.
2. Basis of Payment: Includes supplying fill material, stockpiling, scarifying substrate surface, placing where required, and compacting.

1.3 REFERENCES

A. ASTM International:
1. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)).
2. ASTM D1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (6,000 ft-lbf/ft3 (2,700 kN-m/m3)).
3. ASTM D1556 - Standard Test Method for Density of Soil in Place by the Sand-Cone Method.
4. ASTM D1633 - Test Method for Compressive Strength of Molded Soil - Cement Cylinders.
5. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
6. ASTM D2901 - Test Method for Cement Content of Freshly Mixed Soil Cement.
7. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
8. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).
9. ASTM D4253 - Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.
10. ASTM D4832 - Compressive Strength of Controlled Low Strength Material.

1.4 SUBMITTALS

A. Product Data: Submit data for geotextile fabric indicating fabric and construction.

B. Materials Source: Submit name of imported fill materials suppliers.

C. Submit samples and certified test documentation of all materials to be used.

D. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

E. Submit field soil test on material in place as backfill.

PART 2 - PRODUCTS

2.1 FILL MATERIALS

A. Suitable materials may be processed on-site, or may be imported. If imported materials are required to meet the quantity requirements of the project, it will be provided at no additional expense to the Owner, unless a unit price item is included for imported materials in the bidding schedule. The following types of materials are defined as suitable:

1. Type A - Coarse Stone Gravel: Angular, natural stone; free of shale, clay, friable material, sand, debris; graded in accordance with ANSI/ASTM C136 within the following limits:

Sieve Size	Percent Passing
2 inches	100
One inch	95
3/4 inch	95 to 100
5/8 inch	75 to 100
3/8 inch	55 to 85
No. 4	35 to 60

2. Type B - Pea Gravel: Natural stone; free of clay, shale, organic matter; graded in accordance with ANSI/ASTM C136, to the following:
   a. Minimum Size: 1/4 inch. Maximum Size: 1/2 inch.
   b. Manufactured angular, crushed stone, crushed rock, or crushed slag with the following gradation requirements. The material shall have a minimum sand equivalent value of 75.

Sieve Size	Percentage Passing
3/4-inch	100
No. 4	30 – 50
No. 200	0 – 5

3. Type C - Sand: Natural river or bank sand; free of silt, clay, loam, friable or soluble materials, or organic matter; graded in accordance with ANSI/ASTM C136. Sand with 100 percent passing a 3/8-inch sieve, at least 90 percent passing a No. 4 sieve, and a sand equivalent value not less than 30.
4. Type D – Blended Material: Crushed rock or gravel with 100 percent passing a 1/2-inch sieve and not more than 2 to 4 percent passing a No. 8 sieve and 1 to 2 percent passing a No. 200 sieve.
5. Type E - Select Fill: Crushed rock or gravel with 100 percent passing a 1/2-inch sieve and not more than 10 percent passing a No. 4 sieve.
6. Type F – Structural Fill: Granular, non-expansive imported or site materials approved by the Soils Engineer. Crushed rock or gravel meeting the following gradation requirements:

Sieve Size	Percentage Passing
2-inch	100
1-1/2-inch	90 - 100
1-inch	20 – 55
3/4-inch	0 – 15
No. 200	0 – 3

7. Type G - Soil Cement

Sieve Size	Percentage Passing
1-inch	100
3/4 inch	80 - 100
No.4	30 - 60
No.10	20 - 45
No. 200	3 – 10

8. Type H - Subsoil: Drain rock shall be crushed rock or gravel, durable and free from slaking or decomposition under the action of alternate wetting or drying. The material shall be uniformly graded and shall meet the following gradation requirements:

Sieve Size	Percentage Passing
1-inch	100
3/4-inch	90 - 100
3/8-inch	40 - 100
No. 4	25 – 40
No. 8	18 – 33
No. 30	5 – 15
No. 50	0 – 7
No. 200	0 – 3

9. Type I – Not Used.
10. Type J - Cement-treated Backfill: Material which consists of Type H material, or any mixture of Types B, C, G, and H materials which has been cement-treated so that the cement content of the material is not less than 5 percent by weight when tested in accordance with ASTM D 2901 - Test Method for Cement Content of Freshly Mixed Soil Cement. The ultimate compressive strength at 28 days shall be not less than 400 psi when tested in accordance with ASTM D 1633 - Test Method for Compressive Strength of Molded Soil - Cement Cylinders.
11. Type K - Topsoil: Stockpiled topsoil material which has been obtained at the site by removing soil to a depth not exceeding 2 feet. Removal of the topsoil shall be done after the area has been stripped of vegetation and debris.
12. Type L - Controlled strength material: Controlled low strength material shall meet the following requirements:
    a. Slurry shall have a 7-day compressive strength of not less than 100 psi and not more than 200 psi. The compressive strength shall be determined in accordance with ASTM D4832.
    b. The water-cement ratio of the mix shall not exceed 3.5:1. The water content shall not exceed that required to provide a mix that will flow and can be pumped.
    c. The consistency of the slurry shall be such that the slurry flows easily into all openings between the pipe and the lower portion of the trench.
13. Type M - Aggregate sub-base, structural fill. Well-graded crushed rock or natural gravel meeting the following gradation requirements:

Sieve Size	Percentage Passing
4-inch	100
3-inch	95 - 100
No. 200	3 – 15

B. Where these Specifications conflict with the requirements of any local agency having jurisdiction or with the requirements of a pipe material manufacturer, the Engineer shall

be immediately notified. In case of conflict between types of pipe embedment backfills, the Contractor is to use the agency-specified backfill material if that material provides a greater degree of structural support to the pipe, as determined by the Engineer. In case of conflict between types of trench or final backfill types, the Contractor shall use the agency-specified backfill material if that material provides the greater in-place density after compaction.

C. Fill and backfill types, including use of native soil, shall be used in accordance with the following provisions. Native soil used for fill and backfill must meet the requirements of the type of material specified below and as shown for the corresponding type of material shown in 2.1.A above.
   1. Embankment fills shall be constructed of Type M material, as defined herein, or other material approved by the Project Engineer. Drainage structures embankments shall be backfilled with materials used in original construction.
   2. Pipe zone backfill shall consist of the following materials for each pipe material listed below.
      a. Concrete pipe, shall be provided Type A or B pipe bedding and embedment backfill material, or native material that meets the criteria described in Article 3.4 below, and is acceptable to the Engineer.
      b. Plastic pipe shall be provided Type D bedding and embedment zone material, or native material that meets the criteria described in Article 3.4 below, and is acceptable to the Engineer.
   3. Trench zone backfill for pipelines shall be any of Types A through H backfill materials or any mixture thereof.
   4. Final backfill material for pipelines under paved areas shall be Type G backfill material.
   5. Final backfill under areas not paved shall be the same material as that used for trench backfill, unless otherwise indicated.
   6. Trench backfill and final backfill for pipelines under structures shall be the same material as used in the pipe zone, except where concrete encasement is required by the Contract Documents.
   7. Aggregate base materials under pavements, curb and gutter, and sidewalk shall be Type G material constructed to the thickness indicated.
   8. Aggregate sub-base shall be Type M material.
   9. Backfill around structures shall be Types A through Type H materials, or any mixture thereof.
   10. Under structures where groundwater must be removed to allow placement of concrete, Type F material shall be used. Before the Type F material is placed, filter fabric shall be placed over the exposed foundation. Filter fabric shall be Mirafi 140 N, Mirafi 700X, or equal.
   11. Under all other structures, Type G or H material shall be used.
   12. Backfill used to replace pipeline trench over-excavation shall be a layer of Type F material with a 6-inch top filter layer of Type E material or filter fabric to prevent migration of fines for wet trench conditions or the same material as used for the pipe zone backfill if the trench conditions are not wet.

2.2 ACCESSORIES

A. Geotextile Fabric: Non-biodegradable. Product to be selected for specific conditions and approved by the Soils Engineer.

3 PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify exposed native materials at bottom of over-excavation are checked and approved by the Soils Engineer for their intended use.

B. Verify fill materials to be reused are acceptable to the Soils Engineer for the intended use.

C. Check existing foundations for damage to concrete and water/damp-proofing and repair as required or as directed by the Engineer when damage is significant.

D. Verify sub-drainage, damp-proofing, or waterproofing installation has been inspected.

E. Verify underground tanks are anchored to their own foundations to avoid flotation after backfilling.

3.2 PREPARATION

A. Verify with the Soils Engineer native material at bottom of excavations has been adequately scarified and re-compacted and is suitable for supporting structural backfill, foundations and slabs and that it is of uniform density.

B. Compact sub-grade to density requirements for subsequent backfill materials.

C. Cut out soft areas of sub-grade not capable of compaction in place. Backfill with Type F fill and compact to density equal to or greater than requirements for subsequent fill material.

D. Proof roll to identify soft spots; fill and compact to density equal to or greater than requirements for subsequent fill material.

E. Provide and install geotextile fabric in areas of native soils that can not achieve adequate density by other means.

3.3 BACKFILLING

A. Backfill areas to contours and elevations with approved and unfrozen materials. Slope backfill as required to follow sloping slab requirements so concrete will not be less than the required thickness at any point.

B. Systematically backfill in depths compatible with compaction machinery. Do not backfill over porous, wet, frozen or spongy sub-grade surfaces.

C. Place geotextile fabric, if required, over materials incapable of satisfactory compaction prior to placing next lift of fill.

D. Structural Fill: Place and compact materials in continuous layers not exceeding 6 inches of compacted depth.

E. Select Fill: Place and compact material in continuous layers not exceeding 8 inches of compacted depth.

F. Employ a placement method that does not disturb or damage foundation perimeter drainage, (if applicable) foundation damp proofing, foundation waterproofing and protective cover and utilities in trenches.

G. Maintain optimum moisture content of backfill materials to attain required compaction density.

H. Backfill and compact against grade beams evenly on both sides. Do not backfill against laterally unsupported foundations.

I. Slope finished grade away from building at a minimum 10% for a minimum of 10 ft. where paving or sidewalks do not adjoin the building unless noted otherwise. Slope away at 5% for the next 10 ft. Provide grading that will remove water to natural water courses.

J. Make grade changes gradual. Blend slope into level areas.

K. Legally remove surplus backfill materials from site.

L. Leave fill material stockpile areas completely free of excess fill materials.

M. In no case shall man-made or deleterious materials be used in any backfill. There shall be no native, or imported granular materials larger than 4" in any dimension used in any backfill location.

3.4 BACKFILLING OF TRENCHES

A. Pipe bedding material around plastic pipe shall be fine gravel with no particles larger than 1/2-inch (Backfill Type D material). Excavated native material will be allowed, provided that it is free draining material which contains no organic materials, and no rocks, clods or frozen lumps. If the trench is wet, the pipe bedding material shall be 3/8-inch to 3/4-inch stone. All pipe bedding material shall receive prior approval by the Engineer before use.

B. Pipe zone backfill materials shall be manually spread around the pipe so that, when compacted, the pipe zone backfill will provide uniform bearing and side support.

C. A 4-inch thickness of granular bedding material shall be placed in the ditch before the pipe is laid and the joint made. Pipe bedding material shall be placed on both sides of the pipe and on top to a depth of 12 inches over the top of the pipe, 15 inches over the top of the pipe in paved or traffic areas, and compacted by hand held compacting tools before other backfilling is done.

D. In especially rocky areas where there is concern that settling rocks in the surrounding material may rupture the pipeline, the amount of bedding material below and above the pipe shall be increased. In these cases there will be 8 inches of bedding material below the pipe and 15 inches above. The Resident Project Representative shall indicate where this special bedding specification shall apply.

E. When the bottom of the trench is unstable, an additional 4 inches shall be over-excavated and filled with bedding material before laying of pipe.

F. Employ a placement method that does not disturb or damage utilities in the trench. Maintain optimum moisture content of fill materials to attain required compaction density.

G. Where the backfill material moisture content is too high to permit the specified degree of compaction, the material shall be dried until the moisture content is satisfactory.

H. Trench backfill material to be placed and compacted in equal continuous layers not exceeding 12 inches compacted depth.

I. Compaction testing will be performed in accordance with applicable ASTM testing standards as identified in Section 31 23 17 - Trenching. If tests indicate Work does not meet specified requirements, remove material, replace, compact, and retest.

3.5 TOLERANCES

A. Top Surface of compacted backfill: Plus or minus inches from required elevations.

3.6 FIELD QUALITY CONTROL

A. Perform laboratory material tests in accordance with ASTM D1557.

B. Perform in place compaction tests in accordance with the following:
1. Density Tests: ASTM D1556.
2. Moisture Tests: ASTM D3017.

C. When tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to the Owner.

D. Frequency of Tests: One test of moisture content and density per 600 square feet of each lift of backfill. Test utility trench backfill once for each 100 feet of trench for each lift of backfill. Additional tests shall be provided where the Soils Engineers technician may suspect inadequate compaction.

E. Field inspection and testing will be performed under provisions the specifications. Tests and analysis of fill material will be performed in accordance with the specifications.

3.7 PROTECTION OF FINISHED WORK

A. Reshape and re-compact fills subjected to vehicular traffic.

3.8 SCHEDULE (Compaction is relative to ASTM D1557)

A. Exterior side of stemwalls (without adjacent paving)
1. Native material as approved by the Soils Engineer compacted to 85%

B. Fill under grass areas:
1. Subsoil fill, to 6 inches below finish grade, compacted to 80 percent, except where noted otherwise.

C. Fill under landscaped areas:
1. Subsoil fill, to 6 inches below finish grade, compacted to 80 percent, except where noted otherwise.

D. Fill Over Drainage Piping Gravel Cover:
1. Fill Type H, to 6 inches below finish grade, compact uniformly to 90 percent of maximum density.

E. Fill under asphalt or concrete paving:
1. Type A or F fill, to 4 inches below finish paving elevation, compacted to 90 percent.

F. Fill for over-excavation:
1. Type A or F fill, flush to required elevation, compacted to 90 percent.

G. Fill under foundations:
   1. Type A or F fill, compacted to 90 percent, unless noted otherwise.

H. Fill under interior slabs-on-grade:
   1. Type A or F fill, compacted to 90 percent

END OF SECTION

SECTION 32 1123

AGGREGATE BASE COURSES

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. This work shall consist of furnishing and placing course aggregate of the class herein provided or shown on the plans in accordance with the geotechnical engineering report as prepared by Geomat, Inc.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Basc course aggregate shall be composed of materials consisting of crushed stone, crushed or screened gravel, caliche, sand, or a combination of such materials. Base course aggregate shall be free from vegetable matter and all other deleterious materials. When the stationary plant method is used, base course aggregate will be accepted immediately following mixing based on periodic samples taken from the pugmill output. When a road mix method is used, base course aggregate will be tested for acceptance on samples taken from the watered and completely processed window. base course aggregate will be tested in compliance with AASHTO methods provided below or in accordance with other approved methods:

Mechanical Analysis	AASHTO T 27
Passing No. 200 Sieve	AASHTO T 11
Liquid Limit	AASHTO 89
Los Angeles Abrasion	AASHTO T 96
Soundness (5 cycle- Magnesium Sulfate Solution)	AASHTO T 14
Linear Shrinkage	Materials Testing

Control Manual

B. Base course aggregate materials shall be combined in such proportions that the resulting composite blend meets the requirements of one of the classes in the following table, unless otherwise shown on the plans:

BASE COURSE CLASSIFICATION
PERCENT PASSING

Sieve Size	Class 1-B
1"	100
3/4"	80-100
No. 4	30-60
No. 10	20-45
No. 200	3-10
Soundness	18 or less
L.A. Abrasion	50 or less
L.L.	25 or less

C. When base course material is produced from pits or quarries listed on the plans, all oversize material, up to an including rocks and boulders 10 inches in greatest dimension, shall be crushed and mixed with other material.

D. Fifty percent by weight of all plus No. 4 materials shall have a minimum of two mechanically fractured faces. When base course is to be treated with cement or asphalt, the requirement for mechanically fractured faces shall not apply unless otherwise indicated on the plans or in the special provisions.

PART 3 - EXECUTION

3.1 GENERAL

A. The Contractor shall produce material conforming with all the requirements of this section. When corrective material is required to be added in the windrow, such material shall not be incorporated until the quality and quantity has been approved by the Architect. No payment will be made for furnishing such corrective material to the extent that the addition of such corrective material results in an excess of material over that required for the work.

3.2 PREPARATION OF FOUNDATION

A. The subgrade, subbase, or base course upon which base course is to be placed shall be cleaned of all loose and deleterious materials, shall be free from frozen material, and the top 8 inches shall have a moisture content of 4% below to 2% above optimum as specified in the geotechnical engineering report.

3.3 MIXING AND PLACING

The Contractor shall mix and place base course materials by one of the following methods.

A. Mixing shall provide a homogenous mixture of unsegregated and uniformly dispersed materials as place in position for compacting. Plant and equipment shall be adequate in all respects.

B. Stationary Plant Method: The base course material and water shall be mixed in an approved mixer. Water shall be added during the mixing operation in the amount necessary to provide the optimum moisture content for placement plus or minus two percentage points. After mixing, the base course material shall be transported to the job site while it contains the proper moisture content and shall be placed without delay on the roadbed by means of an approved aggregate spreader.

C. Travel Plant Method: After the material for each layer of base course has been placed through an aggregate spreader or windrow sizing device, the base shall be uniformly mixed by a traveling mixing plant. During mixing, water shall be added in an amount sufficient to provide the optimum moisture content plus or minus two percentage points at the time of placement of material.

D. Road Mix Method: After material for each layer of base course has been placed, the materials shall be mixed by means of motor graders or other suitable equipment until the mixture is uniform throughout. Water shall be added during mixing sufficient to provide the optimum moisture content plus or minus two percentage points at the time of placement of material.

E. The Contractor shall spread and compact base course in layers which will permit the required density to be obtained. Density requirements will be determined by the geotechnical engineering reports. Unless otherwise provided, base course shall be compacted to not less than 95 percent Standard Proctor density (ASTM D-698). Field density tests will be taken at locations designated by the Engineer.

3.4 SURFACE TOLERANCE

A. The top surface of base course shall not deviate in excess of 3/8 inch when tested with a 10 foot straightedge in any direction. All deviations from this tolerance shall be corrected.

END OF SECTION 32 1123

SECTION 32 1216
ASPHALT PAVING

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Asphalt concrete pavement shall consist of a mixture of mineral aggregate and asphalt, mixed at a central mixing plant and spread and compacted on a prepared subgrade or base in accordance with the plans and geotechnical engineering report as prepared by Geomat, Inc.

PART 2 - PRODUCTS

2.1 PRIME COAT (NOT REQUIRED)

A. General: If a prime coat is specified or shown on the plans, it shall be applied to surfaces of bases at least 12 hours prior to placing the asphalt cement unless otherwise directed by the Architect/Engineer.

B. Conditions of Base Course: Immediately prior to application of the asphalt prime, an inspection will be made by the Architect/Engineer to verify that the base course has been constructed as specified. Also, all loose and foreign material shall be removed by light sweeping. Material so removed shall not be mixed with cover aggregate.

The surface to be primed shall be in a smooth and well-compacted condition, true to grade and cross-section, and free from ruts and inequalities.

C. Application: Asphalt prime shall be applied uniformly at the rate of 0.10 to 0.30 gallon per S.Y. or as directed by the Architect/Engineer. It shall be applied only when permitted by the Architect/Engineer and when the air temperature is not less than 40°F. Prime coat shall consist of asphalt emulsion.

In order to prevent lapping at the junction of two applications, the distributor shall be promptly shut off. A hand spray shall be used to touch up all spots unavoidably missed by the distributor.

D. Pressure Distributor: The pressure distributor used for applying prime coat material shall be equipped with pneumatic tires and shall be so designed and operated as to distribute the prime material in a uniform spray without atomization, in the amount and between the limits of temperature specified. It shall be equipped with a speed tachometer registering feet per minute and so located as to be visible to the truck driver to enable him to maintain the constant speed required for application at the specified rate.

The pressure distributor shall be equipped with a tachometer registering the pump speed, pressure gauge, and a volume gauge. The rates of application shall not vary from the rates specified by the Architect/Engineer by more than 10%. Suitable means for accuracy indicating at all times the temperature of the prime material shall be provided. The thermometer well shall be so placed as not to be in contact with a heating tube.

The distributor shall be so designed that the normal width of application shall be not less than 6', with provisions for the application of lesser width when necessary. If provided with heating attachments, the distributor shall be so equipped and operated that the prime material shall be circulated or agitated throughout the entire heating process.

E. Sand Cover: The asphalt prime coat should preferably be entirely absorbed by the base course and, therefore, require no sand cover. If, however, it has not been completely absorbed prior to the start of placing the asphalt concrete mixture and in the meantime it is necessary to permit traffic thereon, just sufficient sand shall be spread over the surface to blot up the excess liquid asphalt and prevent picking it up under traffic. Also, sand shall be used in amounts deemed necessary by the Architect/Engineer at intersections and such areas where traffic may pass over the prime coat. Prior to placing the asphalt concrete, loose or excess sand shall be swept from the base. If a sand cover is specified on the drawings to cover asphalt prime, it shall be applied within 4 hours after the application of said prime coat, unless otherwise ordered by the Architect/Engineer.

F. Protection: Liquid asphalt shall be prevented from spraying upon adjacent pavements, structures, guard rails, guide posts, culvert markers, trees, and shrubbery that are not to be removed; adjacent property and improvements; and other facilities or that portion of the traveled way being used by traffic.

The Contractor shall protect the prime coat against all damage and markings, both from foot and other traffic. Barricades shall be placed where necessary to protect the prime coat. If, after the prime coat has been applied to the satisfaction of the Architect/Engineer and has been accepted by him, it is disturbed by negligence on the part of the Contractor, it shall be restored at his expense to its condition at the time of acceptance. No material shall be placed until the prime coat is in a condition satisfactory to the Architect/Engineer.

2.2 TACK COAT

A. If the asphalt concrete pavement is being constructed directly to an existing hard-surfaced pavement, a tack coat shall be evenly and uniformly applied to such existing pavement edge preceding the placing of the asphalt concrete. The surface shall be free of water, all foreign material, or dust when the tack coat is applied. No greater area shall be treated in any one day than will be covered by the asphalt concrete during the same day. Traffic will not be permitted over tack coating.

B. Tack coat shall consist of cationic emulsified asphalt. Application rate shall be 0.10 to 0.15 gallons per S.Y., the exact quantities being determined by the Architect/Engineer.

C. A similar tack coat shall be applied to the surface of any course is, in the opinion of the Architect/Engineer, the surface is such that a satisfactory bond cannot be obtained between it and the succeeding course.

D. When required, the contact surfaces of all cold pavement joints, curbs, gutters, manholes, and the like shall be painted with a tack coat immediately before the adjoining asphalt concrete is placed. Asphalt tack coat shall be applied in controlled amounts as shown on the plans or determined by the Architect/Engineer. Surfaces where a tack coat is required shall be cleaned to the satisfaction of the Architect/Engineer before the tack coat is applied.

PART 3 - EXECUTION

3.1 PLACING ASPHALT CONCRETE MIXTURE

A. At the time of delivery to the site of the work, the temperature of mixture shall be not lower than that required to obtain the density specified.

B. The Architect/Engineer shall require a temperature which laboratory tests show will be suitable for its workability.

C. When hauling time from the mixing plant to the job site exceeds two hours or when inclement weather prevails, bituminous mixtures shall be covered with tarpaulins while being hauled. The tarpaulins shall completely cover the load and be firmly tied down. Mixtures shall be delivered to site of the work without segregation of the ingredients and within the temperature range specified in this section.

D. Asphalt concrete may be placed when the temperature is 50°F and rising and the weather is favorable as determined by the Architect/Engineer. None may be placed in wet weather or on a wet surface.

E. The asphalt concrete shall be evenly spread upon the subgrade or base to such a depth that after rolling it will be of the specified cross-section and grade of the course being constructed.

F. Depositing and spreading of the asphalt concrete shall be accomplished by means of self-propelled mechanical spreading and finishing machine designed especially for that purpose and which permits depositing and spreading in a strip 8' to 14' in width. The machine shall be equipped with a vibrating or tamping screen capable of being accurately regulated and adjusted to distribute a layer of the material to a definite predetermined thickness and template. The paving machine shall be equipped with an automatic leveling device controlled from an external guide. The initial pass for each course shall be made using a paver equipped with a 40' minimum external reference, except this shall not apply when asphaltic concrete is placed adjacent to concrete pavement or gutter. Subsequent passes shall utilize a matching device of 1' minimum length, riding on the adjacent lift.

G. All joints shall be completely bonded.

H. Placing once commenced must be continued without interruption. No greater amount of the mixture shall be delivered in any one day than can be properly distributed and rolled during the day.

I. In narrow, deep, or irregular sections, intersections, turnouts, or driveways, where it is impractical to spread the finish the base and level the surface mixtures by machine methods, the Contractor may use spreading equipment or acceptable hand methods approved by the Architect/Engineer.

3.2 ROLLING

A. Asphalt concrete shall be thoroughly compacted by rolling. Rollers shall be of a type approved by the Architect/Engineer. Rolling shall be commenced with a steel wheel roller along the lower edge of the area to be rolled and be continued until the edge is thoroughly compacted, after which the roller shall gradually advance to the crown point, both sides being rolled in a like manner. Rolling shall be continued with steel and pneumatic wheel rollers until the layer has become thoroughly compacted throughout and is true to grade and cross-sections.

B. Rollers shall be maintained in good mechanical condition, and those that cannot be operated without jerking or driven along a straight path shall not be used. No leakage from any roller shall be allowed to come in contact with the pavement being constructed nor shall any roller be permitted to stand motionless on any portion of the work before it has been properly compacted. Steel roller wheels shall be treated with water or oil to prevent the adherence of the asphalt concrete, and water or oil may be used on pneumatic-tired rollers but the quantity used must not be such as to be detrimental to the surface being rolled.

C. Final rolling of the top or finish course shall be accomplished with a steel wheel roller, removing all surface imperfections, including indentures made by pneumatic-tired rollers.

D. Rolling of both the base course and surface course shall be continued until all roller marks are eliminated and a density of at least 96% of the density of a laboratory specimen of the same mixture for both surface course and hase course.

E. In areas not accessible to the roller, the mixture shall be thoroughly compacted with hand operated mechanical tampers. Any mixture that becomes mixed with foreign material or in any way is defective shall be removed, replaced with fresh mixture, and compacted to the density of the surrounding pavement.

3.3 SAMPLING AND TESTING PAVEMENT

A. Sampling of the compacted asphalt pavement will be taken and tested to determine conformance of the finished pavement with the specified requirements. The Contractor shall replace the pavement at his expense where samples are removed. Six (6) samples including rings and cores to be taken will re required and tested in accordance with these specifications prior to acceptance to verify proper compaction and proper paving depths. Coring of the pavement, and testing of the core samples shall also be paid by the Contractor.

B. The minimum test requirements for the pavement shall consist of a test for:

1. The gradation of extracted aggregates
2. Density of compacted pavement
3. Asphalt content be extraction (if not previously controlled and verified by tank strap test)
4. The frequency for these tests shall not be less than 1 test in each of the 3 categories for each 500 tons or fraction thereof of asphalt concrete placed and for asphalt concrete (less than 500 tons) placed during one day's run.

3.4 JOINTS

A. Care shall be exercised in connection with the construction of joints to insure that the surface of the pavement is true to grade and cross-section.

B. In making the joint along any adjoining edge such as a curb, gutter, or an adjoining pavement and after the hot mixture is placed by the finishing machine, sufficient hot material shall be carried back to fill any space left open. This joint shall be properly "set up" with the back of a rake at proper height and level to receive the maximum compression under rolling. The work of "setting up" this joint shall be performed by competent workmen who are capable of making a correct, clean, and neat joint.

C. Longitudinal and transverse joints shall be made in a careful manner. Well-bonded and sealed joints are required. Joints between old and new pavements or between successive days' work shall be carefully made in such a manner as to insure a thorough and continuous bond between the old and new surfaces. In the case of surface course, the edge of the old surface course shall be cut back for its full depth so as to expose a fresh surface and, if necessary to obtain a well-bonded joint, shall be painted with a tack coat after which the hot surface mixture shall be placed in contact with it and raked to a proper depth and grade. Before placing mixture against contact surfaces of curbs, gutters, headers, manholes, etc., they shall be painted with a tack coat.

D. No asphalt concrete surface course shall be placed which cannot be finished within daylight hours of the same day it is laid unless otherwise specified or directed by the Architect/Engineer.

3.5 MANHOLE AND VALVE COVERS

A. Manholes frames and valve covers shall be adjusted prior to placing the surface course.

3.6 SMOOTHNESS

A. Upon completion, the pavement shall be true to grade and cross-section. Except at intersections or any changes of grade, when a 10' straight edge is laid on the finished surface parallel to the centerline of the roadway, the surface shall not vary from the edge of the straight edge more than 3/16". Areas that are not within this tolerance shall be brought to grade immediately following the initial rolling. After the completion of final rolling, the smoothness of the course shall be checked, and the irregularities that exceed the specified tolerances or that retain water (bird baths) on the surface shall be corrected by removing the defective work by means of jackhammering and replacing with new material as directed by the Architect/Engineer at the expense of the Contractor. No skin or overlay patches will be acceptable for correcting depression areas.

3.7 LIFTS

A. Placement of asphalt concrete pavement shall be done in one lift up to three inches (3") of the pavement structure thickness as indicated on the plans.

3.8 TRAFFIC AND LANE MARKINGS

A. Traffic and Lane Markings: Lay out area and review with Owner before paint application. Apply two coats of alkyd type traffic-lane marking paint over cleaned paving surface. Refer to drawings for handicap and fire lane paint marking.'

1. Parking space and general directional arrows or markings - OSHA White
2. Handicap Spaces and International HC Logo - OSHA Blue on White
3. Fire Lanes and No Parking - OSHA Red
4. Cart Storage and restricted curbs as noted - OSHA Yellow

B. Apply paint as per manufactures recommendations to cured and clean surface.

C. Layout stripping pattern and locations with proper surveying devices and measuring devices. Strike arcs and straight lines with chalk or other marking materials to identify locations.

D. Install paint with mechanical equipment which is designed to provide smooth straight line with hard edges along paint stripe. Hand brush or roller application is not allowed.

E. Protect paint until it has attained its full set and hardness. Repaint areas as required to achieve full uniform color and appearance. Cover mistakes or rework with coat of pure slurry sealer without aggregate and repaint after sealer has hardened and set.

END OF SECTION

SECTION 32 1313
CONCRETE PAVING

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Portland cement concrete curbs, walks, gutters, cross gutters, valley gutters, aprons, slope paving and median paving constructed of concrete shall have a minimum 28 day compressive strength of 4500 psi.

B. Subgrade preparation for concrete curbs, gutters, walks, aprons, alleys, intersections, and slope paving shall conform to the requirements of Section 31 2002.

PART 2 - EXECUTION

2.1 FORMS

A. Form material shall be free from warp, with smooth and straight upper edges and, if used for the face of curb, shall be surfaced on the side against which the concrete is to be placed. Timber forms may be used for forming curved sections but shall not be used for straight work unless authorized in writing by the Architect. Metal forms for such work being of a gauge that will provide proper rigidity and strength for the purpose for which they are intended. Wood forms used on curb returns shall be not less than : of an inch in thickness, cut in the length and radius as shown on the plans and held rigidly in place by the use of metal stakes and clamps. The curb face forms shall be cut to conform exactly with the curb face batter, as well as being cut to the required length and radius. In every case, however, the forms shall be of sufficient rigidity and strength and shall be so supported as to adequately resist springing or deflection as a consequence of the placing and tamping of the concrete.

B. All curb and combined curh and gutter shall be divided into blocks or stones in lengths not to exceed 6' long using metal templates not less than 1/16" nor more than 1/4" thick cut to the dame cross-section as the curb or curb and gutter being constructed. Templates shall be securely attached to forms to prevent movement during concrete placement.

C. Form material shall be thoroughly clean at the time it is used and shall be given a coating of light oil or other suitable material immediately prior to the placing of the concrete.

D. Forms, except curb back planks, shall be set with the upper edges thereof flush with the specified grade of the finished surface of the adjacent portion of the work and shall be not less than a depth equivalent to the full specified depth of thickness of the concrete to be supported thereby.

E. Back forms shall be held securely in place by means of stakes driven in pairs, one at the front form and one at the back, at intervals not to exceed 4'; clamps, spreaders, and braces being used in connection therewith to such extent as may be necessary to insure proper rigidity of the forms. Forms for walks, gutters, and similar work shall be firmly secured by means of stakes driven flush with the upper edge of the forms at intervals not to exceed 5'. The stakes shall be of sufficient size and shall be so driven as to properly and adequately support the forms.

F. Form clamps, specifically designed and manufactured for the curb and gutter to constructed, may be used if, in the opinion of the Architect, they fulfill the requirements hereinabove specified for curb and gutter forms.

PART 3 -EXECUTION

3.1 PLACING CONCRETE

A. The concrete shall be placed on a thoroughly dampened subgrade sufficiently moist to insure that no moisture will be absorbed from the fresh concrete.

B. Surfaces of structures in sidewalks, curbs, and gutters shall be adjusted as necessary prior to placing of concrete to meet the contiguous sidewalk surfaces.

C. Concrete shall be placed in horizontal layers not to exceed 6" each in thickness, each layer being spaded along the forms and thoroughly tamped. However, if the section if more than 6" in depth, the concrete may be placed to provide the thickness shown or specified, if mechanical internal vibrators are used or if, in the opinion of the Architect, the spading and tamping is sufficient to consolidate the concrete for its entire depth.

D. After the concrete for walk has been placed between the side forms, a strike-off shall be used to bring the surface to the proper section to be compacted. It shall then be spaded along the form faces and tamped with appropriate tampers not less than 2 times, in order to assure a dense and compact mass, forcing the larger aggregate into the body thereof and bringing to the surface sufficient free mortar for finishing.

E. After the concrete has been placed and tamped, the upper surface shall be struck off uniformly smooth and true to the specified grade.

3.2 EXPANSION JOINTS

A. Expansion joints shall be constructed in curbs, walks, and gutters as hereinafter specified, or as noted on the Plans/Details. No such joints shall, however, be constructed in cross gutters or driveway aprons.

B. Unless otherwise shown on the plans, 1/2" joints shall be constructed in curbs and gutters at the end of all returns except where cross gutters are being constructed. They shall be at the ends of the cross gutter transitions and also along the line of the work at regular intervals of every sixth stone, but not to exceed 36", joints in gutter being continuous with those in adjacent curb. No joints shall be constructed in returns. Where continuous curb and gutter is constructed adjacent to cement concrete pavement, weakened plane joints shall be installed continuous with alternate joints installed in the adjacent pavement, in which case no expansion joints for sidewalks shall be placed at intervals not exceeding 18' with joint filler strips. The weakened plane joints shall be as specified in subsection Transverse Contraction Joints.

C. Expansion joint filler strips shall be placed in walks at the PT and PC of all walk returns, between walk and a building or structure, in walk returns between the walk and the back of the curb returns, and around all utility pole encountered along the line of the work. At the PT and PC and around utility poles, the joint filler strips shall extend the full depth of the concrete being placed. Joint filler strips between walk and curb shall be the full depth of the walk with the top of the filler strip set flush with the specified grade of the top of the curb. Expansion joint filler strips including those around utility poles shall not be less than 1/2 inch in thickness.

D. Expansion joint filler strips shall be vertical and shall extend to the full depth and width of the work in which they are installed, being constructed at right angles or radially to the line of the curb or gutter as the case may be. The filler strips shall completely fill these joints at least to within 1/4 of an inch of any surface of the concrete that will be exposed upon completion of the work and must fully extend at least to those surfaces that will not be exposed. However, before the work will be accepted, any joint filler that protrudes beyond a surface that will not be exposed or beyond 1/4 of an inch below a surface that is exposed shall be trimmed off the specified dimension in a neat and workmanlike manner. During the placing and tamping of the concrete, the filler strip shall be held rigidly and securely in proper position.

3.3 FINISHING

A. Surfaces of the various items of work shall be finished as specified. Edges of concrete at expansion joints shall be rounded to 1/4 inch radius. Upon completion, the finished surface shall be true to line and grade and free from irregularities.

3.4 CURB

A. The front forms may be stripped as soon as the concrete has set sufficiently but must be removed before the expiration of 6 hours after pouring. Immediately following the stripping of these forms, Class A mortar, thinned to the consistency of grout, shall be applied to the curb face. If monolithic curb and gutter is being constructed, this mortar shall be applied to the full-exposed face; otherwise, it shall extend for an additional 2 inches below the gutter.

B. The face and top of the curb shall then be carefully troweled to a smooth and even finish, the top being finished to a transverse slope of 1/4 of an inch toward the front, with both edges rounded to a radius of : of an inch. The troweled surface shall be finished with a fine hair broom parallel with the line of the work.

3.5 WALK

A. Following the placing of concrete, the surface shall be worked to a true and even grade, free from waves and irregularities. After the preliminary troweling, the initial scoring for the block markings shall be made to a depth of 1 inch in order to insure the scoring depth required. The work shall then be carefully troweled to a smooth and even finish, with the edges rounded to a radius of 1/2 inch, the scoring markings made to the required depth following which it shall be given a fine hair broom finish, applied transversely and remarked when required to insure a neat uniform joint. Troweling may be done with a long handled trowel or "Fresno".

B. Contraction joints or block joints shall not exceed intervals of 6 feet or as noted on the Plans/Details. Joints shall be made at regular intervals along the line of the work. On straight work, the joints shall be parallel with and at right angles to the line of the work; at curves the joints shall, in general, be along lines concentric with and radial to the proportion of the work in which they are placed. The markings shall be made with jointer tools that will round the edges of the scoring lines to a radius of 1/8 of an inch, with a depth of not less than 1/1/4 inch. The finished joint opening, exclusive of radii, shall not be wider than 1/8 inch. The Contractor will be required to have a sufficient number of jointer tools on the job to accomplish the above specified requirements.

C. The side forms shall remain in place after completion of the walk until the concrete is sufficiently set but must be removed before the work will be accepted.

3.6 GUTTER

A. After the concrete has been thoroughly tamped in such manner and to such extent as to force the larger aggregates into the body thereof and bringing to the top sufficient free mortar for finishing, the surface shall be worked to a true and even grade by means of a float, troweled with a long handled trowel or "Fresno" and then longitudinally broom finished, following which the flow line of the gutter shall be troweled smooth for a width of approximately 3 inches and the outer edge rounded to a radius of 1/2 inch.

B. Side forms shall remain in place until the concrete is sufficiently set, after completion of the gutter, but must be removed before the work will be accepted.

C. Construction joints and expansion joints and other details of construction shall be as indicated on the plans. The finished surface shall conform to the required roadway section as to both line and grade. The gutter sections will not be opened to traffic until specimen beams have attained a flexural strength of not less than 500 pounds per square inch (AASHTO T 97). When such tests are not conducted, the gutter shall not be opened to traffic until 14 days after the concrete has been placed. In the event that high-early cement is used, the flexural requirements will remain the same as previously stated; however, in lieu of a flexural test and after a minimum of 7 days curing has taken place, the Architect will determine when sections may be opened to traffic.

3.7 CONCRETE SLOPE PAVEMENT

A. All subgrade preparation required for this item shall be done in accordance with applicable provisions of Section 312002 with the exception that minimum density requirements will be 90% of maximum density as determined by ASTM D 698 in all cases, instead of 95% of maximum in the top 6 inches or 12 inches of compacted fill.

B. Wire reinforcing mesh shall be included and shall be 6"x 6" No. 6 gauge fabric. Additional steel, if required, will be included as shown on the plans and shall be included as part of the item.

C. Thickness of concrete shall be 4 inches nominal, and construction joints shall be required at 18 foot intervals maximum. Concrete shall be screeded and finished with wood float or equivalent to a plane surface having no variation when measured with a 10 foot straight edge in excess of 1/4 inch, unless a curvilinear surface is designated for a particular job. All concrete work shall be in accordance with Section 03200.

3.8 CURING

A. After the completion of the finishing operations, all concrete shall be sprayed with concrete curing compound. The surface of the concrete shall be kept thoroughly damp between the completion of the finishing operations and the application of the curing compound. No curing compound will be used on sidewalk.

B. The curing compound shall be applied under pressure, by means of a spray nozzle, in such manner and quantity as to entirely cover all exposed surfaces of the concrete with a uniform film.

3.9 DRIVEWAY APRONS

A. Driveway aprons shall be provided in new curves at all existing driveways along the line of the work and at locations shown on the plans or as directed by the Architect.

B. The location and construction details for aprons shall conform to applicable local ordinances and the drawings and general provisions of Contract.

C. Where walk is to be constructed across aprons, the thickness of the walk shall be not less than 6 inches, unless otherwise specified or shown on the plans.

3.10 DRAINAGE OUTLETS THROUGH CURB

A. The Contractor will be required to provide suitable outlets through the new curb for all existing building drains along the line of the work.

3.11 MISCELLANEOUS TYPES OF CURB, GUTTERS, SIDEWALKS

A. Extruded type concrete curb and gutter, precast curb and gutter sections, cut stone curbs, brick sidewalks, flagstone sidewalks, etc. will be permitted where approved by the Architect and in accordance with the plans.

3.12 REPAIRS AND REPLACEMENT

A. New work that is found to be defective or damaged prior to the acceptance of existing work damaged by the Contractor's operation shall be repaired or replaced by the Contractor at no expense to Owner; sidewalk that is to be replaced shall be neatly saw-cut. The minimum size slab that is removed and replaced shall be 5 feet long and for the full width of the walk. Curb and gutter shall be saw-cut on a neat line at right angles to the face of the curb to at least 2/3 of the full section of curb and/or gutter on either side of defective or damaged portion.

3.13 TESTS

A. Testing procedures shall be as provided elsewhere in the specifications.

3.14 BACKFILLING AND CLEANUP

A. Backfilling to the finished surface of the newly constructed improvement must be completed before acceptance of the work.

B. Upon completion of the work, all earth or burlap covering shall be removed, the surface of the concrete thoroughly cleaned, and the site left in a neat and orderly condition, including disposal of excess materials and earth.

END OF SECTION 32 1313

SECTION 31 2001
SOIL STERILIZATION

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. The work covered by this section of the specifications consist of furnishing all materials, labor, and equipment and in performing all operations in connection with the application of soil sterilant type herbicide, complete, in strict accordance with this section of the specifications and applicable drawings and general provisions of Contract.

1.2 EQUIPMENT:

A. All equipment, tools, and machines used in the performance of the work required by this section of the specifications shall be subject to the approval of the Architect/Engineer and shall be maintained in satisfactory working condition at all times.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. Herbicide soil sterilants shall be an aqueous solution of:

Dupont 85% CMU weed killer
Telvar
Sodium TCA-90
Monobor-Chlorate
Polybar-Chlorate
Hyvar XL
Or approved equal

PART 3 - EXECUTION

3.1 CONSTRUCTION METHODS:

A. Soil Sterilization: It is anticipated that all areas to receive base course and/or paving, as determined by the Architect/Engineer, will need soil sterilization to insure pavement protection from weed growth. After the curb and gutter has been placed and grading is complete to subgrade, the subgrade shall be thoroughly scarified to a depth of 6" and watered to near optimum moisture content. Then an aqueous solution of an approved herbicide soil sterilant shall be applied to the subgrade at the rate recommended by the manufacturer. Compaction of the subgrade shall then be handled in the usual manner with the provision that the prime coat be applied before the subgrade has a chance to dry out. This provision is necessary due to the fact that the weed killers require a certain amount of moisture to be effective.

END OF SECTION 31 2001

SECTION 33 4100
STORM UTILITY DRAINAGE PIPING

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. The construction items, specified in this section, are common to storm sewer pipe installation, pipe type culverts and pre-cast manhole storm drain systems.

B. Corrugated polyethylene and/or PVC pipe will be used for storm sewer pipe installations or pipe type culverts.

1.2 REFERENCES

AASHTO

M 294M-98 MP6-95

ASTM

F477-93 F405-89
F677-35

PART 2 - PRODUCTS

2.1 MATERIALS

A. Pipe: Pipe and fittings shall be corrugated polyethylene pipe and/or PVC.

2.2 CERTIFICATION

A. The OWNER/ENGINEER will be supplied with a certification on each item or type of material required in the sewer line, as to that item meeting the specifications and/or the reference specifications before that item is installed.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Pipe and appurtenances shall be new and unused. The type of pipe to be installed shall be as approved by these specifications or unless otherwise shown on the drawings. Pipe and appurtenances shall be handled in such a manner as to insure delivery to the trench in sound, undamaged condition. Particular care shall be taken to prevent damage to any pipe coating.

B. The interior of the pipe shall be thoroughly cleaned of foreign material before being lowered into the trench and shall be kept clean during construction operations. When work is not in progress, the open ends of pipe shall be securely closed so that no foreign materials will enter the pipe. Any section of pipe found to be defective before or after laying shall be replaced with sound pipe, or repaired in a manner satisfactory to the ENGINEER, without additional expense to the OWNER.

C. The CONTRACTOR shall install a plug in the new sewer at any point of connection to an existing system. The plug shall remain in place until the ENGINEER authorizes its removal in writing. The CONTRACTOR shall not flush or otherwise discharge any flow into an existing system unless approved in writing by the ENGINEER.

D. Pipe shall be laid to line and grade as shown on the plans and as staked in the field. The bottom of the trench shall be graded and prepared to provide a firm and uniform bearing through out the entire length of the pipe barrel. Suitable excavation shall be made to receive the bell of the pipe and the joint shall not bear upon the bottom of the trench. All adjustment to the line and grade shall be made by scraping away or filling in with pipe zone material under the body of the pipe, and not by wedging or blocking. When connections are to be made to any existing manhole, pipe, or other improvements, the actual elevation or position of which cannot be determined without excavation, the CONTRACTOR shall excavate for and expose the existing improvement before laying the connecting pipe or conduit. When existing underground improvements may reasonably be expected to conflict with the line or grade established for the new sewer line, the ENGINEER shall request and the CONTRACTOR shall excavate as necessary to expose and locate such potentially conflicting underground improvements prior to laying the new pipe.

E. Any adjustment in line or grade which may be necessary to accomplish the intent of the plans will be made, and the CONTRACTOR will be paid for any additional work resulting from such change in line or grade in the manner provided for in the General Conditions.

F. CONTRACTOR shall submit to the ENGINEER the proposed method for making connections to existing manholes. Connection methods will be dependent upon manhole size and pipe sizes. Unnecessary damage to the existing manhole should be avoided.

G. Pipe shall be laid upgrade in a continuous operation from structure to structure, with the socket or collar ends of the pipe upgrade unless otherwise permitted by the ENGINEER. Concrete pipe with elliptical reinforcement shall be laid with the minor axis of the reinforcement cage in a vertical position. Corrugated metal pipe shall be laid with the external laps of the circumferential seams toward the inlet end.

3.2 JOINTS FOR PIPE

A. Joints for Pipe: The type of joint to be used shall be elastometric seals (gaskets) conforming to F477-93.

B. General: The ends of the pipe shall be so formed that when the pipes are laid together and jointed, they shall make a continuous and uniform line of pipe with a smooth and regular surface.

C. The CONTRACTOR shall furnish the ENGINEER complete information concerning the type and make of all joint material which he intends to use under the contract, including certification that the joint material meets the requirements of the specifications.

3.3 TESTING FOR LEAKAGE

A. Normally storm sewer lines need not be tested, but if in the opinion of the ENGINEER, the workmanship or materials do not appear to be satisfactory, the ENGINEER may require that a section of the storm sewer line be tested.

3.4 CLEANING AND INSPECTION

A. Cleaning: No pipe spalls, rocks, dirt, joint compounds, cement mortar and other trash or obstructions shall be left in a storm sewer pipe of any size or type.

B. Inspection: Before lines become operational or final acceptance of the installation, larger size lines will be inspected.

END OF SECTION 33 4100