SANTA FE COUNTY
FIRE DEPARTMENT

IFB# 2019-0222-PW/MAM

CONSTRUCTION SERVICES
FOR THE EL DORADO FIRE STATION NO. 1

SANTA FE COUNTY FIRE DEPARTMENT

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FOR THE EL DORADO FIRE STATION NO. 1

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SANTA FE COUNTY
IFB 2019-0222-PW/MAM
CONSTRUCTION SERVICES FOR THE
EL DORADO FIRE STATION NO. 1

The Santa Fe County Fire Department requests bids to procure a licensed construction company for the construction of a new apparatus bay and storage space to the existing El Dorado Fire Station No. 1 in the community of El Dorado, NM. The work consists of the construction of a 1,550 sq. ft. addition to the existing 3,080 sq. ft. El Dorado Fire + Rescue building on an existing 2 acre site in El Dorado, Bids may be held for ninety (90) days subject to all action by the County. Santa Fe County reserves the right to reject any and all bids in part or in whole. A completed bid package must be submitted in a sealed container indicating the bid title and number along with the bidding firm's name and address clearly marked on the outside of the container. **All bids must be received by 2:00 PM on Wednesday, May 29, 2019 at the Santa Fe County Purchasing Division, located at 142 W. Palace Avenue, (2nd floor Bokum Building), Santa Fe, N.M. 87501.** By submitting a bid for the requested materials and/or services each firm is certifying that its bid is in compliance with regulations and requirements stated within the IFB package.

A Pre-Bid Conference & Site Visit will be held on Thursday, May 9, 2019 at 3:00 PM at the El Dorado Fire Station No. 1, located at 144 Avenida Vista Grande, El Dorado, NM 87506. Attendance at the Pre-Bid Conference & following site visit is MANDATORY.

EQUAL OPPORTUNITY EMPLOYMENT: All qualified bidders will receive consideration of contract(s) without regard to race, color, religion, sex, national origin, ancestry, age, physical and mental handicap, serious mental condition, disability, spousal affiliation, sexual orientation or gender identity.

Information on Invitation for Bid packages will be available by contacting Michelle A. Marmion, Santa Fe County, by telephone at (505) 992-6753 or by email at mmarmion@santafecountynm.gov and on the Santa Fe County website at http://www.santafecountynm.gov/asd/current_bid_solicitations.

BIDS RECEIVED AFTER THE DATE AND TIME SPECIFIED ABOVE WILL NOT BE ACCEPTED.

Santa Fe County Fire Department
Publish: April 28 & 29, 2019

SECTION 00 2000 – DEFINITIONS

Unless otherwise defined herein, definitions set forth in the Standard Form of Agreement between Owner and Contractor, AIA Document A101-2007, as modified by County, General Conditions of the Contract for Construction, AIA Document A201-2007, as modified by County or in other Contract Documents are applicable to the Bidding Documents.

"Addenda" - written or graphic instruments issued by the County prior to the execution of the Contract that modify or interpret the Bid Documents by additions, deletions, clarifications or corrections.

"Alternate" - an item or component of the project that for which the County is soliciting a separate price from the work included in the Base bid. The County may or may not award the alternate(s) in conjunction with the Base Bid, but any Alternate, if awarded, will only be awarded in conjunction with a Base Bid and will not be awarded separately.

"Base Bid" - the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bid Documents as the base, to which Work may be added or from which Work may be deleted for sums stated in the Alternate Bids. The Base Bid shall be on a lump sum basis.

"Bid" - a complete and properly executed proposal to do the work for the sums stipulated therein, in accordance with the Bid Documents and the Contract Documents.

"Bidder" - a person submitting a Bid pursuant to this solicitation.

"Bidding Documents" – consist of the Advertisement or Invitation for Bid, Instructions to Bidders, Supplementary Instruction to Bidders, the bid form, and other sample bidding and contract forms. The Contract Documents consist of the Sample Fe County Agreement, the Bidding Documents, Drawings, Specifications, the Project Manual, and all Addenda issued prior to execution of the Contract. All applicable laws and ordinances and the rules and regulations of all authorities having jurisdiction over the Project shall apply to the Contractor and the Contract Documents.

"County" or "the County" – means Santa Fe County, New Mexico, a political subdivision of the State of New Mexico.

"Deductive Alternate" – *An alternate bid resulting in a deduction from the same bidder's base bid.*

"Responsive Bid"- a Bid that conforms all the material respects to the requirement set forth in this Invitation for Bid. Material respects of a Bid include, but are not limited to, price, quality, quantity or delivery requirements.

"Responsible Bidder" – a person or entity who submits a responsive Bid and who meets the requirements set forth in the Bid Documents.

"Sub-bidder" (or "Subcontractor") – a contractor who contracts directly with the bidder.

"Unit Price" - an amount stated in the bid as a price per unit of measurement for materials, equipment, or services or a portion of the Work as described in the Bid Documents.

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SECTION 00 3000 – INSTRUCTIONS FOR BIDDERS

1. **LOCATION AND DESCRIPTION OF WORK**: The Santa Fe County Fire Department is requesting bids to procure a licensed construction company for the El Dorado Fire Station No. 1 located in the community of El Dorado, New Mexico. The project is a 1,550 SF addition to the existing 3,080 SF El Dorado Fire + Rescue building on an existing 2 acre site in Eldorado, NM. The building addition includes an 18' wide x 70' long Apparatus Bay and a 13' x 22' Storage Room. The new Apparatus Bay is intended to blend with the existing facility with materials and colors, and will include large 14' x 14' Overhead Doors, new heating and exhaust filtration system, and new metal signage.

   The existing building renovation will include re-painting existing overhead doors, re-stuccoing adjacent surfaces to addition, existing roof adjusted to accommodate proper drainage, and openings between existing and new bays will be provided.

   Site work includes retiring the existing septic system that is in the area of addition, and providing a new septic system. Adjusting asphalt driveway around new bay doors and water retention from roof run-off will also be part of work.

   The existing bays will receive repainting and new heating and exhaust filtration system.

   The Contractor shall supply all labor, materials and equipment necessary to complete the work in accordance with the construction plans and specifications. All required permits, including those required by CID and Santa Fe County, are the responsibility of the Contractor.

2. **TIME AND PLACE OF RECEIVING AND OPENING BIDS**: This information will be found in the "Advertisement for Bids" attached hereto. **A bid received after the specified date and time will not be considered and will be returned to the bidder unopened.**

3. **PRE-BID CONFERENCE & SITE VISIT:** A pre-bid conference and site visit will be held on ***Thursday, May 9, 2019 at 2:00 PM*** at the **El Dorado Fire Station No. 1, located at 144 Avenida Vista Grande, El Dorado, NM 87506.** Attendance at the pre-bid conference and following site visit is ***MANDATORY***.

4. **SPECIFICATIONS**: The construction/addition of the project will be in accordance with the specifications and drawings provided by the County, which are included in this bid package. The County has established a procurement library of documents for Bidders to consider while creating their bids. The documents are available for viewing online at http://www.santafecountynm.gov/asd/current_bid_solicitations.

5. **CONTRACT TIME**: The number of days for the completion of work (the contract time) is 180 calendar days. The number of days for the completion of work is weather working calendar days, where "calendar days" are defined as consecutive days.

6. **COPIES OF BIDDING DOCUMENTS**: Bidders may obtain complete sets of the Bidding Documents by accessing our website at www.santafecountynm.gov/asd/current_bid_solicitations. The following documents are included in the Procurement Library:
   1. Invitation for Bid (IFB)
   2. Plans/Drawings
   3. Soil Testing Report

7. **BIDDER'S REPRESENTATION**: By submitting a bid a bidder represents that: a) the bidder has read and understands the Bid Documents and Contract Documents; b) the bid is made in compliance with the Bid Documents and Contract Documents; c) The bidder has visited the site and has become familiar with local conditions under which the Work is to be performed, and has correlated the bidder's personal observations with the requirements of the proposed Contract Documents; d) the bidder has familiarized itself with federal, state and local laws, ordinances, rules, and regulations affecting performance of the Work; e) the bid is based upon the materials, equipment and systems required by the Bid Documents without exception; and f) the County shall rely on these representations.

7. **INTERPRETATIONS/ADDENDA**: All questions about the meaning or intent of the Bid or Contract Documents shall be submitted to the Procurement Manager in writing.

   Replies will be issued by written addenda e-mailed or delivered to all parties recorded by the printer, as having received the bidding documents at least five (5) calendar days before the scheduled bid opening date. Questions received less than seven (7) calendar days prior to the date for opening of bids will not be answered. Only questions answered by formal written addenda will be binding. Oral and other interpretations or clarifications will be without legal effect. Written questions or inquiries in relation to the Invitation for Bid will be directed to:

   Michelle A. Marmion, Senior Procurement Specialist
   Santa Fe County Purchasing Division
   142 W. Palace Avenue (Second Floor)
   Santa Fe, NM 87501
   Ph. (505) 992-6753
   Fax (505) 989-3243
   E-mail – mmarmion@santafecountynm.gov

   Bidders may ONLY contact the Procurement Manager regarding the procurement. Any bidder that contacts other County Staff may be disqualified from bidding. Other County employees do not have the authority to respond on behalf of the County. Copies of addenda will be made available for inspection wherever Bid Documents are on file for that purpose.

   Each addendum shall be part of the contract documents as specified in the written contract, attached to these specifications (see Appendix F).

Addenda will be issued no later than five (5) working days prior to the date for receipt of bids except an addendum withdrawing the request for bids or one which includes postponement of the date for receipt of bids.

Each bidder shall ascertain prior to submitting a bid that the bidder has received all addenda and the bidder shall acknowledge receipt in the bid.

8. **PREFERENCE IN PROCUREMENT:**

A. ***New Mexico In-state Preference***

New Mexico law, Section 13-1-22 NMSA 1978, provides a preference in the award of a public works contract for an "**in-state resident contractor**". Application of a resident contractor preference requires the bidder to provide a copy of a valid and current certificate as a resident contractor. Certificates are issued by the state taxation and revenue department.

If a bidder submits with its bid a copy of a valid and current in-state resident contractor certificate, the bidder's bid will be deemed to be 5% lower than the bid actually submitted.

Certification by the department of taxation and revenue for the resident contractor takes into consideration such activities as the business or contractor's payment of property taxes or rent in the state and payment of unemployment insurance on employees who are residents of the state.

OR

B. ***New Mexico Resident Veteran Preference***.

New Mexico law, Section 13-1-22 NMSA 1978, provides a preference in the award of a public works contract for a "**resident veteran contractor**". Certification by the department of taxation and revenue for the resident veteran contractor requires the bidder to provide evidence of annual revenue and other evidence of veteran status.

A bidder who wants the veteran contractor preference to be applied to its bid is required to submit with its bid the certification from the department of taxation and revenue and the sworn affidavit attached hereto as Appendix D. If a bidder submits with its bid a copy of a valid and current veteran resident contractor certificate, the bidder's bid will be deemed to be 10%, lower than the bid actually received, depending on the business' annual revenue.

The in-state resident contractor preference is not cumulative with the resident veteran contractor preference.

The in-state, veteran or County preferences do not apply to procurement of services or goods involving federal funds or federal grant funds.

Additional information about obtaining the certificate as a resident contractor and resident veteran contractor may be found at: http://www.tax.newmexico.gov/Businesses/Pages/In-StatePreferenceCertification.aspx.

9. **SUBCONTRACTORS, SUPPLIERS AND OTHERS**: The contractor shall be required to fully comply with the Subcontractors Fair Practices Act, NMSA 1978, 13-4-31 to 13-4-42.

A. The Contractor, in the bid documents, must identify in writing to the County those portions of the work that it proposes to subcontract and after the Notice of Award, may only subcontract other portions of the work with the County's written consent.
B. Any subcontractor who will be providing more than $5,000 or one-half of one percent of the architect's estimate of the total project cost (not including alternates) whichever is greater for any service, must be listed on the Subcontractor Listing. The subcontractor listing threshold for this IFB is $5,000. The Subcontractor Listing form must be fully completed. All subcontractors are subject to New Mexico Wage Rates.
C. Awarded Contractor must enter all subcontractors on the Workforce Solutions website after the County issues the Notice of Award.

10. **SUBSTITUTIONS**: The materials, products, and equipment described in the Bid Documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution. No substitution will be considered prior to receipt of bids.

11. **WAGE RATES/REGISTRATION WITH THE LABOR AND INDUSTRIAL DIVISION OF THE LABOR DEPARTMENT**: The contractor shall be required to fully comply with the Public Works Minimum Wage Act, NMSA 1978, 13-4-11 thru 13-4-17. If the minimum wage rate determination for the project is not included in the initial Bid Documents, it will be furnished in an addendum.

A contractor or subcontractors who submit a bid valued at more than sixty thousand dollars ($60,000) for a public works project that is subject to the Public Works Minimum Wage Act must be registered with the New Mexico Workforce Solutions at the time of the bid opening. The registration number shall be provided in the bid submitted by the contractor in the space provided for subcontracts with work proposed. After the bid opening, the registration numbers will be verified by the County and the bid will be determined to be non-responsive and disqualified if the registration numbers are ***"inactive"*** and the contractor does not provide proof of the required registration for itself or its subcontractors for work proposed over sixty thousand dollars ($60,000).

For a public works contract whose value is $60,000 or more, the NM Public Works Minimum Wage Act, 13-4-11 NMSA 1978, also requires all tiers of subcontractors to submit certified weekly payroll records to the general contractor and the County biweekly.

If this provision applies, the contractor shall, and shall require all tiers of subcontractors, to submit certified weekly payroll records to the contractor and the County's Project Manager for this project.

12. **BID FORM**:

A. The bid forms are included in the bidding documents; additional copies may be obtained from the Santa Fe County Purchasing Division.

B. Bid forms must be completed in either ink or typewritten. The bid price of each item on the form must be stated in numerals and written words; in case of an error in extensions in the unit price schedule the unit price shown in written words shall govern.

C. Bids by corporations must be executed in the corporate name by the president or a vice president (or other corporate office accompanied by evidence of authority to sign) and the corporate seal shall be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be shown below the signature.

D. Bids by partnerships must be executed in the partnership name and signed by a partner, their title must appear under their signature and the official address of the partnership must be shown below the signature.

E. All names must be typed or printed below the signature.

F. The bid shall contain an acknowledgment of receipt of all addenda (the numbers of which shall be filled in on the bid form).

13. **BID SECURITY**: Each individual bid shall be accompanied by bid security equal to 5% of the amount of the bid. Such bid security shall be in the form of a certified or cashier's check made payable to the County or a surety bond issued by a surety authorized to conduct business in the State of New Mexico and who is approved in federal circular 570 as published by the U.S. Treasury Department.

By submitting the bid and providing the bid security, the bidder pledges to enter into a binding contract with the County and will furnish bonds covering the faithful performance of the contract and payment of all obligations arising hereunder. Should a bidder refuse to enter into such contract or fail to furnish such bonds, if required, the amount of the bid security shall be forfeited to the County as liquidated damages, not as penalty.

The County will have the right to retain the bid security of bidders to whom an award is being considered until either the contract has been executed and bonds, if required, have been furnished or the specified time has elapsed so that bids may be withdrawn or all bids have been rejected.

14. **POWER OF ATTORNEY**: Attorneys in fact who sign bonds must attach certified effective copies of their Power of Attorney to all bonds.

15. **QUALIFICATION OF BIDS**: All contractors and subcontractors must have a valid New Mexico license appropriate to the work herein specified at the time the bid is submitted.

16. **SUBMISSION OF BIDS**: Bids shall be submitted at the time and place indicated in the Advertisement for Bids and shall be enclosed in an opaque sealed envelope, marked with the project title, name and address of the bidder, N.M. License Number, and accompanied by the list of subcontractors and other required documents. All blanks must be filled in. Conditional bids will not be considered. The envelope shall be addressed to:

Michelle A. Marmion, Procurement Specialist Senior
Santa Fe County Purchasing Division
142 W. Palace Avenue (Second Floor)
Santa Fe, NM 87501

17. **MODIFICATION AND WITHDRAWAL OF BIDS**: A bid may not be modified, withdrawn or canceled by the bidder following the time and date designated for the receipt of bids, and each bidder so agrees to these conditions by submitting a bid.

    Prior to the time and date designated for receipt of bids, a bid submitted may be modified or withdrawn by notice to Santa Fe County at the address designated for receipt of bids. Such notice shall be in writing and signed by the bidder.

    Upon receipt such written confirmation shall be date and time stamped by the County on or before the date and time set for receipt of bids. A modification of a bid shall be worded as not to reveal the amount of the original bid.

18. **GROSS RECEIPTS TAXES**: The amount of the bid shall exclude applicable New Mexico Gross Receipts Taxes or applicable local option taxes. The applicable gross receipts tax or applicable local option taxes shall be computed and shown as a separate amount on each request for payment made under the contract.

19. **CONSIDERATION OF BIDS**: Each bid shall be opened publicly at the time and place designated in the IFB. The name of each bidder, the amount of each bid and each bid item, and such other relevant information shall be recorded. The record shall be open for public inspection.

20. **BID OPENING PROCEDURE**: The person or persons opening the bids shall verify that the requirements of the Instruction to Bidders have been fulfilled, and shall read aloud the name of each apparently responsive bidder and the bid amount. If any requirements have not been met, the bid shall be deemed non-responsive and disqualified. Each bid shall be reviewed for the following:

    A. Bid Proposal – Include name of bidder, type of organization, contractor's license number and Workforce Solution registration number and all required signatures.
    B. Bid Form- Include acknowledgement of all addenda (if applicable), bidder's name, title, address, telephone number, contractor's license number and type, United States Treasury number, resident preference number, if applicable, and all required signatures.
    C. Bid Sheet-Include best price offered, excluding GRT.

D. Non-Collusion Affidavit for Prime Bidder Form-Include all required notarized signatures.
E. Certification of Non-Segregated Facilities Form-Include all required notarized signatures.
F. Certification of Bidder Regarding Equal Employment Opportunity Form-Include all required signatures.
G. Bid Security- Shall be in the form of a certified or cashier's check made payable to the County or a surety bond issued by a surety.
H. Subcontractor's Listing Form-List of all subcontractors performing work over $5,000, include name, address, telephone number, license number and **active** NM Department of Workforce Solutions Registration Number.
I. Campaign Contribution Disclosure Form-Include all required signatures.
J. Valid Certificate of Preference, if applicable.

IF ANY OF THESE REQUIREMENTS HAVE NOT BEEN MET, THE BID MAY BE DISQUALIFIED AND CONSIDERED NON-RESPONSIVE.

21. **BIDS TO REMAIN OPEN**: All bids shall remain open for ninety (90) days after the day of the bid opening.

22. **AWARD OF CONTRACT**:

A. The County reserves the right to reject any and all bids and waive any and all informalities or technicalities and the right to disregard all nonconforming or conditional bids or counter proposals.
B. If a contract is to be awarded, it will be awarded to the lowest responsible bidder submitting a bid that is either: (i) the lowest base bid; or (ii) the lowest bid including the base bid and the alternate(s); or (iii) the lowest bid including the base bid and any combination of the alternates.
C. If the lowest responsible bidder has otherwise qualified, the lowest bidder may negotiate with the County for a lower bid if the lowest bid is within **ten percent** over budgeted project funds in order to prevent all bids from being rejected. No change in the original scope and/or terms and conditions will be allowed. Negotiations may be permitted with product, materials, and equipment alternatives as determined to be in the best interest of the County.
D. Alternates may be accepted and awarded in any manner or order based on available budget. The County reserves the right not to award any particular alternate.

23. **LIQUIDATED DAMAGES**: Liquidated damages in the amount of five hundred dollars ($500.00) per each working day that expires after the date of substantial completion until substantial completion is achieved and a certificate of Substantial Completion is issued by the County.

24. **PREFERENCES**: In the construction of this project, the County has no preference for any process, type of equipment, or kind of material, but will consider all processes, types of equipment or kinds of materials offered on a usual competitive basis if they are in fact equal to that specified and will accomplish the purpose intended. The County reserves the right to be the sole judge as to whether or not a different process, type of equipment or kind of material offered is in fact equal to that specified.

25. **LICENSE OR ROYALTY FEES**: Licenses and/or royalty fees for products or for processes must be paid for directly by the contractor.

26. **PERMITS**: It is the responsibility of the contractor and each subcontractor to obtain permits and inspections required by the County and/or the State of New Mexico or any other entity that may have jurisdiction over the construction or scope of work.

27. **COLLUSION**: No bidder shall be interested in more than one bid. Collusion among bidders or the submission of more than one bid under different names by any firms or individual shall be cause for rejection of all bids in question without consideration.

28. **QUANTITIES**: The quantities set forth in the bid proposal are estimated quantities on which bids will be compared and which will be the basis for award of contract. Payment will be made for the work actually performed.

29. **PROTEST PROCEDURE**: Any bidder who is aggrieved in connection with procurement may protest to the County Purchasing Manager as set forth in Resolution No. 2006-60 by the Board of County Commissioners. A copy of Resolution No. 2006-60 is available upon request. The protest must be in writing and be submitted within fifteen (15) days after the facts or occurrences. The complete procedures and requirements regarding protests and resolution of protests are available from the Santa Fe County Purchasing Division upon request.

30. **CONTRACTOR'S QUALIFICATION STATEMENT**: Bidders to whom award of a contract is under consideration shall submit, upon request, information and data to prove that their financial resources, production or service facilities, personnel, and service reputation and experience are adequate to make satisfactory delivery of the services, construction, or items of personal property described in the Bidding Documents.

31. **BOND REQUIREMENTS – PERFORMANCE BOND AND PAYMENT BOND**: If awarded the contract, a bidder shall furnish bonds covering the faithful performance of the contract and payment of all obligations arising thereunder. The amount of the bonds, performance and payment, shall each be equal to 100% of the contract sum. Bonds shall be issued by a surety authorized to conduct business in the State of New Mexico and who is approved in federal circular 570 as published by the U.S. Treasury Department. The cost of the bonds shall be included in the bid.

32. **TIME OF DELIVERY AND FORM OF BONDS**: The bidder shall deliver the required bonds to the County no later than seven (7) days following the date of execution of the Contract. If the Work is to be commenced prior thereto in response to a letter of intent, the bidder shall, prior to commencement of the Work, submit evidence satisfactory to the County that such bonds will be furnished and delivered in accordance with this section.

    The bidder shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the power of attorney.

33. **WARRANTY**: The contractor shall furnish a written warranty of workmanship to the Procurement Manager for a period of one (1) year following the completion date in addition to all other warranties required by the Contract Documents.

34. **NOTICE OF AWARD**: A written Notice of Award shall be issued by the County after review and approval of the bid and related documents.

36. **IDENTICAL BIDS**: If two or more identical low bids are received, the County will apply the process described at Section 13.1.110 NMSA 1978, of the State Procurement Code.

37. **CANCELLATION OF AWARD**: When in the best interest of the public, the County may cancel the award of any contract at any time before the execution of said contract by all parties without any liability against the County.

38. **NOTICE TO PROCEED**: The County will issue a written Notice to Proceed and a purchase order to the contractor stipulating the date from which contract time will be charged and the date contract time is to expire, subject to valid modifications in accordance with the Contract Documents.

39. **FAILURE TO EXECUTE CONTRACT**: Failure to return the signed contract with acceptable contract bonds and certificate of insurance within ten (10) calendar days after the date of the Notice of Award shall be just cause for the cancellation of the award. The award may then be made to the next lowest responsible bidder, or the work may be re-advertised and constructed under contract or otherwise, as the County may decide.

40. **INSURANCE REQUIREMENTS**: At a minimum upon execution of the Agreement between the County and the contractor, the contractor shall furnish to the County, Certificates of Insurance naming Santa Fe County as additional insured for the insurance specified in the written contract attached to these specifications (see Appendix F).

41. **CLARIFICATION OF NON-COLLUSION AFFIDAVIT OF SUBCONTRACTOR, AND CERTIFICATION OF SUBCONTRACTOR REGARDING EQUAL EMPLOYMENT OPPORTUNITY**: The general contractor is not required to present completed "Non-Collusion Affidavit of Subcontractor" and "Certification of Sub-contractor Regarding Equal Employment Opportunity" forms from their subcontractors at the time of bid submittal; however, once the contract is awarded, the general contractor is responsible for providing these forms as well as the bonds and certificate of insurance.

42. **SUBCONTRACTOR PERFORMANCE AND PAYMENT BOND**. A subcontractor whose work to be performed on a public works building project is one hundred thousand twenty five dollars ($125,000) or more shall submit a performance and payment bond in the amount of the work they are to perform on the project. These bonds will be submitted within the stated (10) calendar days after the date of the Notice to Award.

43. **OPERATIONS AND MAINTENANCE MANUALS**: At the completion of the project the contractor shall submit to the County two (2) copies of a three ring binder with all maintenance and operations instructions for all systems and items within this phase of construction, if applicable.

44. **NOTICE:** The Procurement Code, Sections 13-1-28 through 13-1-199 NMSA 1978, imposes civil and misdemeanor criminal penalties for its violation. In addition, the New Mexico criminal statutes impose felony penalties for bribes, gratuities, and kick backs.

45. **SUFFICIENT APPROPRIATION**: Any contract awarded as a result of this IFB process may be terminated if sufficient appropriations or authorizations do not exist. Such termination will be effected by sending written notice to the contractor. The County's decision as to whether sufficient appropriations and authorizations are available will be accepted by the contractor as final.

46. **NUMBER OF BIDS ACCEPTED**: Bidders shall submit only one (1) bid in response to this IFB.

47. **DOUBLE-SIDED DOCUMENTS:** All submitted bids/proposal documents shall be double-sided, pursuant to Santa Fe County Resolution 2013-7, Adopting Sustainable Resource Management Principles, Section 2. A. Waste Reduction and Reuse…"all documents are to be double-sided, including those that are generated by outside entities using County funds and by consultants and contractors doing business with the County".

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BID PROPOSAL

IFB# 2019-0222-PW/MAM
CONSTRUCTION SERVICES
FOR THE EL DORADO FIRE STATION NO. 1

To Santa Fe County, State of New Mexico, Owner:

In compliance with the Information for Bidders and in strict conformance with the Contract Documents, _____, hereinafter called the Bidder, organized and existing under the laws of the State of New Mexico as a _____ (type of business or legal entity), hereby proposes to perform all the WORK required for the construction of the El Dorado Fire Station No. 1 located in Santa Fe County, New Mexico.

The undersigned declares that the only person or parties interested in the proposal as principals are those named herein; that the proposal is made without collusion with any person, firm or corporation; that it has carefully examined the bidding documents, including special provisions, if any, and that it has made a personal examination of the site of the work, that it is to furnish all the necessary machinery, tools, apparatus and other means of construction and do all the work and furnish all the materials specified in the manner and the time prescribed; that it understands that the quantities are approximate only and subject to increase or decrease, and that it is willing to perform any increased or decreased quantities of work at unit price bid.

The undersigned hereby agrees to execute and deliver the Construction Agreement within ten (10) days, or such further time as may be allowed in writing by Santa Fe County after receiving notification of the acceptance of this proposal, and it is hereby mutually understood and agreed that in case we do not, Santa Fe County may proceed to award the contract to others.

We hereby agree to commence the work within fifteen (15) days, or such further time as may be allowed in writing by Santa Fe County after notification to proceed.

The undersigned proposes to guarantee all work performed under these Plans Specifications and Contract for one year after acceptance by the County and repair and maintain same until the warranty period has been completed.

Signature-Title

(Corporate Seal)

_____
Corporate Name

_____
Address

_____
City, State, Zip Code

(Names of individual members of firms or names and titles of all officers of Corporation.)

_____

_____

_____

_____

Corporation organized under the laws of the State of

_____

_____
New Mexico Contractor's License No.
And Classification (s)

_____
New Mexico Workforce Solutions Registration No.

SANTA FE COUNTY
BID FORM

FROM: _____

_____
hereinafter called "Bidder".

TO: Santa Fe County
142 West Palace Avenue
Santa Fe, New Mexico 87501

hereinafter called "CONTRACTING AGENCY",

BID FOR: **IFB# 2019-0222-PW/MAM**
PROJECT: **Construction Services for the El Dorado Fire Station No. 1**

Purchasing Division:

The bidder has familiarized itself with the existing conditions on the project area affecting the cost of work and with the contract documents which includes:

A. Advertisement for Bids
B. Instructions for Bidders
C. Bid Proposal and other required bid forms as listed herein
D. Form of Agreement
E. Form of Performance Bond
F. Form of Labor and Material Payment Bond
G. Soil Report
H. All information provided in the Project Manual and Drawings

Therefore, the Bidder hereby proposes to furnish all supervision, technical personnel, labor, materials, tools appurtenances, equipment, and services (including all utility and transportation services) required to complete the construction of the El Dorado Fire Station No. 1, in accordance with the above listed document.

(Amounts are to be shown in both words and figures. In case of discrepancy, the amount shown in words will govern).

In submitting this bid, the Bidder understands that the right is reserved by Santa Fe County to reject any irregular or all bids, waive any technicalities in the bids, and accept the bid deemed to be in the best interest of the public and that Santa Fe County intends to award one contract (if at all) for the items bid. If written notice of the acceptance of this bid is mailed, telegraphed or otherwise delivered to the undersigned within ninety (90) days after the opening thereof or at any time thereafter before this bid is withdrawn, the undersigned agrees to execute and deliver the agreement in the prescribed form within ten (10) days after the agreement is presented for signature.

All Addenda pertaining to this Project shall be acknowledged by the Bidder in the spaces provided below:

Addendum No.	Date	Acknowledged by Bidder or Its Authorized Representative	Date Acknowledged
_____		_____	_____
_____		_____	_____
_____		_____	_____

Failure to acknowledge receipt, as provided above, may be considered sufficient grounds for disqualification of the bidder and rejection of its bid. It shall be the bidder's responsibility to become fully advised of all Addenda prior to submitting its bid.

The Bidder agrees to commence work under this Contract within fifteen (15) days after, a date to be specified in a written "Notice to Proceed" from Santa Fe County or its authorized agents. Bidder further agrees to pay liquidated damages as provided in the Contract Documents.

This Bid Proposal contains the following:

A. Bid Proposal
B. Bid Form
C. Bid Sheet
D. Non-Collusion Affidavit for Prime Bidder
E. Certification of Non-Segregated Facilities
F. Certification of Bidder Regarding Equal Employment Opportunity
G. Bid Bond
H. Subcontractors Listing (as included in this packet)
I. Campaign Contribution Disclosure Form
J. Preference Certificate(s)

Failure to include any of the above listed documents in the bid submittal may be considered sufficient grounds for disqualification of the bidder and rejection of its bid.

Respectfully submitted:

Name of Bidder: _____

By: _____
(Signature)

Title: _____
Date: _____

Official Address: _____

_____

_____

Date: _____
Telephone No: _____

Email address:_____
New Mexico Contractor's License Number and Types: _____
United States Treasury Number: _____
Resident Preference Certificate Number: _____

BID SHEET

IFB# 2019-0222-PW/MM
CONSTRUCTION SERVICES FOR THE EL DORADO FIRE STATION NO. 1

Please offer your best price for the work required for the construction of the El Dorado Fire Station No. 1. The lump sum base bid must include pricing all deductive alternates, materials, equipment, labor, travel, incidentals and fees for any required permitting. Be advised that award may be made without discussion with bidders on offers received.

Item	Description
1.	**Construction Services for the El Dorado Fire Station No. 1**

LUMP SUM BASE BID $_____
Base Bid amount written in words: _____

DEDUCTIVE ALTERNATIVES

The following deductive alternatives are an integral part of this bid, and to be responsive, the Bidder shall quote for the Base Bid, and also for the following listed deductive alternatives.

2. **Deductive Alternate #1 Eliminate (2) internal omission/air filter systems in Apparatus Bay 1 & 2**

Deductive Alternate #1: _____

Bid amount written in words: _____

---

3. **Deductive Alternate #2 Eliminate patch and paint existing apparatus Bay 1 & 2**

Deductive Alternate #2: _____

Bid amount written in words: _____

---

4. Deductive Alternate #3 Eliminate upgrade/replace existing HVAC equipment and radiant gas heaters in existing Apparatus Bay 1 & 2

Deductive Alternate #3: _____

Bid amount written in words: _____

---

5. Deductive Alternate #4 Eliminate opening #2 between Bay 1, 2 & Bay 3

Deductive Alternate #4: _____

Bid amount written in words: _____

Note: Lump sum base bid is exclusive of New Mexico Gross Receipts Tax

NON-COLLUSION AFFIDAVIT OF PRIME BIDDER

STATE OF NEW MEXICO

COUNTY OF _____

_____ being first duly sworn, deposes and says that:

(1) They are the _____of _____the Bidder that has submitted the attached Bid Proposal;

(2) They are fully informed respecting the preparation and contents of the attached Bid Proposal and of all pertinent circumstances respecting such bid;

(3) Such bid is genuine and is not a collusive or sham bid;

(4) Neither the said bidder nor any of its officers, partners, owners, agents, representatives, employees or parties in interest, including this affiant, has in any way colluded, conspired, connived or agreed, directly or indirectly with any other bidder, firm or person to submit a collusive or sham bid in connection with the contract for which the attached bid has been submitted or to refrain from bidding in connection with such contract, or has in any manner, directly or indirectly, sought by agreement or collusion or communications or conference with any other bidder, or to secure through any collusion, conspiracy, connivance or unlawful agreement any advantage against the Contracting Agency or any person interested in the proposed contract; and

(5) The price or prices quoted in the attached bid are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the bidder or any of its agents, representatives, owners, employees, or parties in interest, including this affiant.

(SIGNED) _____

TITLE _____

SUBSCRIBED AND SWORN to before me this ____day of _____2019.

_____
NOTARY PUBLIC

My Commission Expires: _____

NON-COLLUSION AFFIDAVIT OF SUBCONTRACTOR

STATE OF NEW MEXICO

COUNTY OF _____
_____being first duly sworn, deposes and says that:

(1) It is the _____ of _____, hereinafter referred to as the "Subcontractor".
(2) It is fully informed respecting the preparation and contents of the Subcontractor's proposal submitted by the Subcontractor to _____, the Contractor, for certain work in connection with the _____ contract pertaining to the _____ project in_____.
(3) Such Subcontractors proposal is genuine and is not a collusive or sham proposal.
(4) Neither the Subcontractor nor any of its officers, partners, owners, agents, representatives, employees or parties in interest, including this affiant, has in any way colluded, conspired, connived or agreed, directly or indirectly with any other bidder, firm or person to submit a collusive or sham bid in connection with the contract for which the attached bid has been submitted or to refrain from bidding in connection with such contract, or has in any manner, directly or indirectly, sought by agreement or collusion or communications or conference with any other bidder, or to secure through any collusion, conspiracy, connivance or unlawful agreement any advantage against the Contracting Agency or any person interested in the proposed contract; and
(5) The price or prices quoted in the Subcontractor's proposal are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the bidder or any of its agents, representatives, owners, employees, or parties in interest, including this affiant.

(SIGNED) _____

TITLE_____

SUBSCRIBED AND SWORN to before me this _____day of _____2019.

_____
Notary Public

My Commission Expires: _____

SUBCONTRACTS

A. The contractor shall not execute an agreement with any subcontractor or permit any subcontractor to perform any work included in this contract until it has submitted a Non-Collusion Affidavit from the subcontractor, is substantially the form shown below, and has received written approval of such subcontractor from Santa Fe County.

B. No proposed subcontractor shall be disapproved by Santa Fe County except for cause.

C. The contractor shall be as fully responsible to Santa Fe County for the acts and omissions of its

subcontractors and of persons either directly or indirectly employed by them, as it is for the acts and omissions of persons directly employed by them.

D. The contractor shall cause appropriate provision to be inserted in all subcontracts relative to the work to require compliance by each subcontractor with the applicable provisions of the contract for the improvements embraced.

E. Nothing contained in the contract shall create any contractual relation between any subcontractor and Santa Fe County.

CERTIFICATION OF NON-SEGREGATED FACILITIES

(Applicable to construction contracts and related subcontracts exceeding $10,000, which are not exempt from the Equal Opportunity Clause).

The construction contractor certifies that it does not maintain or provide for its employees any segregated facility at any of its establishments, and that it does not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. The construction contractor certifies further that it will not maintain or provide for its employees any segregated facilities at any of its establishments, and that it will not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. The construction contractor agrees that a breach of this certification is a violation of the Equal Opportunity Clause in this contract. As used in this certification, the term "segregated facilities" means any waiting room, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clock, locker rooms and other storage or dressing areas, parking lots, drinking foundations, recreating or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, creed, color, or national origin, because of habit, local custom, or otherwise. The construction contractor agrees that (except where it has obtained identical certifications from proposed subcontractors for specific time periods) it will obtain identical certifications from proposed SUBCONTRACTORS prior to the award of subcontracts exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity Clause and that it will retain such certifications in its files.

SIGNED: _____

TITLE: _____

SUBSCRIBED AND SWORN to before me this _____day of _____, 2019.

_____

NOTARY PUBLIC

My Commission Expires: _____

CERTIFICATION OF BIDDER REGARDING
EQUAL EMPLOYMENT OPPORTUNITY

INSTRUCTIONS

This certification is required pursuant to Executive Order 11246 (30 F. R. 12319-25). The implementing rules and regulations provide that any bidder or perspective contractor, or any of their proposed subcontractors, shall state as an initial part of the bid or negotiations of the contract or subcontract 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.

Where the certification indicates that the bidder has not filed a compliance report due under applicable instructions, such bidder shall be required to submit a compliance report within seven calendar days after bid opening. No contract shall be awarded unless such report is submitted.

CERTIFICATION OF BIDDER

Bidder's Name: _____

Address: _____

_____

1. Bidder has participated in a previous contract or subcontract subject to the Equal Opportunity Clause.

   Yes ____ No ____

2. Compliance reports were required to be filed in connection with such contract or subcontract.

   Yes ____ No ____

Certification -- The information above is true and complete to the best of my knowledge and belief.

_____
NAME AND TITLE OF SIGNER (PLEASE TYPE)

_____ _____
SIGNATURE DATE

CERTIFICATION OF SUBCONTRACTOR REGARDING EQUAL EMPLOYMENT OPPORTUNITY

INSTRUCTIONS

This certification is required pursuant to Executive Order 11246 (30 F. R. 12319-25). The implementing rules and regulations provide that any bidder or perspective contractor, or any of their proposed subcontractors, shall state as an initial part of the bid or negotiations of the contract or subcontract 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.

Where the certification indicates that the bidder has not filed a compliance report due under applicable instructions, such bidder shall be required to submit a compliance report within seven calendar days after bid opening. No contract shall be awarded unless such report is submitted.

CERTIFICATION OF SUBCONTRACTOR

Subcontractor's Name: _____

Address: _____

_____

1. Subcontractor has participated in a previous contract or subcontract subject to the Equal Opportunity Clause.

   Yes ____ No ____

2. Compliance reports were required to be filed in connection with such contract or subcontract.

   Yes ____ No ____

Certification -- The information above is true and complete to the best of my knowledge and belief.

_____
NAME AND TITLE OF SIGNER (PLEASE TYPE)

_____ _____
SIGNATURE DATE

BID BOND

A. KNOW ALL MEN BY THESE PRESENT, THAT WE_____ _____hereinafter called the PRINCIPAL, as PRINCIPAL and the _____, of _____a Corporation duly organized under the laws of the State of _____, and authorized to do business in the State of New Mexico, hereinafter called the SURETY, as SURETY are held and firmly bound unto Santa Fe County, a Municipal Corporation, hereinafter called the OBLIGEE, in the sum of _____ DOLLARS ($_____) for the payment of which sum well and truly to be made, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly be these presents.

WHEREAS, the Principal has submitted the accompanying bid, dated_____, 2019, for the Construction Services for the El Dorado Fire Station No. 1.

B. NOW, THEREFORE, if the Obligee shall accept the bid of the Principal and the Principal shall enter into a contract with the Obligee in accordance with the terms of such bid, and give such bond of bonds as may be specified in the bidding of Contract Documents with good and sufficient surety for the faithful performance of such contract and for the prompt payment of labor and material furnished in the prosecution thereof of in the event of the failure of the Principal to enter such contract and give such bond or bonds, if the Principal shall pay to the Obligee the difference not to exceed the penalty hereof between the amount specified in said bid and such larger amount for which the Obligee may in good faith contract with another party of perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect.

B. SIGNED AND SEALED THIS_____DAY OF _____, 2019

_____
BIDDER

By: _____
PRINCIPAL

(SEAL)

_____
WITNESS

By: _____
SURETY

_____
WITNESS

Title: _____

LABOR AND MATERIAL PAYMENT BOND

KNOW ALL MEN BY THESE PRESENT, THAT WE_____ _____as PRINCIPAL hereinafter called the "PRINCIPAL and _____as SURETY hereinafter called the "SURETY", are held and firmly bound unto Santa Fe County, a Political Subdivision of the State of New Mexico as OBLIGEE hereinafter called the "COUNTY", for the use and benefit of any claimants as herein below defined, in the amount of _____($.) dollars for the payment whereof PRINCIPAL and SURETY bind themselves, their heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, the PRINCIPAL has a written contract dated _____, 2019, with the COUNTY for the El Dorado Fire Station No. 1 , which must be constructed in accordance with drawings and specifications which contract is referenced and made a part hereof, and is hereinafter referred to as the "Contract."

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if PRINCIPAL shall promptly make payment to all claimants as hereinafter defined, for all labor and material used or reasonably required for use in the performance of the Contract, then this obligation shall be void; otherwise, it shall remain in full force and effect, subject to the following conditions:

1. A claimant is defined as one having a direct contract with the PRINCIPAL or with a subcontractor of the PRINCIPAL for labor, material, or both, used or reasonably required for use in the performance of the Contract, labor and material being construed to include but not be limited to that part of water, gas, power, light, heat, oil, gasoline, telephone services or rental of equipment directly applicable to the Contract.

2. The above named PRINCIPAL and SURETY hereby jointly and severally agree with the COUNTY that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such claimant's work or labor was done or performed, or materials were furnished by such claimant, prosecute a suit to final judgment for such sum or sums as may be justly due claimant, and have execution thereof. The COUNTY shall not be liable for payment of any cost or expenses of any such suit.

3. No suit or action shall be commenced hereunder by any claimant:

    a. Unless claimant, or other than one having a direct contract with the PRINCIPAL, shall have written notice in the form of an sworn statement to the COUNTY and any one or both of the following: the PRINCIPAL or SURETY above named, within ninety (90) days after such said claim is made or suit filed, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed.

    b. Such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid, in an envelope addressed to the COUNTY, PRINCIPAL or SURETY, at any place where an office is regularly maintained by said COUNTY, PRINCIPAL or SURETY for the transaction of business, or served in any manner in which legal process may be served in the State in which the aforesaid project is located, save that such service need not be made by a public officer.

4. Any suit under this Labor and Material Bond must be instituted in accordance with the statute of limitation under Section 37-1-3 NMSA 1978.

5. No right of action shall accrue on this Bond to or for the use of any person or corporation other than subcontractors or sub-subcontractors of the said Contract between PRINCIPAL and Santa Fe County named herein.

SIGNED AND SEALED THIS_____DAY OF _____, 2019.

_____
CONTRACTOR – PRINCIPAL (signature)

By: _____
(Printed name and title)

_____ (seal)
NOTARY PUBLIC

My Commission expires: _____

_____
SURETY (signature)

_____
(Printed name and title)

_____ (seal)
NOTARY PUBLIC

My Commission expires: _____

_____
SURETY'S Authorized New Mexico Agent

SUBCONTRACTOR LISTING

1. To be fully executed and included with Bid as a condition of the Bid (13-4-31 through 13-4-42 NMSA 1978).
2. For the purposes of this Project the threshold shall be $5,000.
3. The Bidder shall list the Subcontractor's Name, the City or County of the Place of Business and the Category of Work that will be done by each Subcontractor. The awarded contractor will be required to provide signatures for all subcontractors listed on the subcontractor listing form.
4. For ***all trades*** that are listed ***"only one bid received"*** or ***"no bid received"*** the Contractor must list the names and telephone numbers of all businesses contacted for a quote.

Trade:		Name of Subcontractor:	
Address:			
Telephone No:		License No:	
NM Dept of Workplace Solutions Registration Number:			
Signature of Subcontractor (to be obtained after award of contract):			
If "no bid received" or "only one bid received" list name and telephone number of businesses contacted:			
1.			
2.			
3.			
Trade:		Name of Subcontractor:	
Address:			
Telephone No:		License No:	
NM Dept of Workplace Solutions Registration Number:			
Signature of Subcontractor (to be obtained after award of contract):			
If "no bid received" or "only one bid received" list name and telephone number of businesses contacted:			
1.			
2.			
3.			
Trade:		Name of Subcontractor:	
Address:			
Telephone No:		License No:	
NM Dept of Workplace Solutions Registration Number:			
Signature of Subcontractor (to be obtained after award of contract):			
If "no bid received" or "only one bid received" list name and telephone number of businesses contacted:			
1.			
2.			
3.			

Trade:		Name of Subcontractor:	
Address:			
Telephone No:		License No:	
NM Dept of Workplace Solutions Registration Number:			
Signature of Subcontractor (to be obtained after award of contract):			
If "no bid received" or "only one bid received" list name and telephone number of businesses contacted:			
1.			
2.			
3.			
Trade:		Name of Subcontractor:	
Address:			
Telephone No:		License No:	
NM Dept of Workplace Solutions Registration Number:			
Signature of Subcontractor (to be obtained after award of contract):			
If "no bid received" or "only one bid received" list name and telephone number of businesses contacted:			
1.			
2.			
3.			
Trade:		Name of Subcontractor:	
Address:			
Telephone No:		License No:	
NM Dept of Workplace Solutions Registration Number:			
Signature of Subcontractor (to be obtained after award of contract):			
If "no bid received" or "only one bid received" list name and telephone number of businesses contacted:			
1.			
2.			
3.			
Trade:		Name of Subcontractor:	
Address:			
Telephone No:		License No:	
NM Dept of Workplace Solutions Registration Number:			
Signature of Subcontractor (to be obtained after award of contract):			
If "no bid received" or "only one bid received" list name and telephone number of businesses contacted:			
1.			
2.			
3.			

Trade:		Name of Subcontractor:	
Address:			
Telephone No:		License No:	
NM Dept of Workplace Solutions Registration Number:			
Signature of Subcontractor (to be obtained after award of contract):			
If "no bid received" or "only one bid received" list name and telephone number of businesses contacted:			
1.			
2.			
3.			
Trade:		Name of Subcontractor:	
Address:			
Telephone No:		License No:	
NM Dept of Workplace Solutions Registration Number:			
Signature of Subcontractor (to be obtained after award of contract):			
If "no bid received" or "only one bid received" list name and telephone number of businesses contacted:			
1.			
2.			
3.			
Trade:		Name of Subcontractor:	
Address:			
Telephone No:		License No:	
NM Dept of Workplace Solutions Registration Number:			
Signature of Subcontractor (to be obtained after award of contract):			
If "no bid received" or "only one bid received" list name and telephone number of businesses contacted:			
1.			
2.			
3.			
Trade:		Name of Subcontractor:	
Address:			
Telephone No:		License No:	
NM Dept of Workplace Solutions Registration Number:			
Signature of Subcontractor (to be obtained after award of contract):			
If "no bid received" or "only one bid received" list name and telephone number of businesses contacted:			
1.			
2.			
3.			

APPENDIX A

ACKNOWLEDGEMENT OF RECEIPT OF INVITATION FOR BIDS FORM
IFB# 2016-0222-PW/MAM
Construction Services for the El Dorado Fire Station No. 1

In acknowledgement of receipt of this Request for Bid the undersigned agrees that he/she has received a complete copy, beginning with the title page and table of contents, and ending with Appendix F.

The acknowledgement of receipt should be signed and returned to Michelle A. Marmion, Senior Procurement Specialist, no later than close of business on **May 9, 2019** Only potential bidders who elect to return this form completed with the indicated intention of submitting a bid will receive copies of all written questions and the County's written responses to those questions as well as IFB amendments, if any are issued.

FIRM: _____

REPRESENTED BY: _____

TITLE: _____ PHONE NO.: _____

E-MAIL: _____ FAX NO.: _____

ADDRESS: _____

CITY: _____ STATE: _____ ZIP CODE: _____

SIGNATURE: _____ DATE: _____

This name and address will be used for all correspondence related to the Invitation For Bids.

Firm does/does not (**circle one**) intend to respond to this Invitation For Bids.

Michelle A. Marmion
Santa Fe County Purchasing Division
142 W. Palace Avenue (Second Floor)
Santa Fe, New Mexico 87501
(505) 992-6753
mmarmion@santafecountynm.gov

APPENDIX B

CAMPAIGN CONTRIBUTION DISCLOSURE FORM

Pursuant to the Procurement Code, Sections 13-1-28, et seq., NMSA 1978 and NMSA 1978, § 13-1-191.1 (2006), as amended by Laws of 2007, Chapter 234, any prospective contractor seeking to enter into a contract with any state agency or local public body **for professional services, a design and build project delivery system, or the design and installation of measures the primary purpose of which is to conserve natural resources** must file this form with that state agency or local public body. This form must be filed even if the contract qualifies as a small purchase or a sole source contract. The prospective contractor must disclose whether they, a family member or a representative of the prospective contractor has made a campaign contribution to an applicable public official of the state or a local public body during the two years prior to the date on which the contractor submits a proposal or, in the case of a sole source or small purchase contract, the two years prior to the date the contractor signs the contract, if the aggregate total of contributions given by the prospective contractor, a family member or a representative of the prospective contractor to the public official exceeds two hundred and fifty dollars ($250) over the two year period.

Furthermore, the state agency or local public body may cancel a solicitation or proposed award for a proposed contract pursuant to Section 13-1-181 NMSA 1978 or a contract that is executed may be ratified or terminated pursuant to Section 13-1-182 NMSA 1978 of the Procurement Code if: 1) a prospective contractor, a family member of the prospective contractor, or a representative of the prospective contractor gives a campaign contribution or other thing of value to an applicable public official or the applicable public official's employees during the pendency of the procurement process or 2) a prospective contractor fails to submit a fully completed disclosure statement pursuant to the law.

The state agency or local public body that procures the services or items of tangible personal property shall indicate on the form the name or names of every applicable public official, if any, for which disclosure is required by a prospective contractor.

THIS FORM MUST BE INCLUDED IN THE REQUEST FOR PROPOSALS AND MUST BE FILED BY ANY PROSPECTIVE CONTRACTOR WHETHER OR NOT THEY, THEIR FAMILY MEMBER, OR THEIR REPRESENTATIVE HAS MADE ANY CONTRIBUTIONS SUBJECT TO DISCLOSURE.

The following definitions apply:

"**Applicable public official**" means a person elected to an office or a person appointed to complete a term of an elected office, who has the authority to award or influence the award of the contract for which the prospective contractor is submitting a competitive sealed proposal or who has the authority to negotiate a sole source or small purchase contract that may be awarded without submission of a sealed competitive proposal.

"**Campaign Contribution**" means a gift, subscription, loan, advance or deposit of money or other thing of value, including the estimated value of an in-kind contribution, that is made to or received by an applicable public official or any person authorized to raise, collect or

expend contributions on that official's behalf for the purpose of electing the official to statewide or local office. "Campaign Contribution" includes the payment of a debt incurred in an election campaign, but does not include the value of services provided without compensation or unreimbursed travel or other personal expenses of individuals who volunteer a portion or all of their time on behalf of a candidate or political committee, nor does it include the administrative or solicitation expenses of a political committee that are paid by an organization that sponsors the committee.

"**Family member**" means spouse, father, mother, child, father-in-law, mother-in-law, daughter-in-law or son-in-law of (a) a prospective contractor, if the prospective contractor is a natural person; or (b) an owner of a prospective contractor.

"**Pendency of the procurement process**" means the time period commencing with the public notice of the request for proposals and ending with the award of the contract or the cancellation of the request for proposals.

"**Prospective contractor**" means a person or business that is subject to the competitive sealed proposal process set forth in the Procurement Code or is not required to submit a competitive sealed proposal because that person or business qualifies for a sole source or a small purchase contract.

"**Representative of a prospective contractor**" means an officer or director of a corporation, a member or manager of a limited liability corporation, a partner of a partnership or a trustee of a trust of the prospective contractor.

Name(s) of Applicable Public Official(s) if any: _____
(Completed by State Agency or Local Public Body)

DISCLOSURE OF CONTRIBUTIONS BY PROSPECTIVE CONTRACTOR:

Contribution Made By: _____

Relation to Prospective Contractor: _____

Date Contribution(s) Made: _____
_____

Amount(s) of Contribution(s) _____
_____

Nature of Contribution(s) _____
_____

Purpose of Contribution(s) _____
_____

(Attach extra pages if necessary)

_____ _____
Signature Date

_____
Title (position)

--OR—

NO CONTRIBUTIONS IN THE AGGREGATE TOTAL OVER TWO HUNDRED FIFTY DOLLARS ($250) WERE MADE to an applicable public official by me, a family member or representative.

_____ _____
Signature Date

_____
Title (Position)

APPENDIX C

NEW MEXICO WAGE RATE DETERMINATION

STATE OF NEW MEXICO
NEW MEXICO DEPARTMENT OF
WORKFORCE SOLUTIONS
Labor Relations Division
121 Tijeras Ave NE, Suite 3000
Albuquerque, NM 87102
www.dws.state.nm.us

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.

General Contractor

- Provide a complete Subcontractor List and Statements of Intent (SOI) to Pay Prevailing Wages for each Contractor 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.
- Submit bi-weekly certified payrolls to the Contracting Agency.
- 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.
- Make sure, when a project has been completed, the Affidavits of Wages Paid (AWP) are sent to the Contracting Agency.

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 will exceed $60,000.
- Submit bi-weekly certified payrolls to the General Contractor(s).

- 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.

Additional Information

Reference material and forms may be found at New Mexico Department of Workforce Solutions Public Works web pages at: http://www.dws.state.nm.us/new/Labor_Relations/publicworks.html.

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.

Type "B" - GENERAL BUILDING
Effective January 1, 2019

	Base Rate	Fringe Rate	Apprenticeship
Asbestos Worker - Heat & Frost Insulator	32.01	11.11	0.60
Boilermaker	34.97	27.35	0.60
Bricklayer/Blocklayer/ Stonemason	23.78	8.34	0.60
Carpenter/Lather	24.08	10.34	0.60
Cement Mason	20.71	9.78	0.60
Electricians-Outside Classifications			
Groundman	22.81	11.93	0.60
Equipment Operator	32.73	14.51	0.60
Lineman/Tech	38.51	16.02	0.60
Cable Splicer	42.36	17.01	0.60
Inside Classifications			
Wireman/Technician	31.55	10.75	0.60
Cable Splicer	34.71	10.84	0.60
Low-voltage Installer/Technician	28.95	7.52	0.60
Elevator Constructor	42.41	33.51	0.60
Elevator Constructor Helper	33.93	33.51	0.60
Glazier	20.25	5.05	0.60
Ironworker	26.50	15.56	0.60
Painter (Brush/Roller/Spray)	17.00	6.38	0.60
Paper Hanger	17.00	6.38	0.60
Drywall Finisher/Taper	24.08	10.34	0.60
Plasterer	22.42	8.16	0.60
Plumber/Pipefitter	29.45	11.52	0.60
Roofer	24.49	7.80	0.60
Sheetmetal Worker	30.28	16.60	0.60
Soft Floor Layer	20.71	9.78	0.60
Sprinkler Fitter	30.90	20.47	0.60
Tile Setter	23.52	8.10	0.60
Tile Setter Helper/Finisher	15.85	8.34	0.60
Laborers			
Group I	16.09	5.93	0.60
Group II	17.25	5.93	0.60
Group III	18.25	5.93	0.60
Group IV	20.25	5.93	0.60
Operators			
Group I	20.63	6.87	0.60
Group II	22.74	6.87	0.60
Group III	23.19	6.87	0.60
Group IV	23.62	6.87	0.60
Group V	23.80	6.87	0.60
Group VI	24.01	6.87	0.60
Group VII	24.12	6.87	0.60
Group VIII	27.08	6.87	0.60
Group IX	29.41	6.87	0.60
Group X	32.73	6.87	0.60
Truck Drivers			
Group I	14.76	6.25	0.60
Group II	15.00	6.25	0.60
Group III	15.50	6.25	0.60
Group IV	15.51	6.25	0.60
Group V	15.60	6.25	0.60
Group VI	15.75	6.25	0.60
Group VII	15.90	6.25	0.60
Group VIII	16.11	6.25	0.60
Group IX	16.32	6.25	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.

APPENDIX D

Resident Veterans Preference Certification

_____ (NAME OF CONTRACTOR) hereby certifies the following in regard to application of the resident veterans' preference to this procurement.

Please check one box only:

☐ I declare under penalty of perjury that my business prior year revenue starting January 1 ending December 31 is less than $1M allowing me the 10% preference discount on this solicitation. I understand that knowingly giving false or misleading information about this fact constitutes a crime.

"I agree to submit a report or reports to the State Purchasing Division of the General Services Department declaring under penalty of perjury that during the last calendar year starting January 1 and ending on December 31, the following to be true and accurate:

"In conjunction with this procurement and the requirements of this business application for a Resident Veteran Business Preference/Resident Veteran Contractor Preference under Sections 13-1-21 or 13-1-22 NMSA 1978, which awarded a contract which was on the basis of having such veterans preference, I agree to report to the State Purchasing Division of the General Services Department the awarded amount involved. I will indicate in the report the award amount as a purchase from a public body or as a public works contract from a public body as the case may be."

"I understand that knowingly giving false or misleading information on this report constitutes a crime".

I declare under penalty of perjury that this statement is true to the best of my knowledge. I understand that giving false or misleading statements about material fact regarding this matter constitutes a crime.

_____ _____

(Signature of Business Representative)* (Date)

*Must be an authorized signatory of the Business.

The representations made in checking the boxes constitutes a material representation by the business that is subject to protest and may result in denial of an award or un-award of the procurement involved if the statements are proven to be incorrect.

SIGNED AND SEALED THIS_____DAY OF _____, 2019.

_____

NOTARY PUBLIC

My Commission Expires:

_____

APPENDIX E

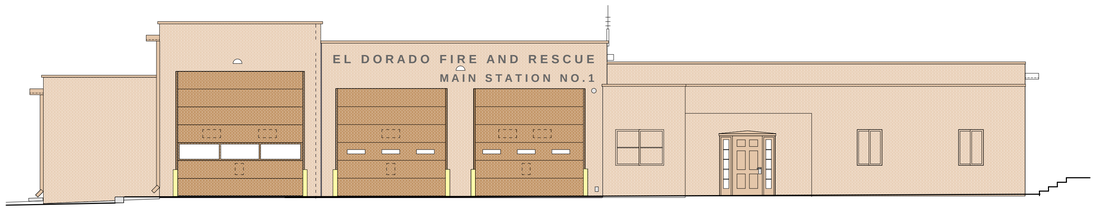
PLANS, SPECIFICATIONS & SOIL TEST REPORT

SANTA FE COUNTY - FIRE DEPARTMENT

EL DORADO FIRE + RESCUE STATION #1

APPARATUS BAY ADDITION

144 AVENIDA VISTA GRANDE SANTA FE, NEW MEXICO 87508



VICINITY MAP

CONTACT INFO

OWNER
COUNTY OF SANTA FE - FIRE DEPARTMENT
35 CAMINO JUSTICIA
SANTA FE, NM 87508
505-992-3070

PROJECT MANAGER
SANTA FE COUNTY - PW / PROJECTS
RON SANDOVAL
P.O. BOX 276,
SANTA FE, NM 87508
505-992-9863

ARCHITECT
SPEARS HORN ARCHITECTS
1334 PACHECO STREET
SANTA FE, NM 87505
505-983-6966

FIRE STATION CONSULTANT
HUITT ZOLLARS
6501 AMERICAS PKWY NE, SUITE 830
ALBUQUERQUE, NM 87110
505-883-8114

STRUCTURAL ENGINEER
LUCHINI TRUJILLO STRUCTURAL ENGINEERS
2019 GALISTEO STREET, D-2
SANTA FE, NM 87505
505-424-3232

MEP ENGINEER
BG BUILDINGWORKS, INC.
7007 WYOMING BLVD. NE, SUITE F-2
ALBUQUERQUE, NEW MEXICO 87109
505-323-9070

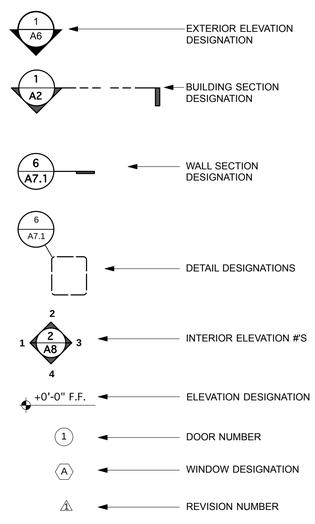
SEPTIC DESIGN
MILLER ENGINEERING
3500 COMANCHE NE, BLDG. F
ALBUQUERQUE, NEW MEXICO 87107
505-888-7500

ESTIMATOR
BALIS & COMPANY
4600A MONTGOMERY NE SUITE 202
ALBUQUERQUE NM 87109
505 883-7990

ABBREVIATIONS

AFF	ABOVE FINISH FLOOR
ALT.	ALTERNATE
ALUM.	ALUMINUM
ANOD.	ANODIZED
APPROX.	APPROXIMATE
B.B.	BASEBOARD
BD.	BOARD
B.O.	BOTTOM OF
BRG.	BEARING
B.U.	BUILT-UP
CARR.	CARRIAGE
C.H.	CEILING HEIGHT
C.L.	CENTER LINE
CLG.	CEILING
CLR.	CLEAR
C.M.U.	CONCRETE MASONRY UNIT
CONC.	CONCRETE
CONT.	CONTINUOUS
DEMO	DEMOLITION
DIA.	DIAMETER
DIM.	DIMENSION
DWG.	DRAWING
(E)	EXISTING
EA.	EACH
EJ	EXPANSION JOINT
EP	ELECTRIC PANEL
EQ.	EQUAL
EQUIP.	EQUIPMENT
EXIST.	EXISTING
EXT.	EXTERIOR
F.B.	FLOOR BOX
F.D.	FLOOR DRAIN
F.E.	FIRE EXTINGUISHER
F.F.	FINISH FLOOR
FL.	FLUORESCENT
GA.	GAUGE / GAGE
GWB	GYPSUM WALL BOARD
GYP.	GYPSUM
HB	HOSE BIBB
H.C.	HOLLOW CORE
HD.	HEAD
H.M.	HOLLOW METAL
HT.	HEIGHT
HWH	HOT WATER HEATER
INT.	INTERIOR
LT.	LIGHT
MIN.	MINIMUM
MFR.	MANUFACTURE(ER)
MTL.	METAL
NEC.	NECESSARY
N.I.C.	NOT IN CONTRACT
NO.	NUMBER
O.C.	ON CENTER
O.H.	OVERHANG
OPNG.	OPENING
P.L.	PROPERTY LINE
PLAM.	PLASTIC LAMINATE
PTD.	PAINTED / PAINT TYPE
QTY.	QUANTITY
RM.	ROOM
R.S.	ROUGH SAWN
SAW	SAW-CUT
S.C.	SOLID CORE
SHT.	SHEET
S.F.	SQUARE FEET
SIM.	SIMILAR
S.O.G.	SLAB ON GRADE
S.S.	STAINLESS STEEL
STL.	STEEL
STRUCT.	STRUCTURAL
TB	TOWEL BAR
T.B.D.	TO BE DETERMINED
TEMP.	TEMPORARY
T&G	TONGUE AND GROOVE
THK.	THICK
T.O.	TOP OF
TOW	TOP OF WALL
T.S.	TUBE STEEL
TYP.	TYPICAL
U.O.N.	UNLESS OTHERWISE NOTED
V.I.F.	VERIFY IN FIELD
W.C.	WATER CLOSET
WD.	WOOD
WDW.	WINDOW
WWF	WELDED WIRE FABRIC

LEGEND



GENERAL NOTES

1. THE GENERAL CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND CONDITIONS PRIOR TO THE COMMENCEMENT OF THE WORK. NOTIFY THE ARCHITECT OF ANY DISCREPANCIES OR DISCOVERED LATENT CONDITIONS. IF THERE ARE ANY DISCREPANCIES BETWEEN THE PLANS THEMSELVES, DETAILS OR SPECIFICATIONS, THE CONTRACTOR SHALL SUPPLY THE MORE EXPENSIVE OR GREATER METHOD AND MATERIAL.

2. EACH CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING AND REPLACING HIS OWN DEFECTIVE WORK AS WELL AS PAYING ALL INCIDENTAL COSTS INCLUDING DAMAGE TO OTHER WORK, FURNISHINGS, AND EQUIPMENT.

3. DRAWINGS ARE NOT TO BE SCALED. ALL WORK, LINES, AND LEVELS SHALL BE LAID OUT BY DIMENSIONS. ANY DEVIATIONS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT IMMEDIATELY. ALL DEVIATIONS SHALL BE CORRECTED BY THE CONTRACTOR BEFORE BEGINNING HIS PORTION OF THE WORK.

4. THE GENERAL CONTRACTOR IS RESPONSIBLE FOR ERECTION AND PLACEMENT OF ALL BARRIERS, PROTECTION WALKWAYS, AND LIGHTING DURING CONSTRUCTION IN ORDER TO MAINTAIN PUBLIC SAFETY. THE GENERAL CONTRACTOR IS RESPONSIBLE FOR ALL CONSTRUCTION METHODS AND MEANS, SITE SAFETY, DAILY CLEANUP, AND LEGAL DISPOSAL OF DEBRIS. ARRANGE HOURS OF CONSTRUCTION OPERATION PARKING FOR GENERAL CONTRACTOR AND SUB-CONTRACTORS, AND POINT OF CONSTRUCTION ACCESS / ENTRY WITH OWNER.

5. IF THERE ARE ANY DISCREPANCIES BETWEEN DIMENSIONS ON FOUNDATION PLAN / FRAMING PLANS AND DIMENSIONS ON ARCHITECTURAL PLAN, BRING TO ARCHITECT'S ATTENTION PROMPTLY.

DEDUCTIVE ALTERNATIVES

NO.1 - ELIMINATE (3) INTERNAL OMISSION / AIR FILTER SYSTEMS AND ALL ASSOCIATED COMPONENTS IN EXISTING APPARATUS BAY 1 + 2. (EF-3 / EF-4)

NO.2 - ELIMINATE PATCH AND PAINT EXISTING APPARATUS BAY 1 + 2.

NO.3 - ELIMINATE / UPGRADE / REPLACE EXISTING HVAC EQUIPMENT ALONG W/ RADIANT GAS HEATERS AND ALL ASSOCIATED COMPONENTS IN EXISTING APPARATUS BAY 1 + 2. (RH-2 / RH-3)

NO.4 - ELIMINATE OPENING #2 - BETWEEN BAY 1 + 2 / BAY 3

DRAWING INDEX (33 sheets total)

CS COVER SHEET

CIVIL / SURVEY
- TOPOGRAPHIC MAP BY DAWSON SURVEYS - 1"=20', 2/14/2018
C-101 SITE UTILITY PLAN - 1"=10'
C-501 MISCELLANEOUS DETAILS

ARCHITECTURAL
L0 SITE PLAN - STAGING AND DEMO - 1/16" = 1'-0"
L1 SITE PLAN - GRADING AND DRAINAGE - 1/16" = 1'-0"

A0 CODE ANALYSIS / OVERALL PLAN - 1/8"=1'-0"

A1 FLOOR PLAN - **DEMO** - 1/4" = 1'-0"
A2 FOUNDATION PLAN - 1/4" = 1'-0"
A3 ROOF FRAMING PLAN - 1/4" = 1'-0"
A4 FLOOR PLAN - **NEW** - 1/4" = 1'-0"

A5.1 EXTERIOR ELEVATIONS - 1/4" = 1'-0"
A5.2 EXTERIOR ELEVATIONS - 1/4" = 1'-0"
A5.3 ROOF PLAN - 1/4" = 1'-0"

A6.1 BUILDING SECTIONS - 1/4" = 1'-0"
A6.2 BUILDING SECTIONS - 1/4" = 1'-0"

A7.1 WALL SECTIONS - 3/4" = 1'-0"
A7.2 WALL SECTIONS - 3/4" = 1'-0"

A8 REFLECTED CEILING PLAN - 1/4" = 1'-0"
A9 WINDOW / DOOR / FINISH SCHEDULES

A10.1 DETAILS - BUILDING
A10.2 DETAILS - SITE

STRUCTURAL
S0 STRUCTURAL SPECIFICATIONS
S1 STRUCTURAL SPECIFICATIONS
S2 STRUCTURAL DETAILS
S3 STRUCTURAL DETAILS
S4 STRUCTURAL DETAILS

MECHANICAL
M0 MECHANICAL NOTES
M1 MECHANICAL PLAN - **DEMO** + **NEW** - 1/8" = 1'-0"
M6 MECHANICAL SCHEDULES

ELECTRICAL
E0 ELECTRICAL NOTES
E1 ELECTRICAL / LIGHTING PLAN - 1/8" = 1'-0"
E2 ELECTRICAL SCHEDULES

100% CD SET - 4 FEBRUARY 2019

SPEARS HORN ARCHITECTS
1334 PACHECO STREET
SANTA FE, NEW MEXICO 87505
TEL: 505-983-6966

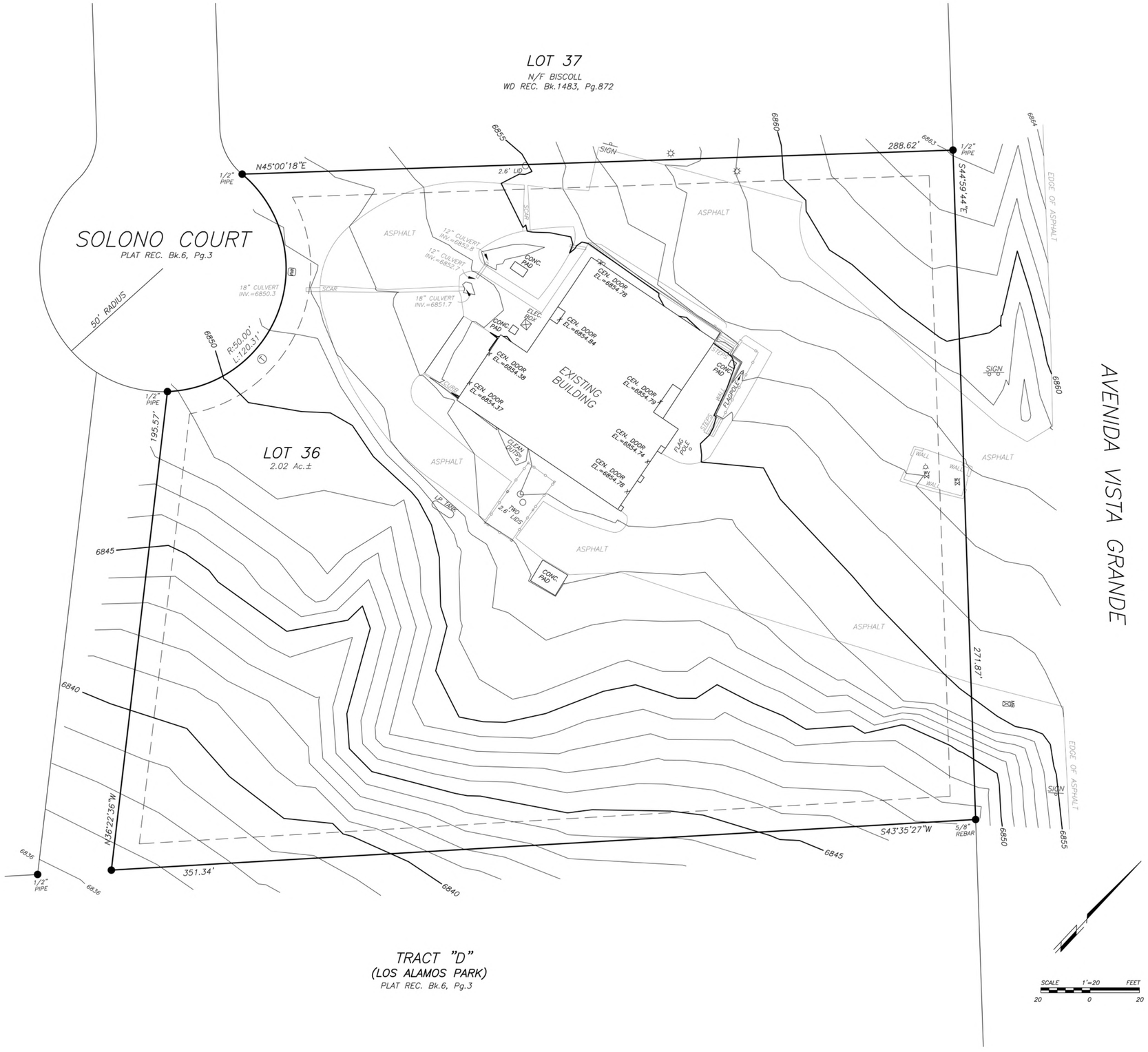
STATE OF NEW MEXICO
JAMES RICHARD HORN
NO. 4312
REGISTERED ARCHITECT
4 FEB. 2019

EL DORADO FIRE + RESCUE STATION NO. 1
APPARATUS BAY ADDITION
144 AVE VISTA GRANDE, SANTA FE, NEW MEXICO 87508

PROJECT: 18- 11
100% CD SET
4 FEB 2019

REVISION	DATE

CS



AVENIDA VISTA GRANDE

TRACT "D"
(LOS ALAMOS PARK)
PLAT REC. Bk.6, Pg.3

SCALE 1'=20 FEET
20 0 20

REFERENCE:

BOUNDARY PLAT PREPARED FOR SANTA FE COUNTY SHOWING LOT 36, BLOCK 14, UNIT 3, ELDORADO AT SANTA FE, RECORDED FEB. 13, 2018, IN PLAT Bk.829, Pg.42 OFFICE OF THE SANTA FE COUNTY CLERK.

WARRANTY DEED, FOR LOT 36, BLOCK 14, UNIT 3. FROM: ELDORADO AT SANTA FE, INC., TO: SANTA FE COUNTY – ELDORADO FIRE DISTRICT. RECORDED JULY 22, 1974 IN PLAT Bk.6, Pg.3, DOCUMENT No. 366,746 OFFICE OF THE SANTA FE COUNTY CLERK.

ELDORADO AT SANTA FE, UNIT 3, BLOCKS 11 THRU 17, TRACTS "B" THRU "I", RECORDED AS INST. #366,746 OFFICE OF THE SANTA FE COUNTY CLERK.

LEGEND:

BEARING ARE BASED ON BOUNDARY PLAT PREPARED FOR SANTA FE COUNTY SHOWING LOT 36, BLOCK 14, UNIT 3, ELDORADO AT SANTA FE RECORDED IN PLAT BK.829, PG.42 OFFICE OF THE SANTA FE COUNTY CLERK.

ELEVATIONS ARE BASED ON SANTA FE CONTROL 1992 SF-49. WITH A PUBLISHED ELEVATION OF 6791.18

- ● DENOTES REBAR, OR AS SHOWN
- WM DENOTES WATER METER
- T DENOTES TELEPHONE PEDESTAL
- ☼ DENOTES OUTDOOR LIGHTING
- MB DENOTES MAILBOX
- —o—o— DENOTES FENCES
- ——— DENOTES BOUNDARY OF LANDS DEALT WITH BY THIS PLAT INFORMATION OUTSIDE OF THIS BOUNDARY IS BACKGROUND INFORMATION ONLY, NOT VERIFIED FOR ACCURACY AND IS NOT PART OF THIS PLAT.

NOTES:

SYMBOLS MAY BE SHOWN LARGER THEN ACTUAL SIZE FOR VIEWING PURPOSES.

THIS PLAT SUBJECT TO ALL VALID RESTRICTIONS, COVENANTS AND EASEMENTS OF RECORD.

THERE IS A TEN FOOT EASEMENT ALONG ALL SIDES OF PARCEL FOR DRAINAGE, UTILITY, AND SERVICE PURPOSES.

FLOOD ZONE:

THIS PROPERTY LIES WITHIN ZONE "X" OTHER AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN. AS SHOWN ON F.I.R.M. PANEL 35049C0550D, DATED DECEMBER 4, 2012.

SURVEYORS CERTIFICATE:

I HEREBY CERTIFY THAT THIS MAP IS A TRUE REPRESENTATION OF A TOPOGRAPHIC SURVEY COMPLETED UNDER MY PERSONAL SUPERVISION IN JANUARY OF 2018. THE SURVEY AND DRAWING ARE TRUE AND CORRECT, TO THE BEST OF MY KNOWLEDGE, AND MEET THE MINIMUM STANDARDS FOR TOPOGRAPHIC SURVEYS IN NEW MEXICO.

EDWARD M. TRUJILLO, N.M.P.L.S. #12352

EDWARD M. TRUJILLO NEW MEXICO 12352 REGISTERED PROFESSIONAL SURVEYOR

TOPOGRAPHIC MAP

SHOWING

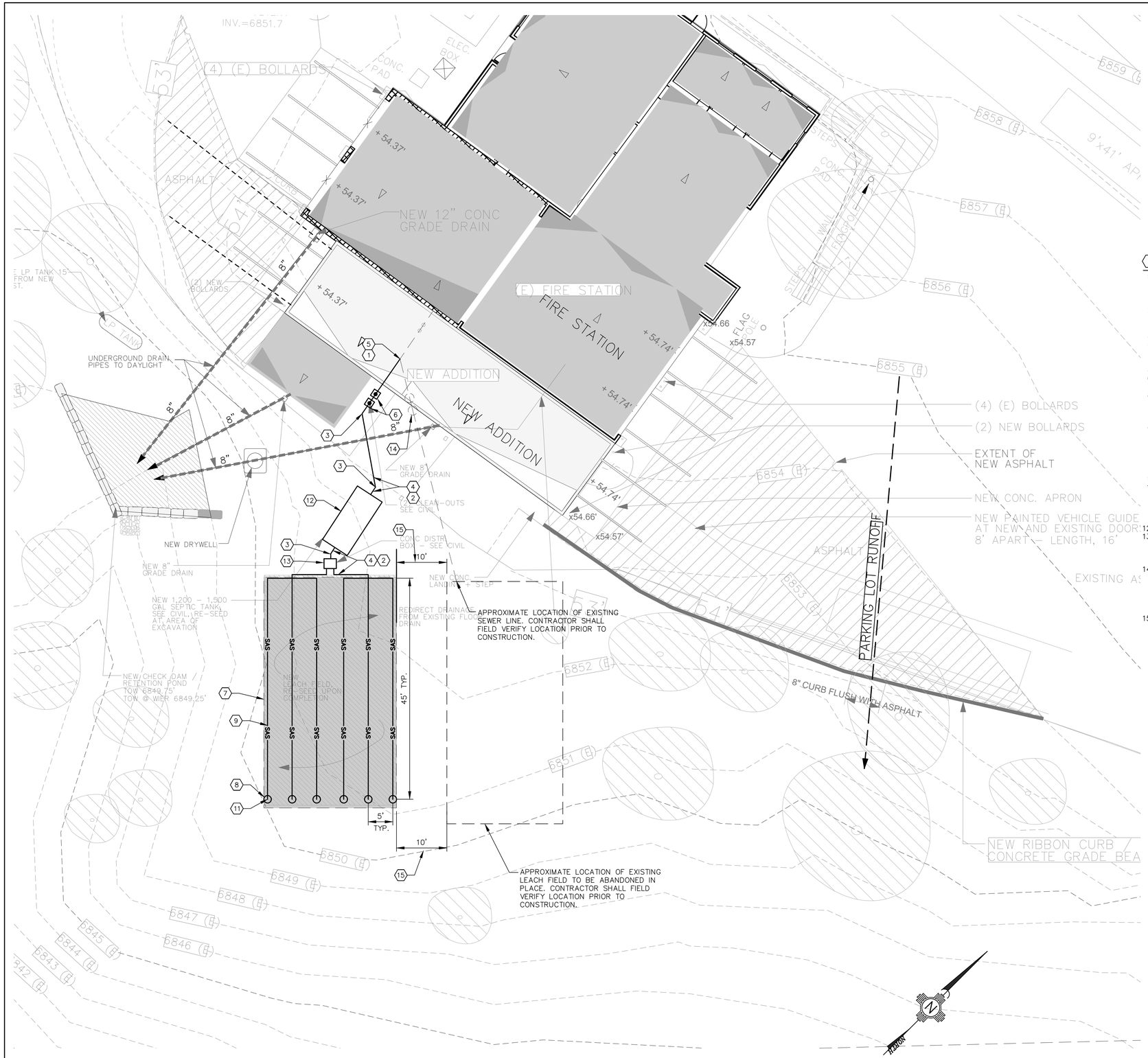
LOT 36, BLOCK 14, UNIT 3, ELDORADO AT SANTA FE

PREPARED FOR

SANTA FE COUNTY

SECTION 7, T.15N., R.10E., N.M.P.M.
SANTA FE COUNTY, NEW MEXICO.

DAWSON SURVEYS INC.
PROFESSIONAL LAND SURVEYORS
2502B CAMINO ENTRADA
SANTA FE, N.M. 87507
FILE#10144\TOPO DATE:02\14\18



LEGEND:

—— W ——	PROPOSED WATER SERVICE LINE
—— SAS ——	PROPOSED SANITARY SEWER LINE
— — W — —	EXISTING WATER SERVICE LINE
— — SAS — —	EXISTING SANITARY SEWER LINE
—— — ——	LIMIT OF BACKFILL
⊡	PROPOSED CLEANOUT
M	PROPOSED WATER METER
	PROPOSED FIRE HYDRANT
●	PROPOSED MANHOLE

KEY NOTES

SANITARY SEWER SYSTEM NOTES

1. CONNECT NEW 4" SANITARY SEWER SERVICE LINE TO EXISTING SANITARY SEWER SERVICE LINE PER NMAPWA STANDARD DRAWINGS AS SHOWN ON SHEET DETAIL SHEET C-501. CONTRACTOR SHALL FIELD VERIFY EXACT LOCATION OF EXISTING SANITARY SEWER LINE AND COORDINATE WITH PROJECT ENGINEER PRIOR TO CONSTRUCTION.
2. NEW 4" SANITARY SEWER SERVICE LINE PER NMPAPWA STANDARD DRAWINGS AS SHOWN ON DETAIL SHEET C-501. PROVIDE FITTINTGS AS NECESSARY. S=2% MIN. CONTRACTOR SHALL COORDINATE WITH PROJECT ENGINEER PRIOR TO CONSTRUCTION.
3. NEW 4" X 4" X 45° BEND WITH DOUBLE CLEANOUTS AS SHOWN. SEE DETAIL SHEET C-501.
4. CONNECTIONS BETWEEN THE SEPTIC TANK AND DISTRIBUTION BOX AND DRAIN FIELD SHALL BE LAID WITH ASTM APPROVED PIPE WITH WATERTIGHT JOINTS ON NATURAL GROUND OR COMPACTED FILL OR APPROPRIATE BEDDING MATERIAL. PIPE SHALL BE SDR35 OR BETTER. SEE DETAIL SHEET C-501.
5. POINT OF CONNECTION OF EXISTING 4" SANITARY SEWER SERVICE LINE TO BUILDING.
6. NEW DOUBLE CLEAN-OUT SEE DETAIL SHEET C-501.
7. NEW LEACH FIELD SEE SHEET C-501 FOR DETAILS.
8. NEW 4" DIAMETER INSPECTION PORTS SDR35 OR BETTER AND CLEANOUTS SHALL BE PLACED AT THE END OF EACH TRENCH. CLEANOUTS AND MONITORING PORTS MUST HAVE THREADED REMOVABLE CAPS, SLOTTED BOTTOMS, BE ACCESSIBLE FROM GROUND SURFACE, AND BE VOID OF GRAVEL OR OTHER MATERIALS.
9. NEW 4" PERFORATED DRAIN PIPE. PERFORATED DRAIN PIPE SHALL HAVE TWO ROWS OF HOLES AND A MINIMUM PERFORATED AREA OF ONE AND ONE-HALF (1 1/2) SQUARE INCHES PER LINEAR FOOT. END CAPS SHALL BE INSTALLED ON ALL DISTRIBUTION LINES. PERFORATIONS SHALL BE LOCATED NOT LESS THAN 30 DEGREES OR MORE THAN 60 DEGREES FROM THE VERTICAL ON EITHER SIDE OF THE CENTER LINE OF THE BOTTOM OF THE PIPE. ALL PLASTIC PIPE SHALL CONFORM TO THE CURRENT AND APPROPRIATE ASTM STANDARDS.
10. NOT USED.
11. THE CONTRACTOR SHALL ENSURE THAT WASTEWATER FLOWS ARE REACHING THE FURTHEST POINTS IN THE LEACH FIELD SYSTEM PRIOR TO BACKFILL. THE INTENT IS TO VERIFY IF THERE IS UNIFORM FLOW THROUGHOUT THE LEACH FIELD SYSTEM. IF THE TESTS DO NOT SHOW THAT WASTEWATER FLOWS ARE REACHING THE FURTHEST POINTS IN THE SYSTEM MODIFICATIONS TO THE SLOPE OF THE LEACH LINES WILL BE REQUIRED.
12. NEW 1500 GALLON SEPTIC TANK SEE DETAIL SHEET C-501.
13. CONCRETE DISTRIBUTION BOX. INVERTS OF ALL OUTLETS SHALL BE LEVEL AND THE INVERT OF THE INLET SHALL BE AT LEAST ONE INCH ABOVE THE OUTLETS. ALL LATERALS FROM THE DISTRIBUTION BOX TO THE DISPOSAL FIELD SHALL BE ASTM APPROVED PIPE WITH WATERTIGHT JOINTS. SEE DETAIL SHEET C-501.
14. ABANDON EXISTING SEPTIC TANK IN PLACE IN ACCORDANCE WITH STANDARD NMED PROCEDURE TO INCLUDE:
    1. PUMP OUT THE EXISTING SEPTIC TANK WITH SEPTIC TANK PUMPER.
    2. CUT AND CAP INLET AND OUTLET LINES FROM TANK.
    3. FILL IN THE SEPTIC TANK WITH FLOWABLE FILL.
    4. DOCUMENT THE LOCATION OF THE FILLED-IN SEPTIC TANK AND ABANDON LEACHFIELD.
15. THE CONTRACTOR SHALL PROVIDE A 10-FOOT MINIMUM SEPARATION BETWEEN THE EXISTING LEACH FIELD AND THE NEW LEACH FIELD. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF PRIOR TO CONSTRUCTION IF THE NEW LEACH FIELD LOCATION WILL REQUIRE MODIFICATION DUE TO THE LOCATION OF THE EXISTING LEACH FIELD.

A1 SITE UTILITY PLAN
SCALE: 1" = 10'

SPEARS HORN ARCHITECTS
1334 PACHECO STREET
SANTA FE, NEW MEXICO 87505
TEL: 505-983-6966

VERLYN A. MILLER III, NEW MEXICO, 14507, 2/4/19, REGISTERED PROFESSIONAL ENGINEER

ELDORADO FIRE & RESCUE STATION NO. 1
SITE UTILITY PLAN

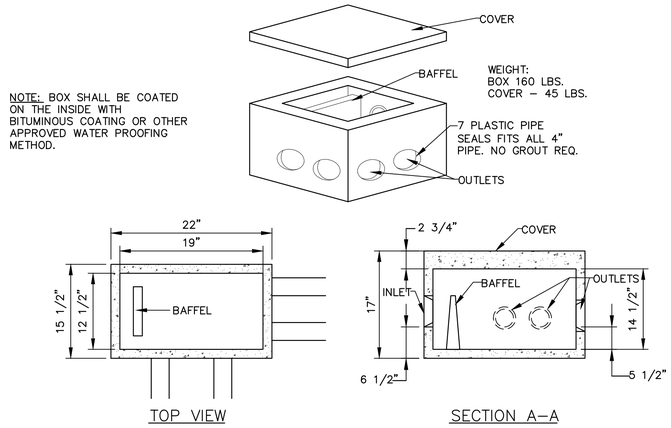
PROJECT: 18- 11
100% CD SET
4 FEB 2019

REVISION	DATE

MILLER ENGINEERING CONSULTANTS
Engineers • Planners
3500 COMANCHE NE BLDG F
ALBUQUERQUE, NM 87107
(505)888-7500
(505)888-3800 (FAX)

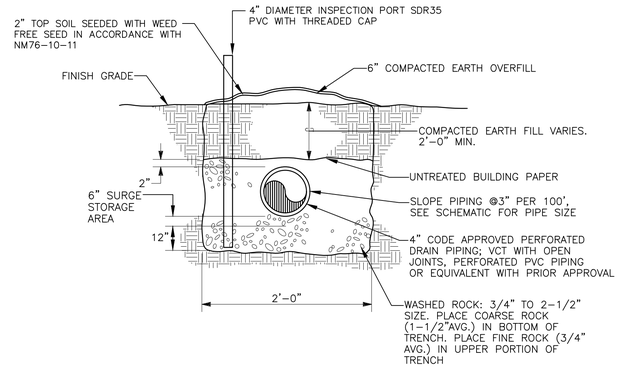
C-101

T:\Clients\Spears Horn Architects\Eldorado Fire Station\AUTOCAD\SHEETS\C-101_Site Plan_120418.dwg, 2/12/2019 10:22:56 AM, DWG To PDF.pc3



D1 DISTRIBUTION BOX DETAIL

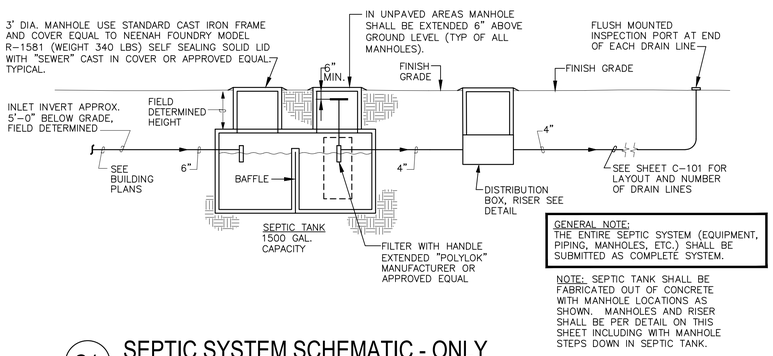
SCALE: NOT TO SCALE



D3 DRAIN LINE DETAIL

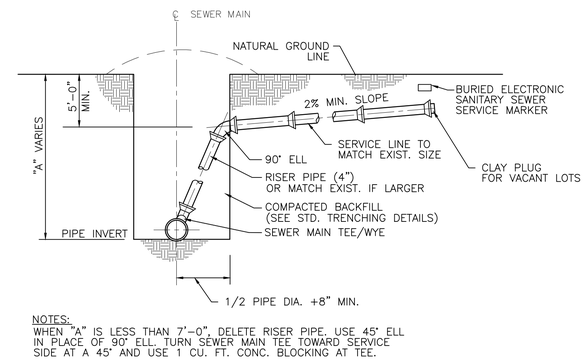
SCALE: NOT TO SCALE

SPACING BETWEEN LINES = 5.0'
TOTAL LENGTH REQUIRED=270'



C1 SEPTIC SYSTEM SCHEMATIC - ONLY

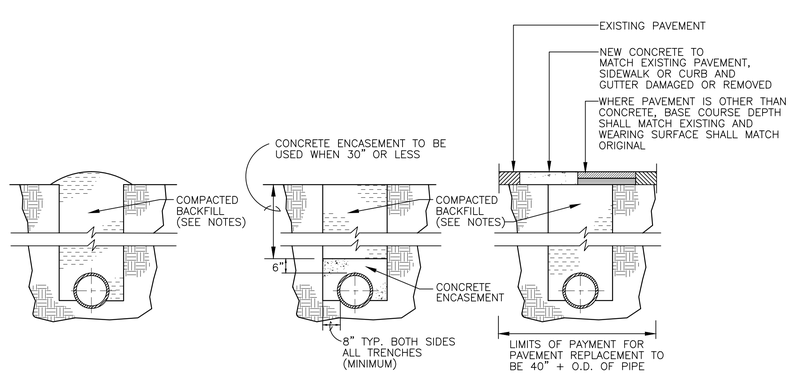
SCALE: NOT TO SCALE



NOTES:
WHEN "A" IS LESS THAN 7'–0", DELETE RISER PIPE. USE 45° ELL IN PLACE OF 90° ELL. TURN SEWER MAIN TEE TOWARD SERVICE SIDE AT A 45° AND USE 1 CU. FT. CONC. BLOCKING AT TEE.

C3 TYPICAL SEWER SERVICE CONNECTION DETAIL

SCALE: NOT TO SCALE



ORDINARY TRENCH

NOTES:
BACKFILL IN AREAS OTHER THAN STREETS, ALLEYS AND DRIVEWAYS SHALL BE COMPACTED TO AT LEAST THE NATURAL DENSITY OF THE UNDISTURBED MATERIAL

UNPAVED ROAD TRENCH

NOTES:
BACKFILL IN UNPAVED STREETS, ALLEYS, AND DRIVEWAYS SHALL BE COMPACTED TO 90% COMPACTION AS DETERMINED BY AASHTO T–180

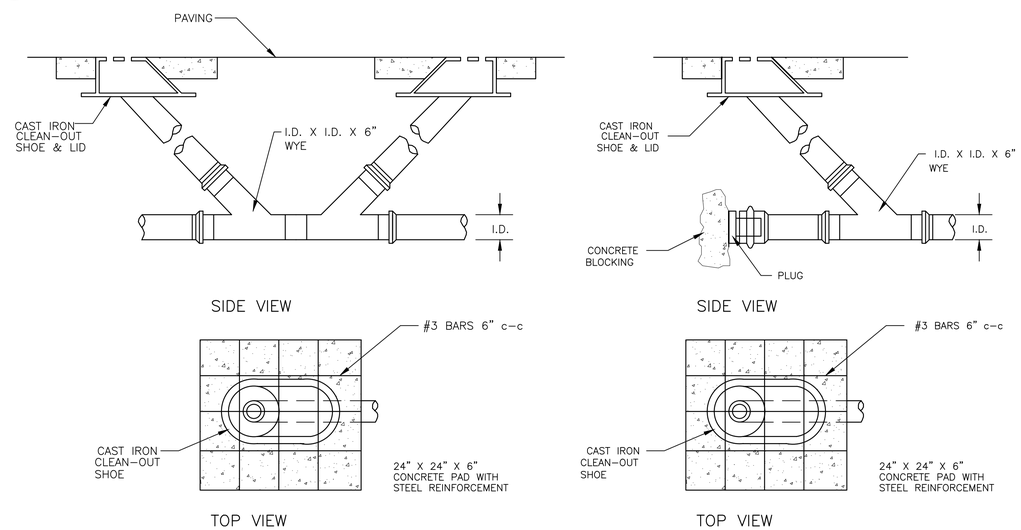
UNDER PAVEMENT

NOTES:
BACKFILL SHALL BE COMPACTED TO 90% WITHIN 12" OF THE SUBGRADE SURFACE AND THE TOP 12" SHALL BE COMPACTED TO 95% COMPACTION AS DETERMINED BY AASHTO T–180

NOTE:
SEE PIPE BEDDING REQUIREMENTS IN SPECS.

A1 TYPICAL SEWER TRENCH DETAILS

SCALE: NOT TO SCALE



A3 TYPICAL DOUBLE AND SINGLE SEWER CLEANOUT DETAIL

SCALE: NOT TO SCALE

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VERLYN A. MILLER JR. NEW MEXICO 14507 REGISTERED PROFESSIONAL ENGINEER 2/4/19

ELDORADO FIRE & RESCUE STATION NO. 1
MISCELLANEOUS DETAILS

PROJECT: 18- 11

100% CD SET

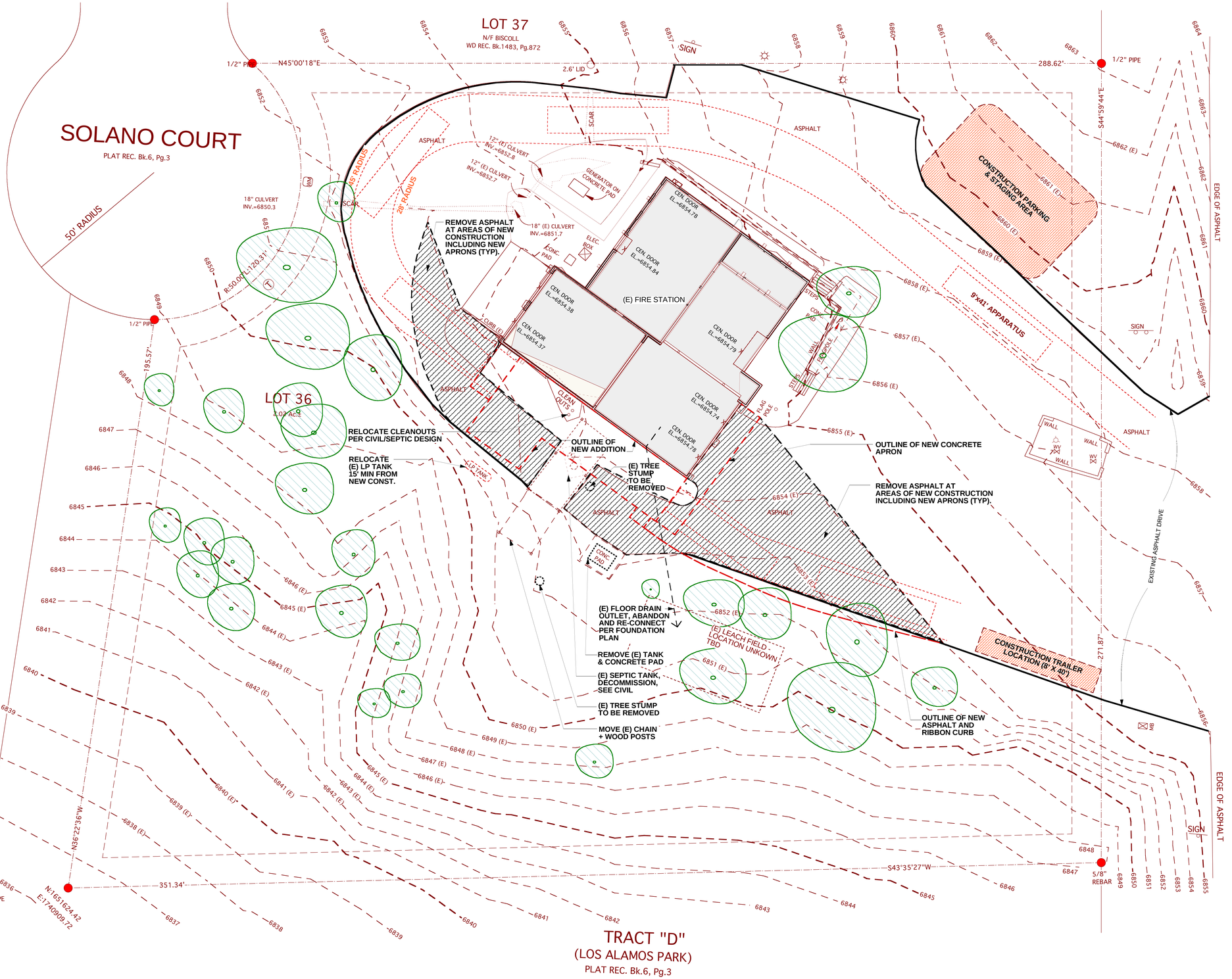
4 FEB 2019

REVISION	DATE

MILLER ENGINEERING CONSULTANTS
Engineers • Planners
3500 COMANCHE NE BLDG F
ALBUQUERQUE, NM 87107
(505)888–7500
(505)888–3800 (FAX)

C-501

T:\Clients\Spears Horn Architects\Eldorado Fire Station\AUTOCAD\SHEETS\C-501_Misc.Details_120418.dwg, 2/12/2019 10:23:44 AM, DWG To PDF.pc3



LEGEND

- CONSTRUCTION PARKING
- ASPHALT DEMOLITION AREA
- NEW CONSTRUCTION AREA
- TREE - EXISITNG
- -6856 (E)— TOPOGRAPHY LINE - EXISTING
- APPARATUS / VEHICULAR PATH OUTLINE

144 AVENIDA VISTA GRANDE

SITE PLAN DEMO / STAGING PLAN
1/16" = 1'-0"

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NO. 4312
REGISTERED ARCHITECT
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EL DORADO FIRE + RESCUE STATION NO. 1
APPARATUS BAY ADDITION
144 AVE VISTA GRANDE, SANTA FE, NEW MEXICO 87508

PROJECT: 18- 11

100% CD SET
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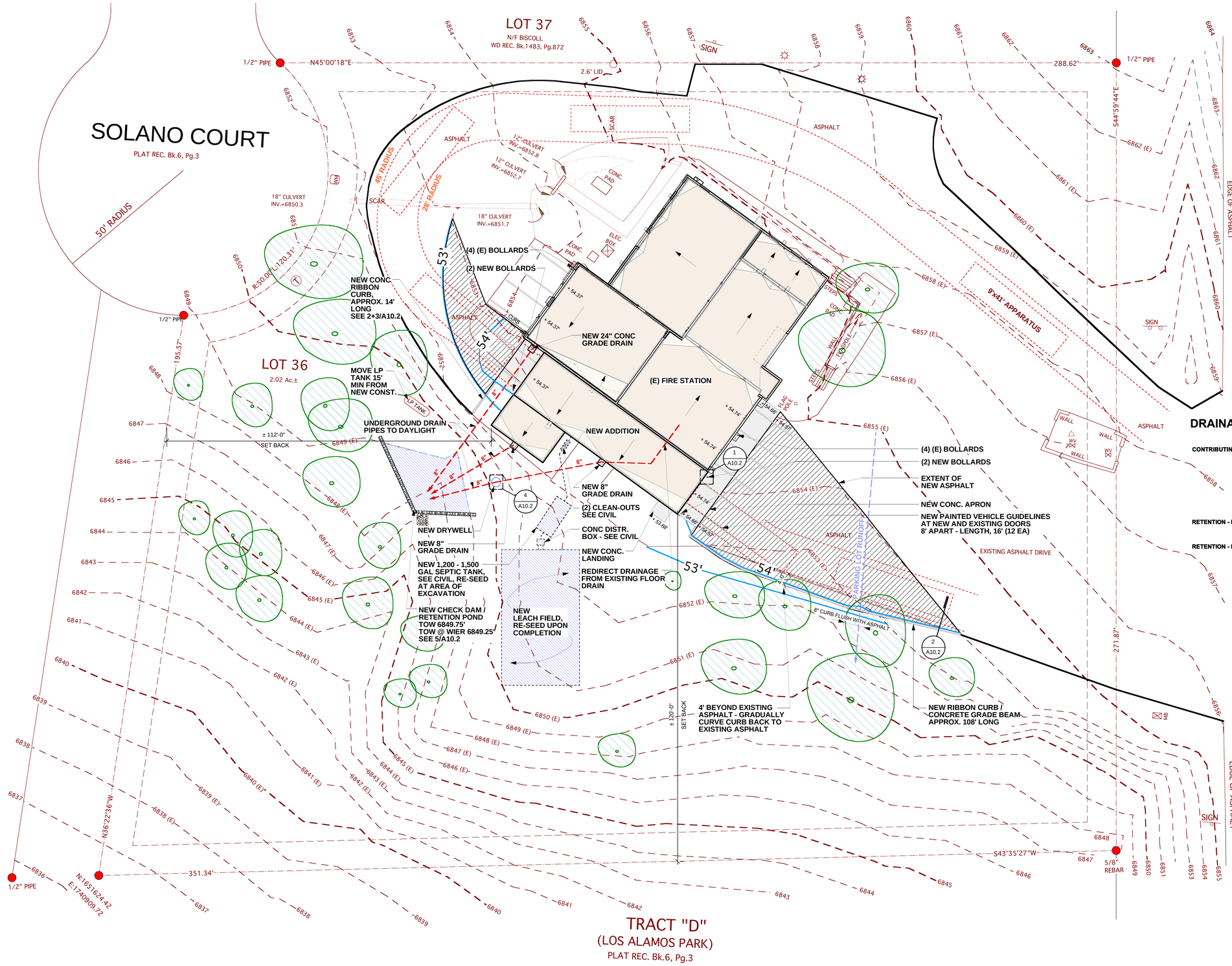

LEGEND

- CONSTRUCTION PARKING
- NEW ASPHALT
- CONCRETE
- 6856 (E) — EXISTING GRADE LINE
- 54' — NEW GRADE LINE
- OVERFLOW / RUNOFF PATH

SITE PLAN NOTES

1) INFORMATION DERIVED FROM TOPOGRAPHIC SURVEY - DAWSON SURVEYS 2/14/2018

2) SEPTIC REPORT DATE 5/24/2018 BY PUMP MASTERS SEPTIC SERVICES

3) IN AREAS OF CONSTRUCTION TRIM TREES RATHER THAN REMOVE, WHEREVER POSSIBLE.

4) ALL DRAIN PIPES TO BE AT 1/8" / FT SLOPE MIN. AND MIN. 24" BELOW GRADE.

DRAINAGE CALCULATIONS / RETENTION

CONTRIBUTING AREAS:	EXISTING ROOF WEST END OF BAY 1/2	**1034 SF**
	NEW ROOF BAY 3 AND STORAGE	**1546 SF**
	TOTAL FROM ROOFS	**2580 SF**
	IMPERMEABLE ASPHALT SHOWS A NET REDUCTION OF	**-400 SF**
	TOTAL DRAINAGE CONTRIBUTING AREA	**2180 SF**
RETENTION - REQUIRED:	2180 SF x 0.16 FACTOR = **348.80 CU FT**	
RETENTION - PROVIDED:	SWALE @ CHECK DAM	
	464 x 1.25' DEEP = 580 CU FT	
	70 x 2.25' DEEP = 70 CU FT	
	738 CU FT / 2 = **369 CU FT**	

SITE PLAN / GRADING AND DRAINAGE / LANDSCAPE
1/16" = 1'-0"

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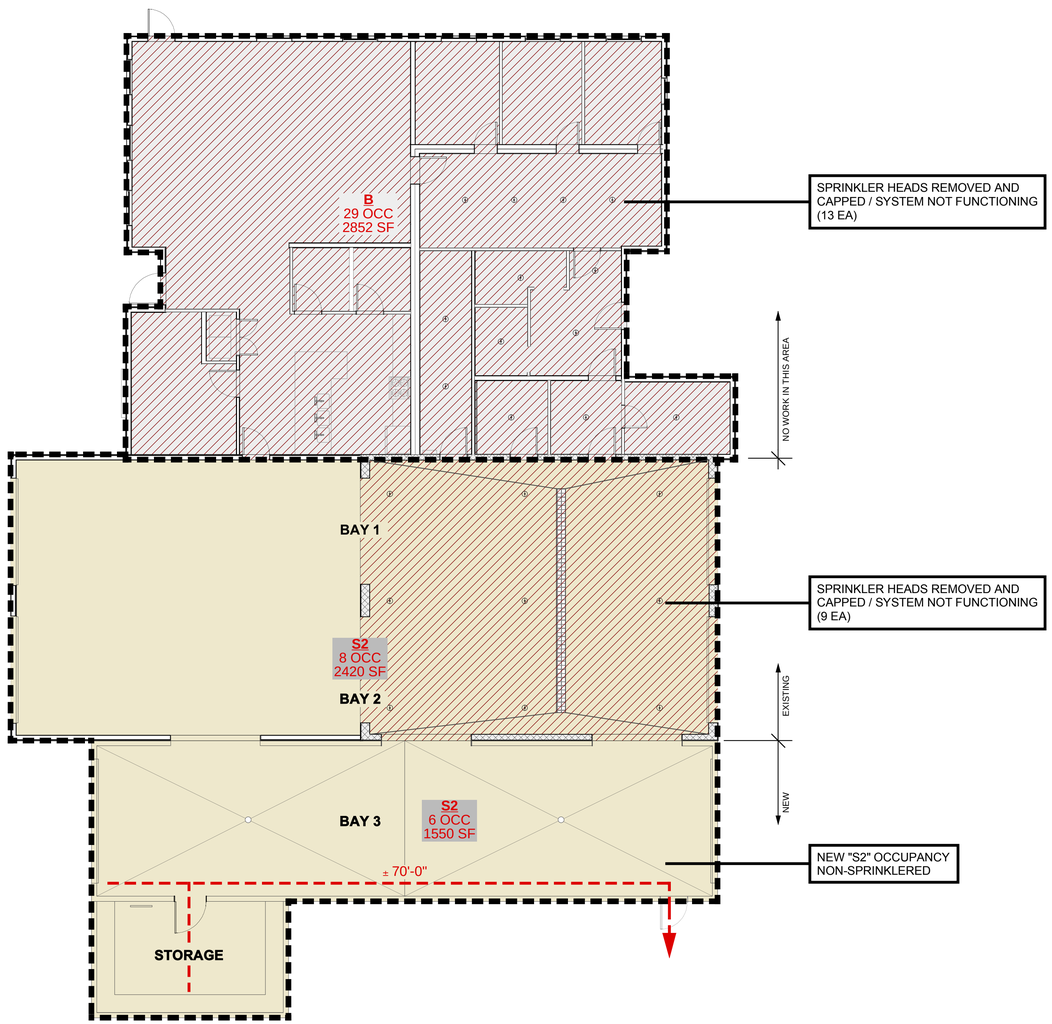

0' 5' 10' 20'

OCCUPANCY + EGRESS

1/8" = 1'-0"

LEGEND

EXIT ACCESS

OCCUPANCY ZONE

PROJECT DATA

CLIENT:	EL DORADO FIRE + RESCUE SERVICES
SCOPE OF WORK:	APPARATUS BAY ADDITION STORAGE ROOM ADDITION
APPLICABLE CODES:	2015 INTERNATIONAL BUILDING CODE 2015 INTERNATIONAL FIRE CODE 2015 NM EXISTING BUILDING CODE 2015 INTERNATIONAL EXISTING BUILDING CODE 2009 NM ENERGY CONSERVATION CODE
PROJECT ADDRESS:	144 AVENUE VISTA GRANDE SANTA FE, NEW MEXICO 87508
COUNTY:	SANTA FE
AREA:	
EXISTING BUILDING:	± 5,390 SF
NEW APPARRATUS BAY:	**± 1,260 SF**
NEW STORAGE ROOM:	**± 286 SF**
ADDITION TOTAL:	**± 1,546 SF**
TOTAL SQUARE FOOTAGE:	**± 6,936 SF**
OCCUPANCY GROUP:	S2: STORAGE/PARKING GARAGES B: CIVIC ADMINISTRATION
CONSTRUCTION TYPE:	TYPE II-B: STEEL STUD FRAME/GYPSUM BOARD/STUCCO
FIRE SUPPRESSION:	NOT REQUIRED / NOT PROVIDED
SLDC ZONING:	PUBLIC / INSTITUTIONAL LAND ZONING
BUILDING HEIGHT - MAXIMUM:	48'
BUILDING HEIGHT - PROVIDED:	±21'-6" @ TOP OF PARAPET / NEW BAY 3

CODE ANALYSIS

OCCUPANCY TYPE

B BUSINESS - 2852 SF / 100 SF PER OCC = 29 OCC
S2 STORAGE/PARKING GARAGES - 4055 SF / 300 SF PER OCC = 14 OCC

TOTAL BLDG OCCUPANCY 43 OCCUPANTS REF: 2015 IBC TABLE 1004.1.2

MAXIMUM COMMON PATH OF EGRESS TRAVEL = 75 FT REF: 2015 IBC TABLE 1006.3.2

CORRIDOR FIRE-RATING REQUIRED __ YES X NO REF: 2015 IBC TABLE 1020.1

PLUMBING FIXTURES

REQ'D FIXTURES	WC	URINALS	LAVATORY	DRINKING FOUNTAIN	SERVICE SINK
(B) 29 OCC	2	0	1	1	1
(S2) 14 OCC	1	0	1		
TOTAL COUNT	3	0	2	1	1
EXISTING / PROVIDED FIXTURES	3	1	3	0 *	1

* WATER COOLER PROVIDED INLIEU OF DRINKING FOUNTAIN

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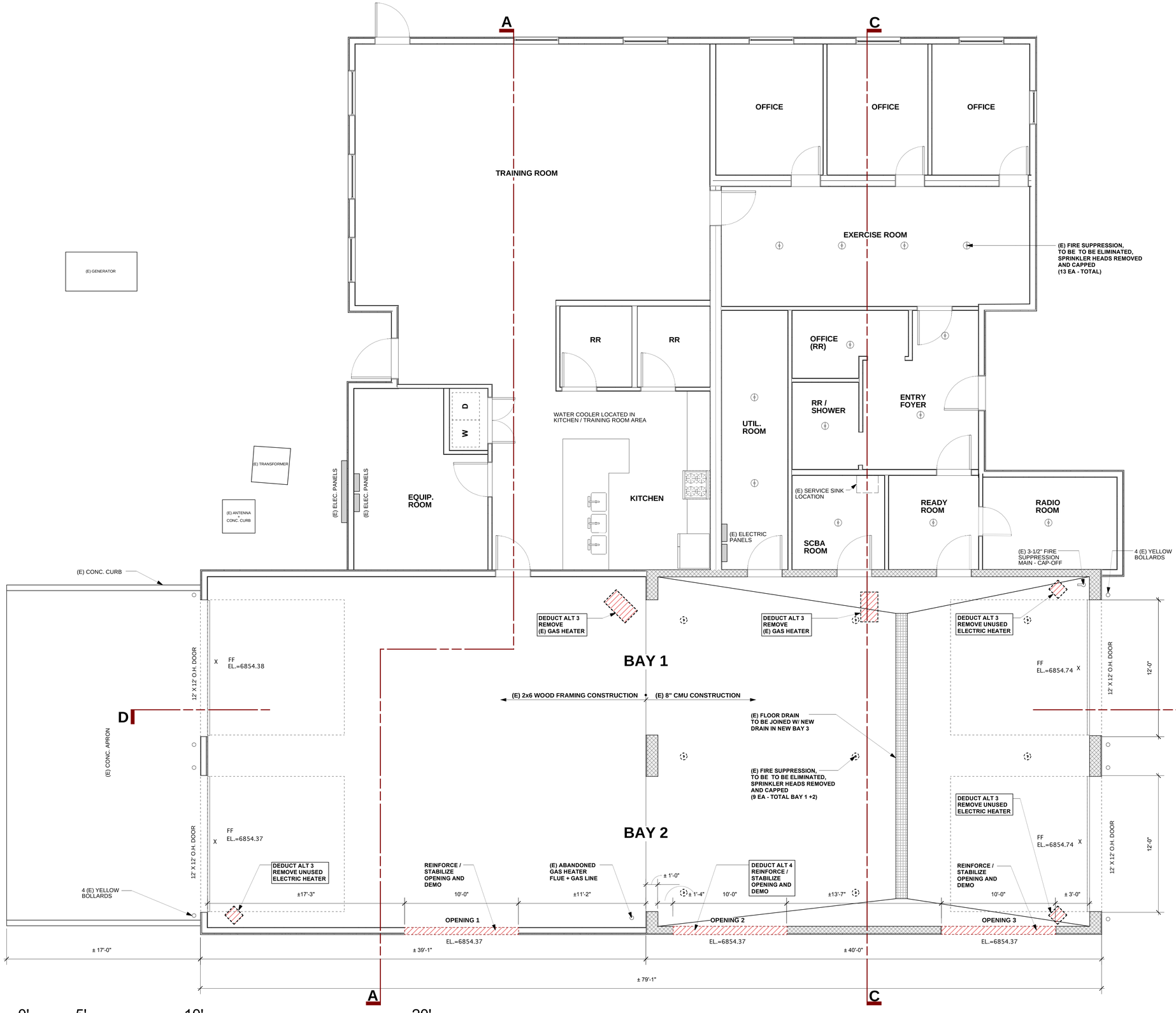

FLOOR PLAN - DEMO
1/4" = 1'-0"

LEGEND

- DEMO WALL
- (E) CMU WALL
- (E) FRAME WALL

DEMOLITION NOTES

1. ALL DIMENSIONS AND LOCATIONS TO BE VERIFIED IN FIELD

2. OWNER TO DETERMINE WHICH MATERIALS, EQUIP., DOORS, ETC. TO BE SALVAGED OTHERWISE MATERIALS, EQUIP., DOORS, ETC. CAN BE DISPOSED OF BY GENERAL CONTRACTOR. CONTRACTOR TO COORDINATE WITH OWNER TO IDENTIFY ALL REUSABLE/SALVAGEABLE MATERIALS AND EQUIPMENT AND PROVIDE SECURE STORAGE DURING DEMOLITION UNTIL READY FOR REINSTALLATION.

2. PROVIDE ADEQUATE TEMPORARY SHORING AND STRUCTURAL SUPPORT WHILE PERFORMING ALL DEMOLITION. PRIMARY STRUCTURAL MEMBERS SHALL NOT BE REMOVED UNLESS PROVISIONS ARE MADE TO SUPPORT STRUCTURE.

3. REMOVE UNUSED CIRCUITS. TERMINATE ALL WIRING AT JUNCTION BOXES. SALVAGE ALL REUSABLE ELECTRICAL OUTLETS, BOXES, SWITCHES, AND ACCESSORIES FOR NEW CONSTRUCTION.

4. CUT-BACK AND CAP-OFF ALL PLUMBING AND MECHANICAL LINES. SALVAGE ALL REUSABLE PLUMBING AND MECHANICAL ACCESSORIES FOR NEW CONSTRUCTION.

5. PROTECT SURFACES TO REMAIN. IF DAMAGED, REPAIR REPLACE ANY DAMAGED MATERIALS THAT ARE TO REMAIN TO MATCH EXISTING FINISH, TEXTURE, AND CONSTRUCTION.

6. WHERE EXISTING ITEMS ARE REMOVED, PATCH SURFACES AS REQUIRED WITH SPECIFIED FINISHES AND FILLS.

7. REMOVE WASTE FROM DEMOLITION. DO NOT ALLOW DEBRIS TO ACCUMULATE ON SITE.

8. NOTIFY OWNER BEFORE DEMOLITION ACTIVITIES THAT MAY AFFECT THE OPERATION OF THE ADJACENT OFFICES/FACILITIES.

9. CONTRACTOR TO REMOVE AND DISPOSE OF ALL DEMOLISHED MATERIALS AND EQUIPMENT IN AN APPROVED REGULATORY MANNER.

10. ALL DEMOLISHED MATERIALS TO BE SEPARATED INTO RECYCLED CONTENT TO GREATEST EXTENT POSSIBLE.

11. IF HAZARDOUS OR CONTAMINATED MATERIALS ARE FOUND, NOTIFY OWNER IMMEDIATELY.

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EL DORADO FIRE + RESCUE STATION NO. 1

APPARATUS BAY ADDITION

144 AVE VISTA GRANDE, SANTA FE, NEW MEXICO 87508

PROJECT: 18- 11

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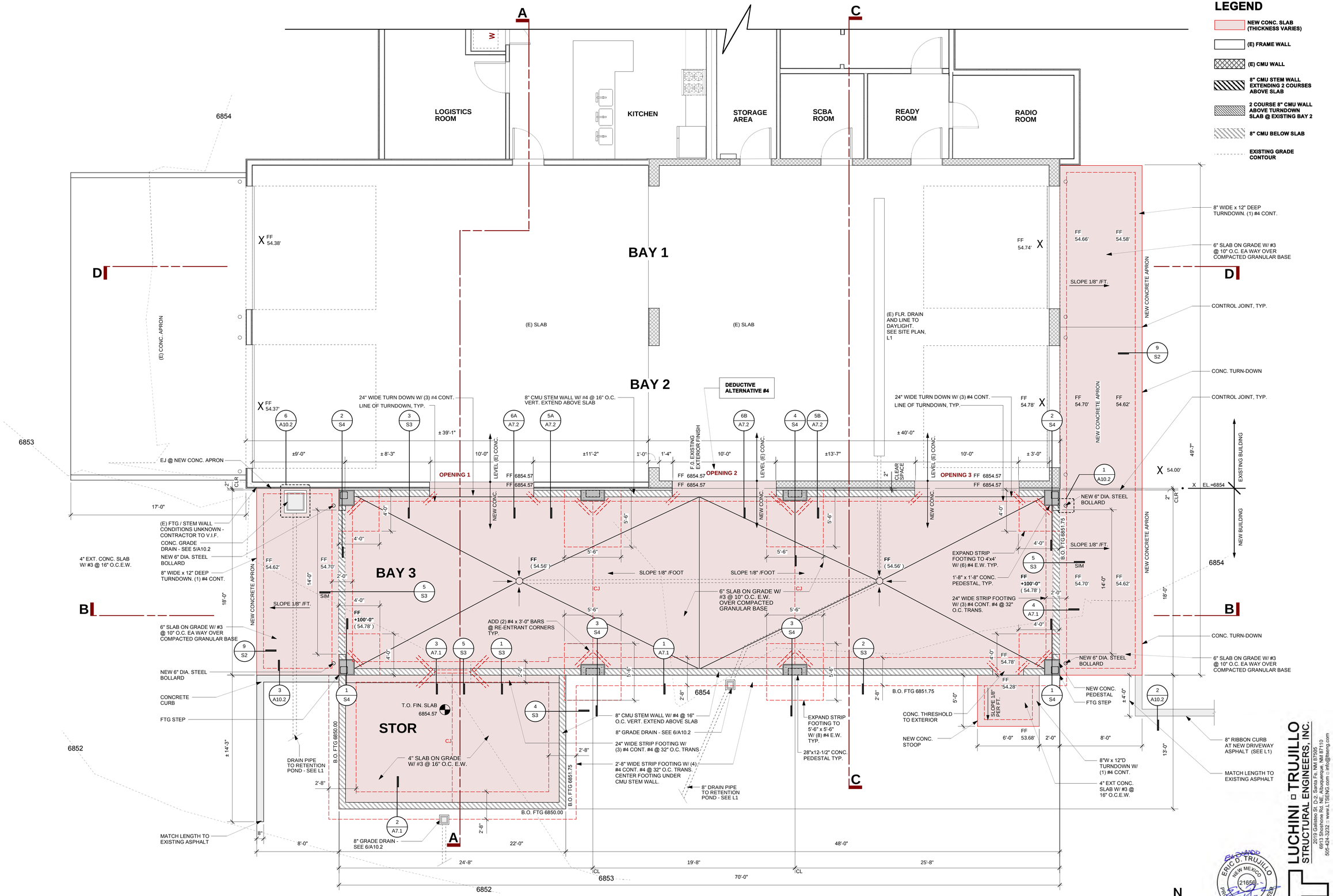

FOUNDATION PLAN - NEW
1/4" = 1'-0"

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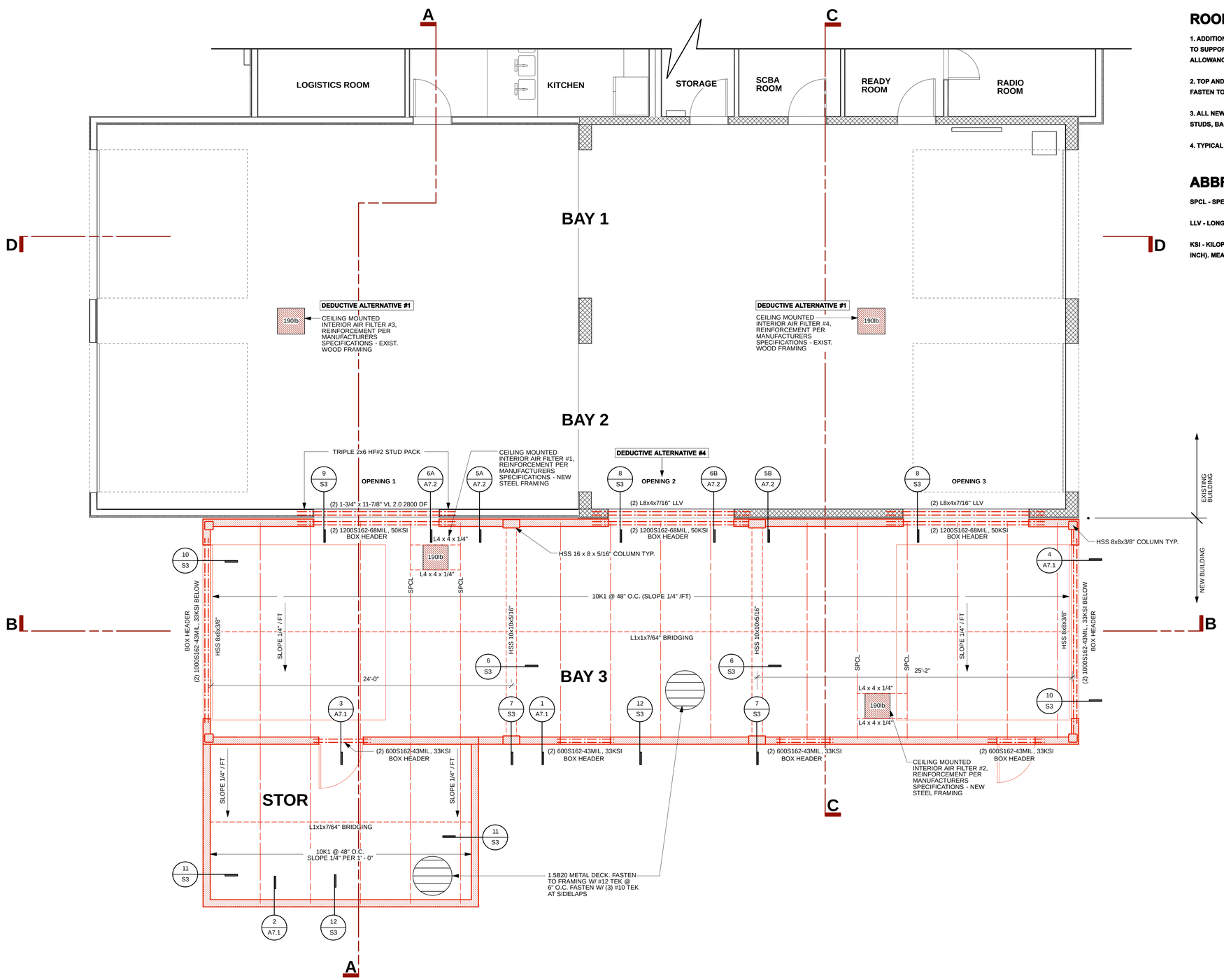
A2



LEGEND

SHEAR WALL SHEATHING: 7/16" OSB W/ #8 TEK @ 6" O.C. EDGES. 12" O.C. FIELD. PANELS APPLIED PERPENDICULAR TO STUD FRAMING. FULLY BLOCK WALL.

ROOF FRAMING NOTES

1. ADDITION ROOF STRUCTURE DESIGNED TO SUPPORT FUTURE BALLASTED PV ARRAY, 15 PSF MAX ALLOWANCE.

2. TOP AND BOTTOM TRACKS SHALL BE 600T150-54MIL, 33KSI, FASTEN TO EA. STUD FLANGE W/ #12 TEK.

3. ALL NEW HEADERS SHALL BEAR ON (2) 600S162-43MIL, 33KSI STUDS, BACK-TO-BACK.

4. TYPICAL WALL STUDS: 600S162-43MIL, 33KSI @ 16" O.C.

ABBREVIATIONS

SPCL - SPECIAL LOADING, STRUCTURAL STEEL.

LLV - LONG LEG VERTICAL, STRUCTURAL STEEL.

KSI - KILOPOUNDS PER SQUARE INCH (1000 LBS PER SQUARE INCH). MEASURE OF TENSILE STRENGTH OF STEEL.

0' 5' 10' 20'

ROOF FRAMING PLAN
1/4" = 1'-0"

N

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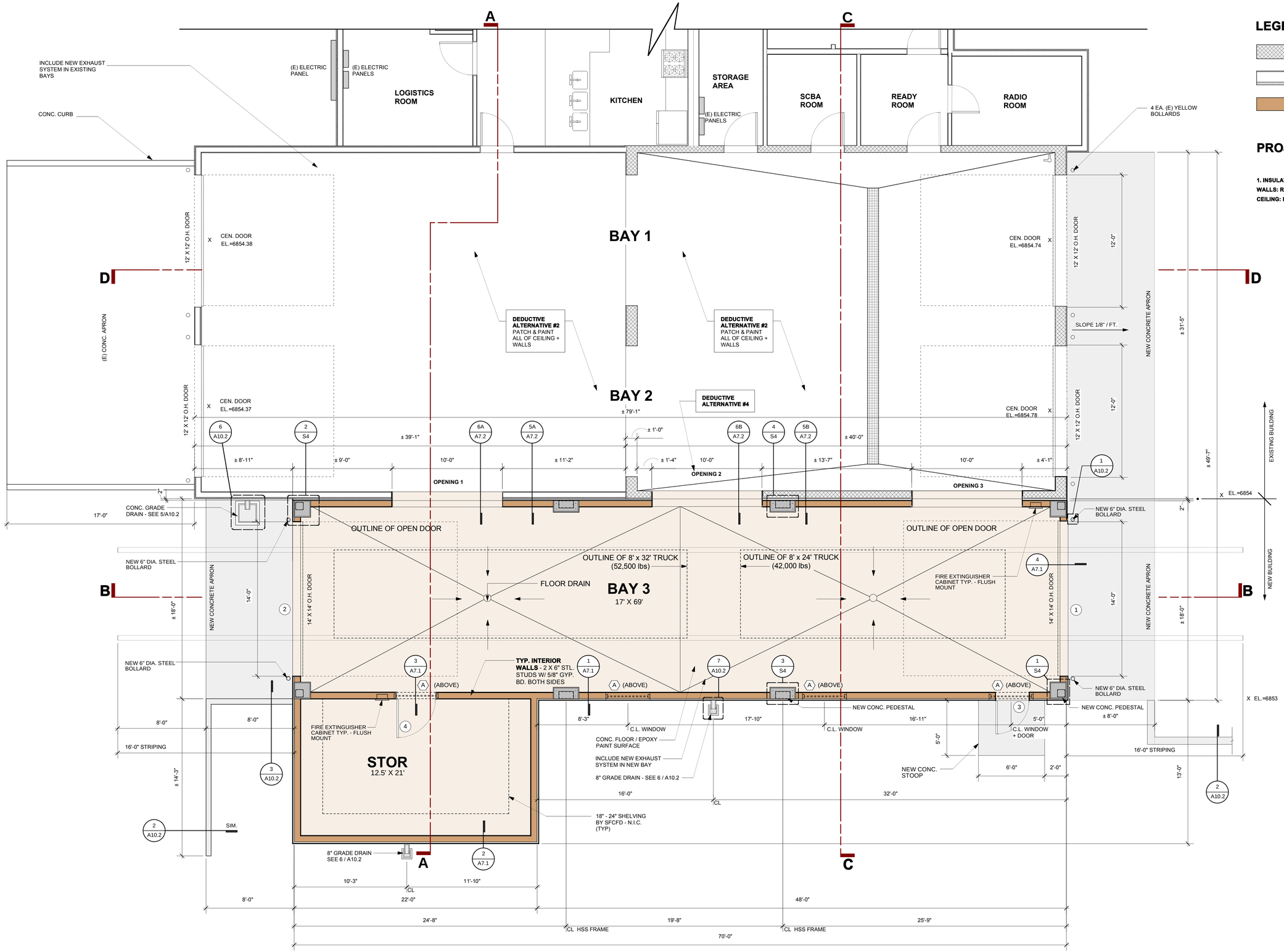
A3



FLOOR PLAN - NEW
1/4" = 1'-0"

LEGEND

- EXISTING CMU WALL
- EXISTING FRAME WALL
- NEW WALL

PROJECT NOTES

1. INSULATION
WALLS: R19 MIN.
CEILING: R28 MIN.

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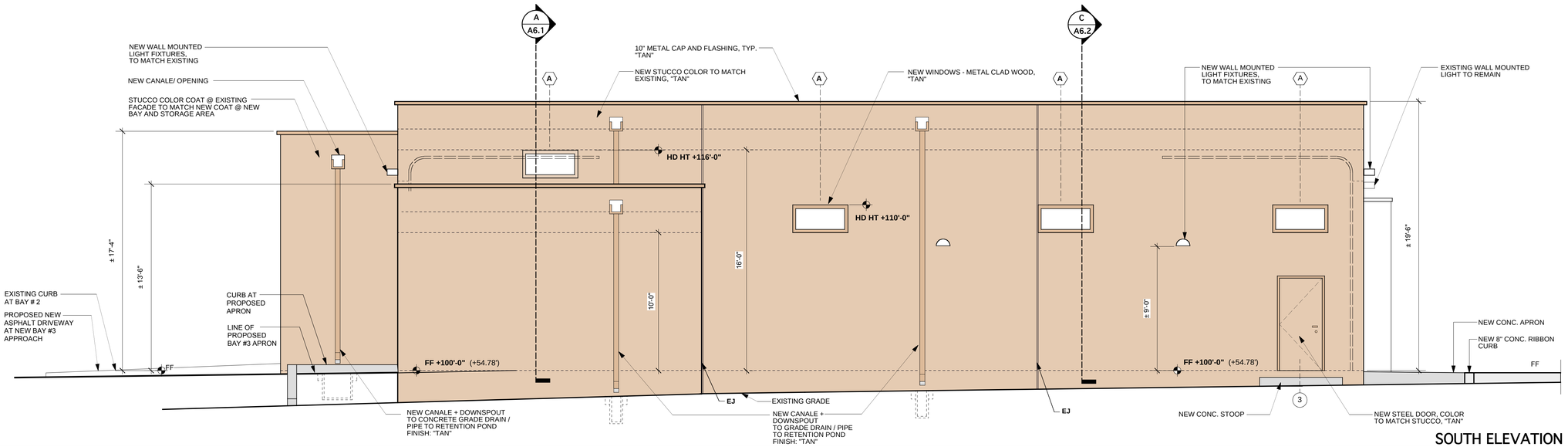
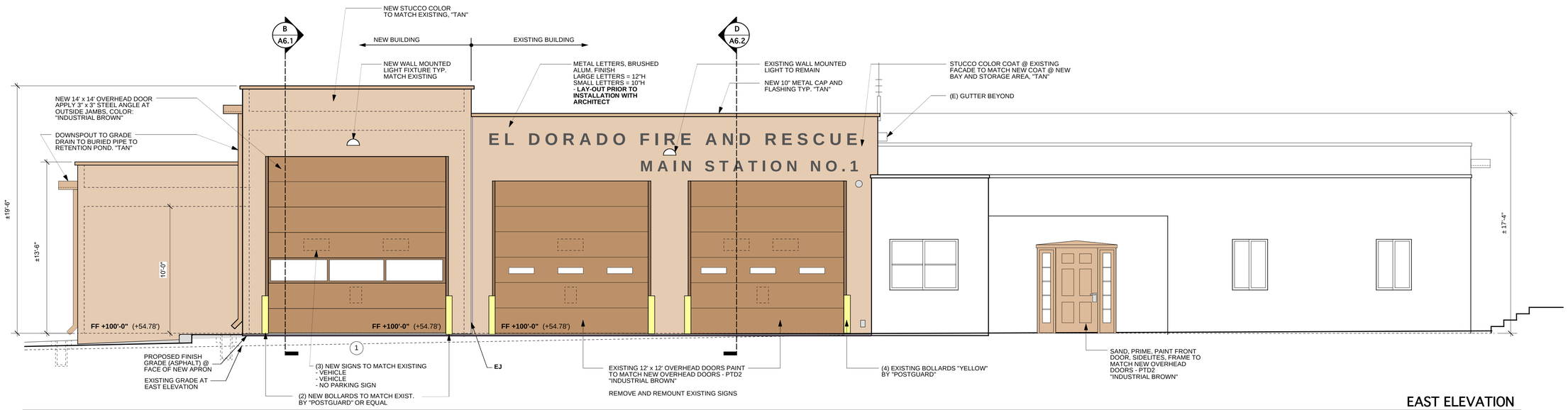
A4



SOUTH ELEVATION
1/4" = 1'-0"



EAST ELEVATION
1/4" = 1'-0"

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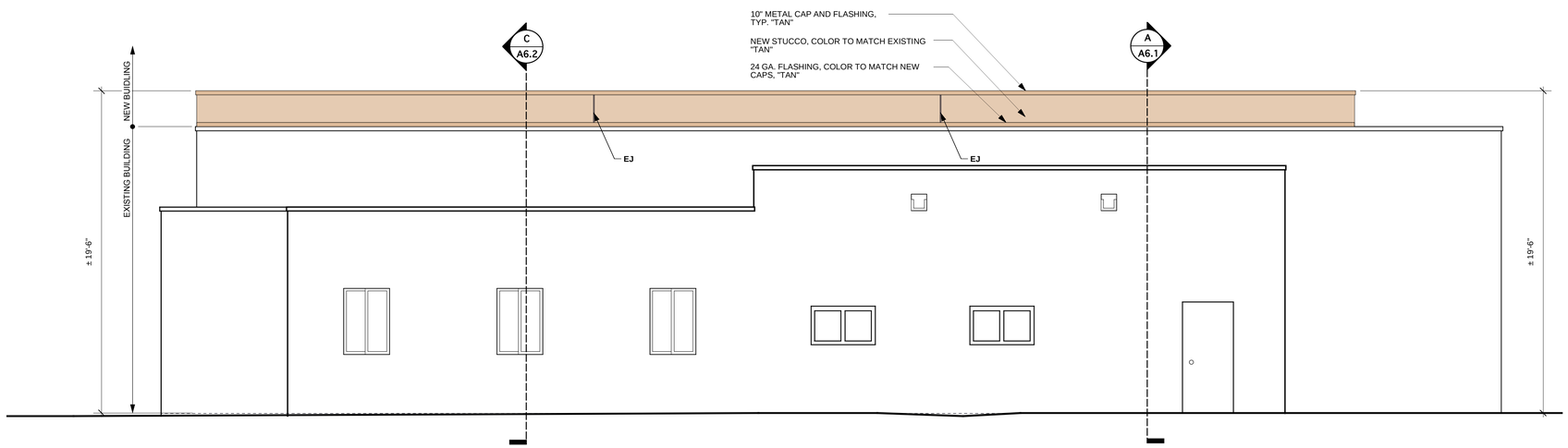
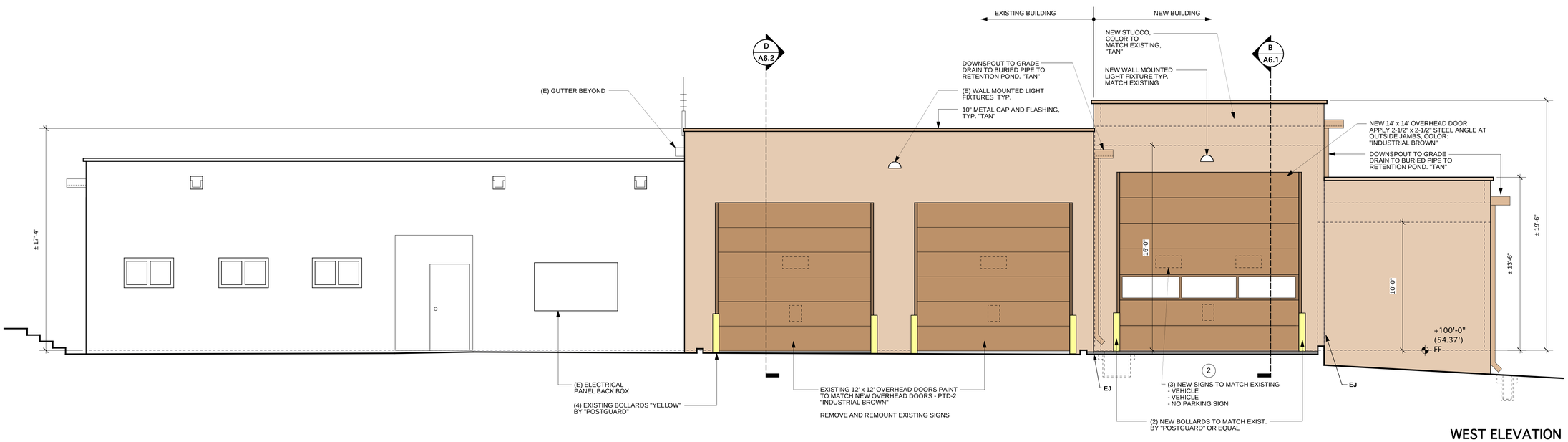


NORTH ELEVATION
1/4" = 1'-0"



WEST ELEVATION
1/4" = 1'-0"

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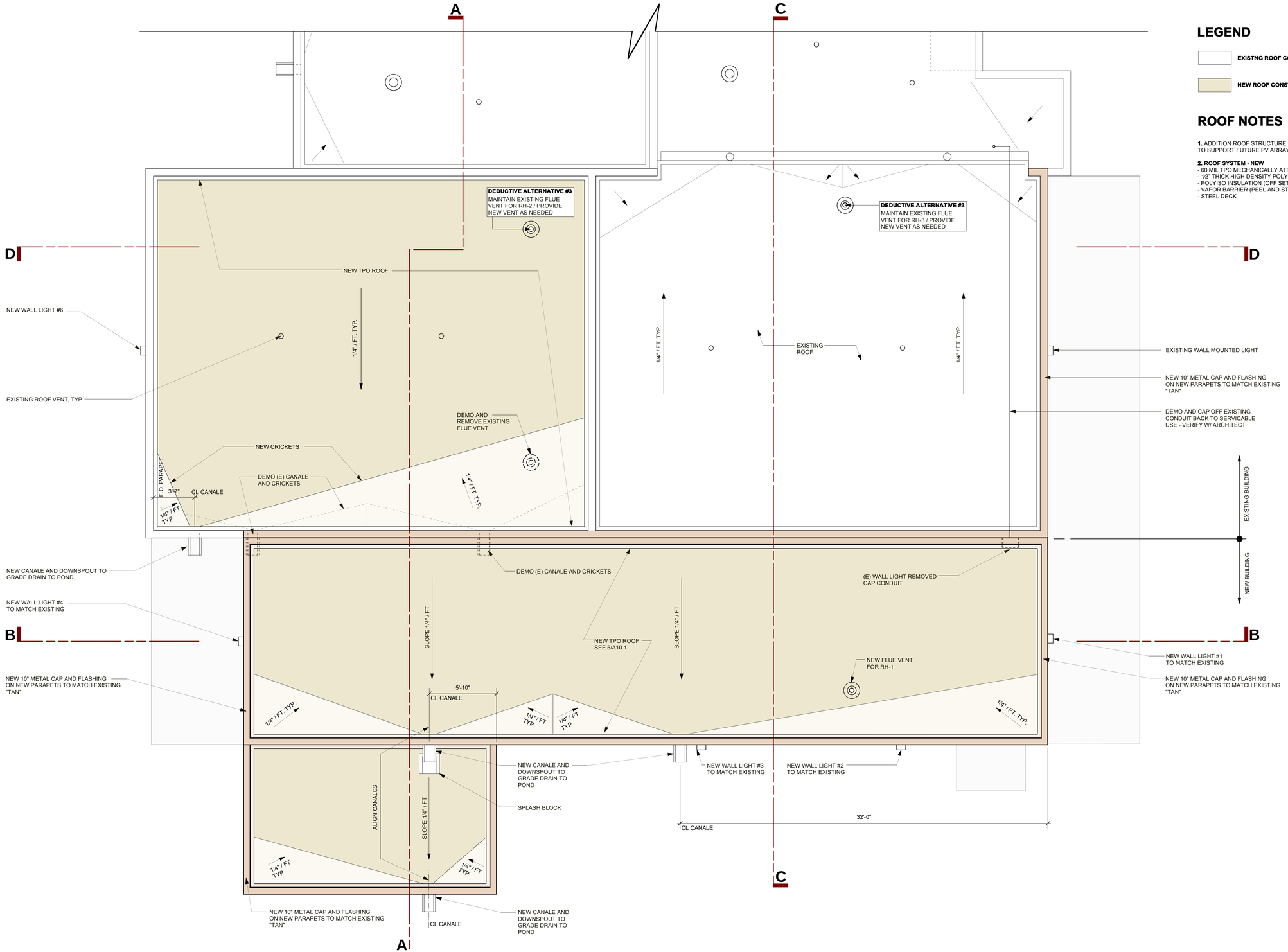
A5.2



LEGEND

EXISTNG ROOF CONSTRUCTION

NEW ROOF CONSTRUCTION

ROOF NOTES

1. ADDITION ROOF STRUCTURE DESIGNED TO SUPPORT FUTURE PV ARRAY

2. ROOF SYSTEM - NEW
- 60 MIL TPO MECHANICALLY ATTACHED SYSTEM
- 1/2" THICK HIGH DENSITY POLYISO COVERBOARD – 80PSI BOARD
- POLYISO INSULATION (OFF SET JOINTS) COMMON FASTENED
- VAPOR BARRIER (PEEL AND STICK TO STEEL DECK)
- STEEL DECK

ROOF PLAN
1/4" = 1'-0"

N

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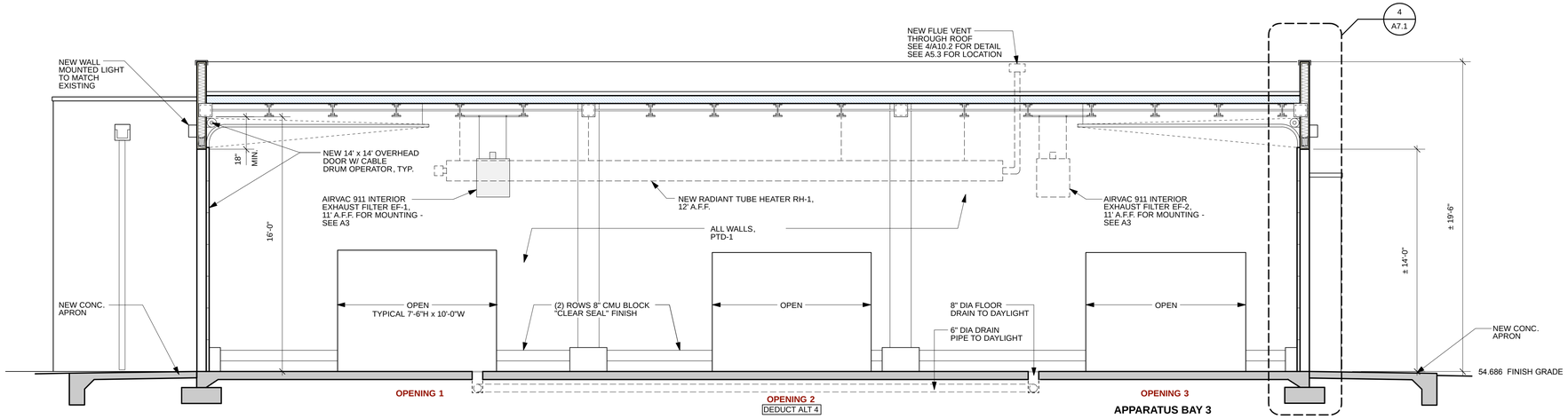
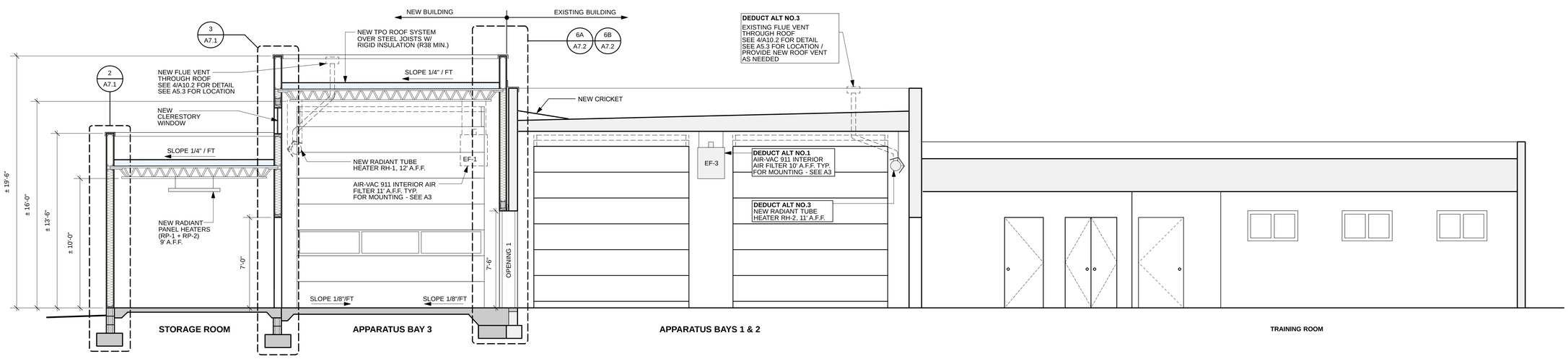
A5.3



SECTION B
1/4" = 1'-0"



SECTION A
1/4" = 1'-0"

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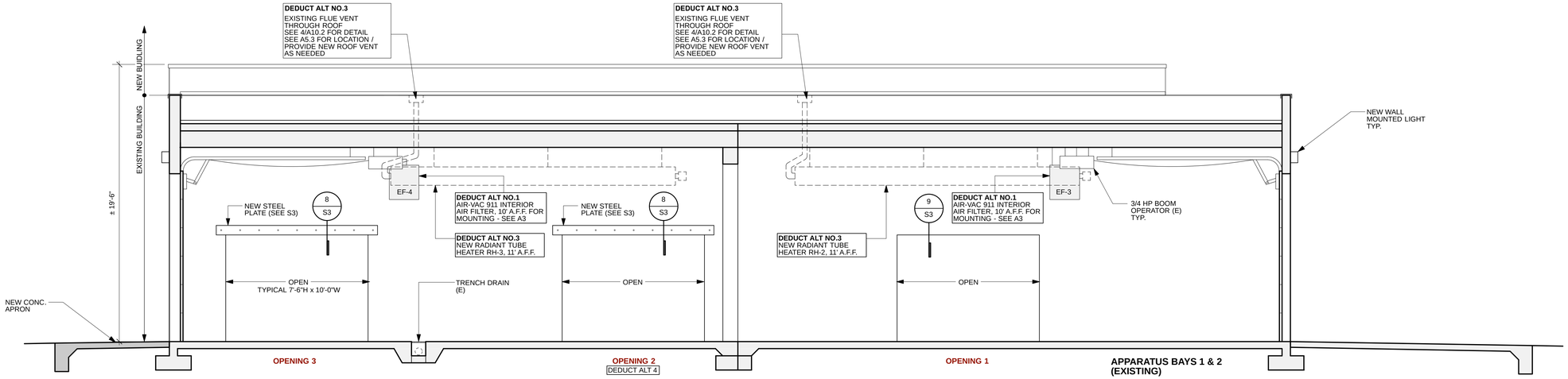
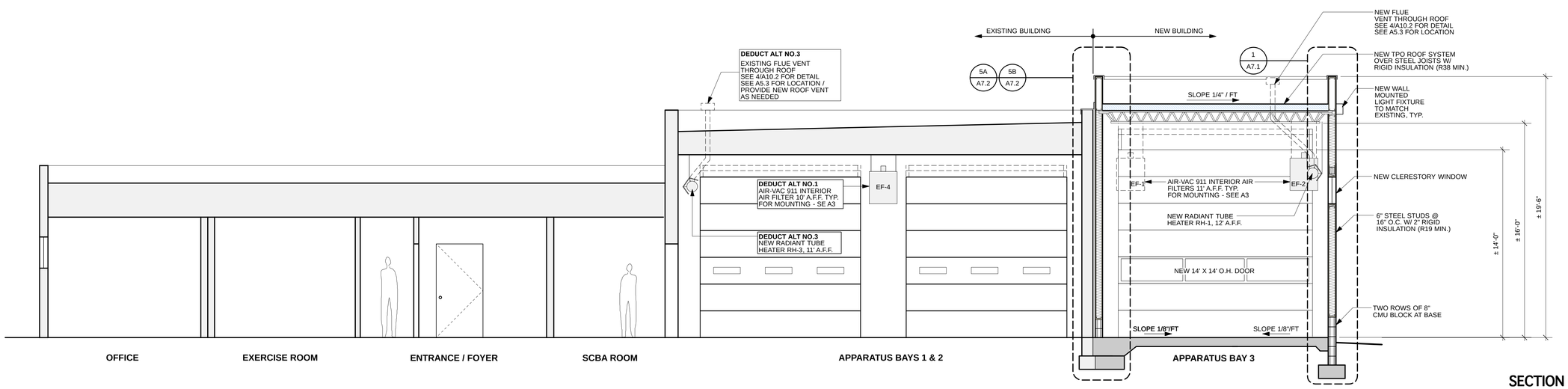
A6.1



SECTION D
1/4" = 1'-0"



SECTION C
1/4" = 1'-0"

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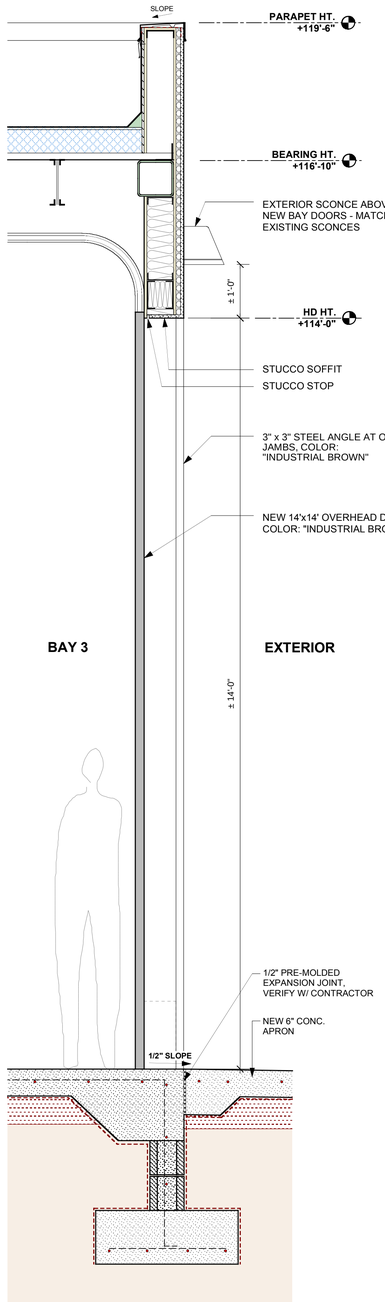
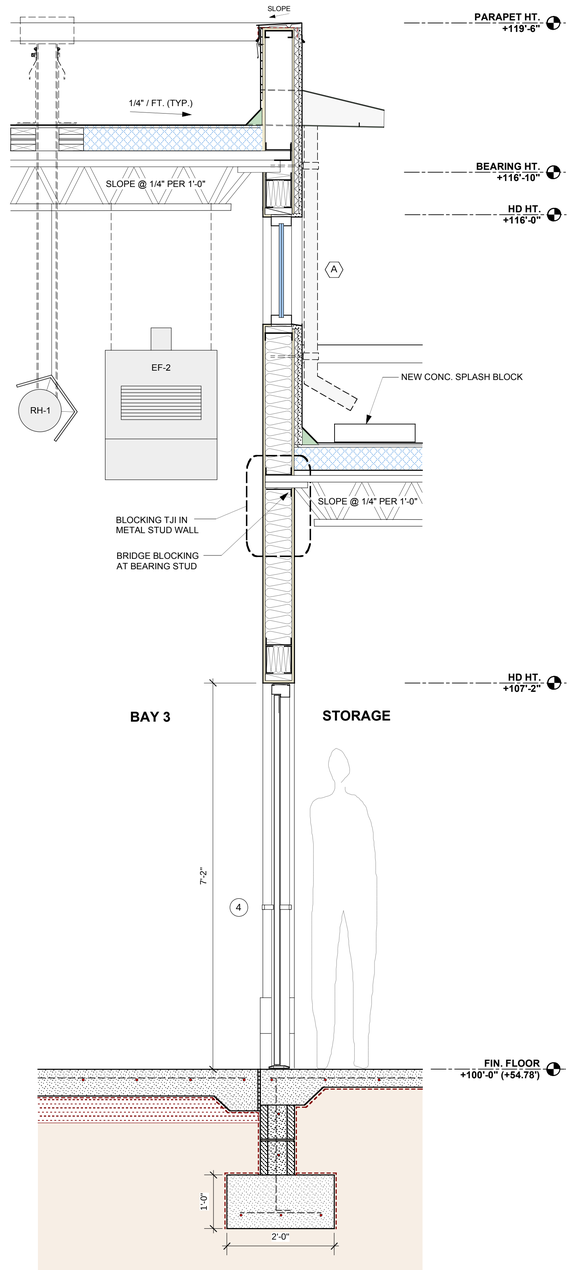


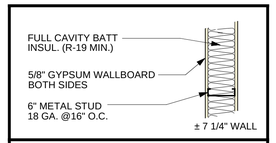
NOTE:
SEE 1 / A7.1 FOR TYPICAL CONSTRUCTION AND NOTES

WALL SECTION - OVERHEAD DOOR TYP. (4 / A7.1)
3/4" = 1'-0"

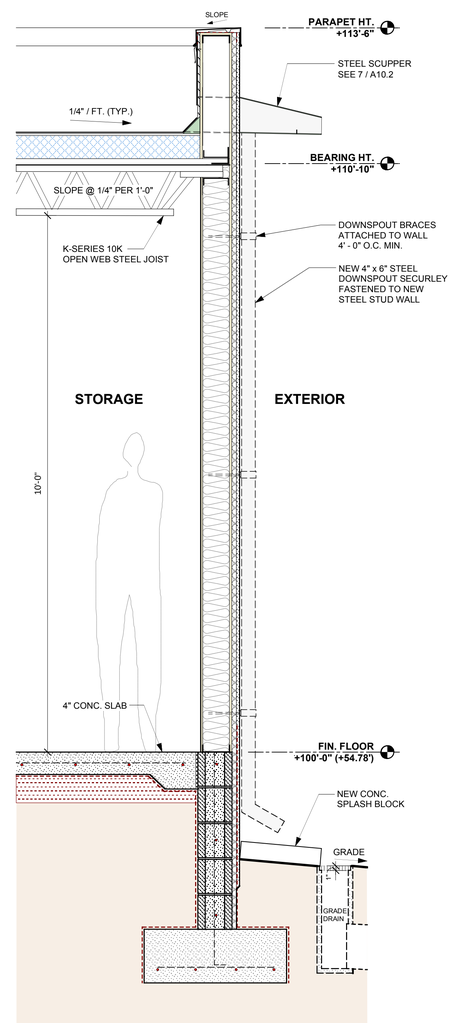


NOTE:
SEE 1 / A7.1 FOR TYPICAL CONSTRUCTION AND NOTES

BAY 3 TO STORAGE WALL SECTION (3 / A7.1)
3/4" = 1'-0"

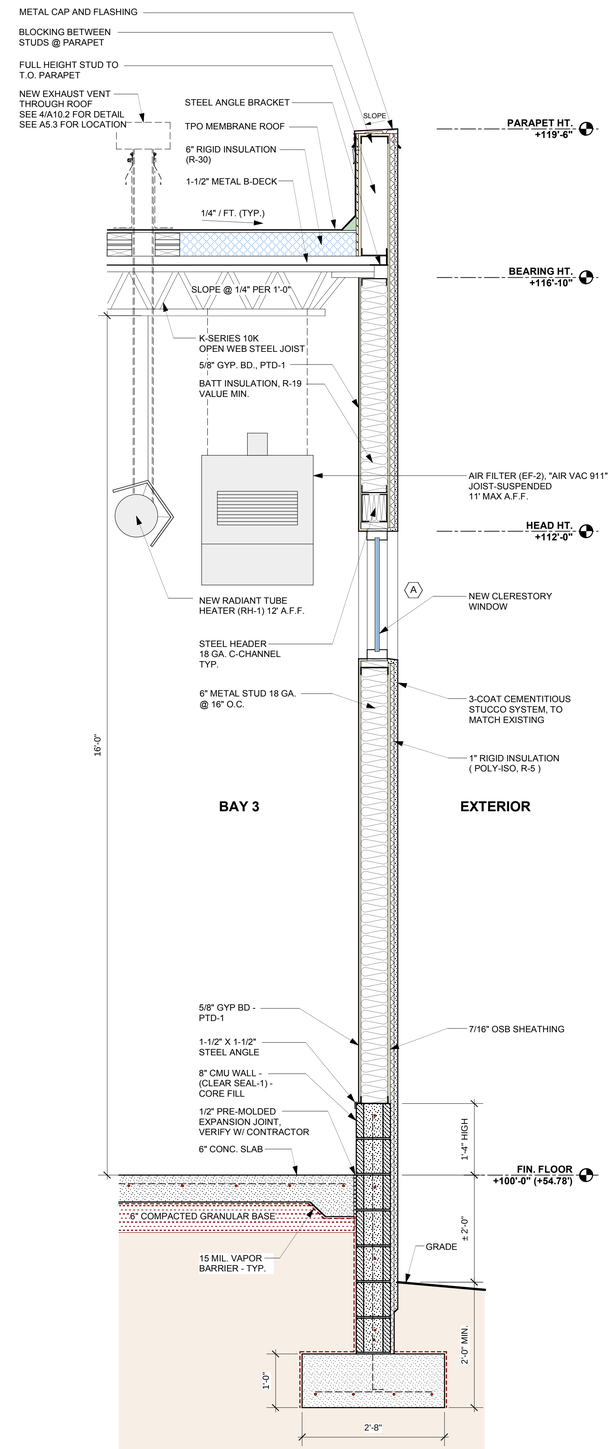


1 6" METAL STUD - INTERIOR WALL
SCALE: 3/4" = 1'-0"



NOTE:
SEE 1 / A7.1 FOR TYPICAL CONSTRUCTION AND NOTES

STORAGE WALL SECTION - TYP. (2 / A7.1)
3/4" = 1'-0"



BAY 3 WALL SECTION - TYP. (1 / A7.1)
3/4" = 1'-0"

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STATE OF NEW MEXICO
JAMES RICHARD HORN
NO. 4312
REGISTERED ARCHITECT
4 FEB. 2019

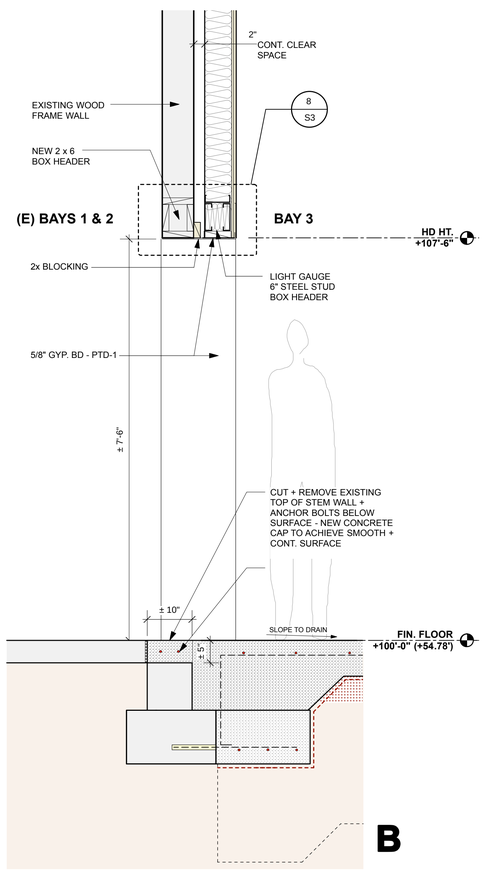
EL DORADO FIRE + RESCUE STATION NO. 1
APPARATUS BAY ADDITION
144 AVE VISTA GRANDE, SANTA FE, NEW MEXICO 87508

PROJECT: 18- 11

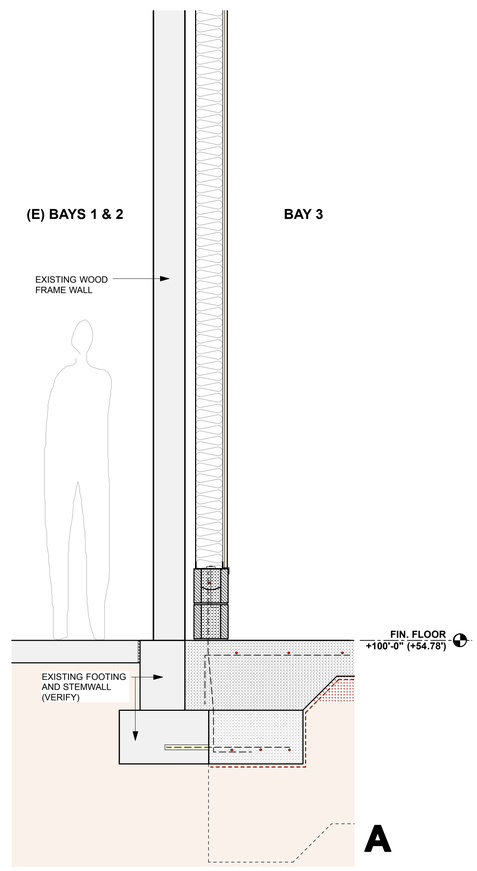
100% CD SET
4 FEB 2019

REVISION	DATE

A7.1



NOTE:
SEE 1 / A7.1 FOR TYPICAL CONSTRUCTION AND NOTES

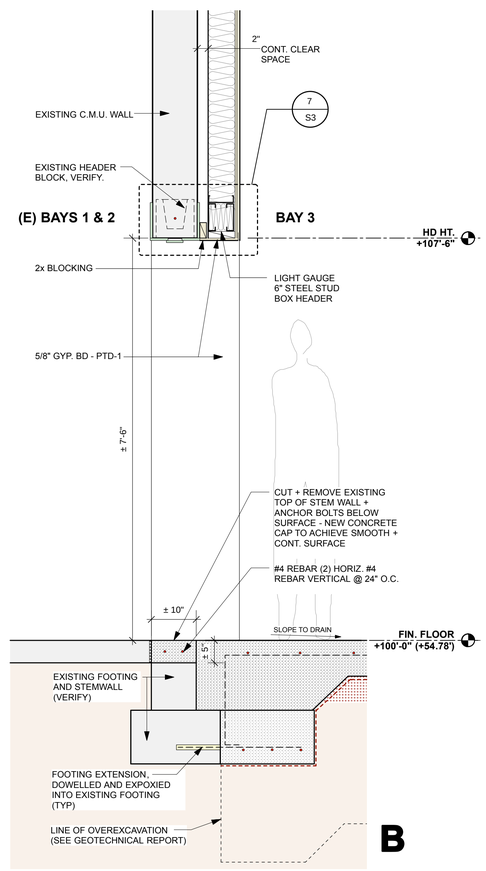


NOTE:
SEE 1 / A7.1 FOR TYPICAL CONSTRUCTION AND NOTES

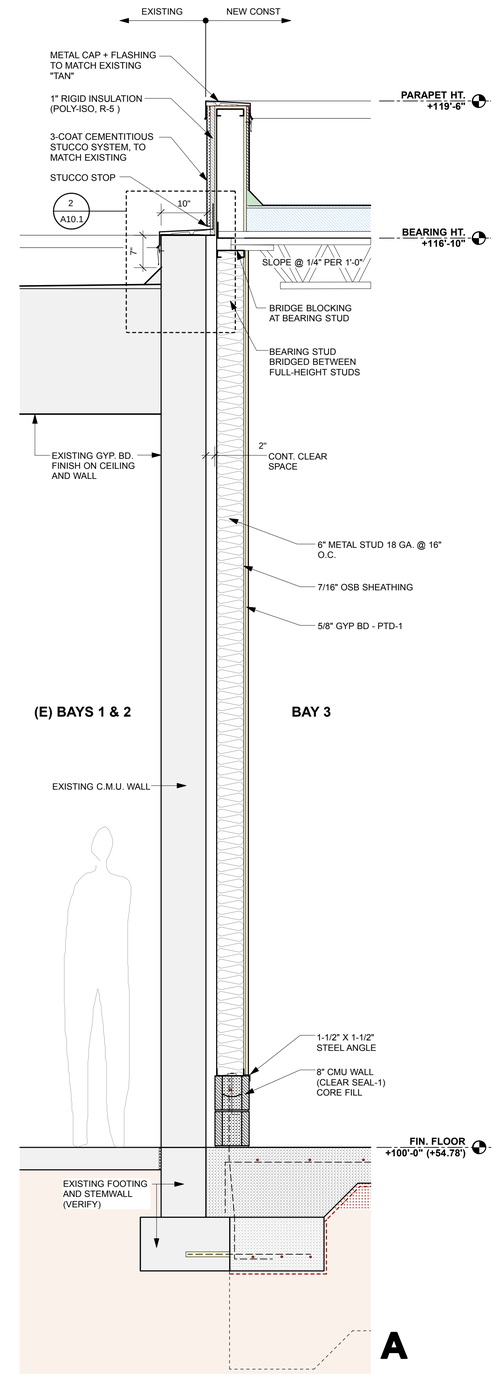
WALL SECTION - NEW WALL **@ EXISTING FRAME WALL**

3/4" = 1'-0"

6
A7.2



NOTE:
SEE 1 / A7.1 FOR TYPICAL CONSTRUCTION AND NOTES



NOTE:
SEE 1 / A7.1 FOR TYPICAL CONSTRUCTION AND NOTES

WALL SECTION - NEW WALL **@ EXISTING CMU WALL**

3/4" = 1'-0"

5
A7.2

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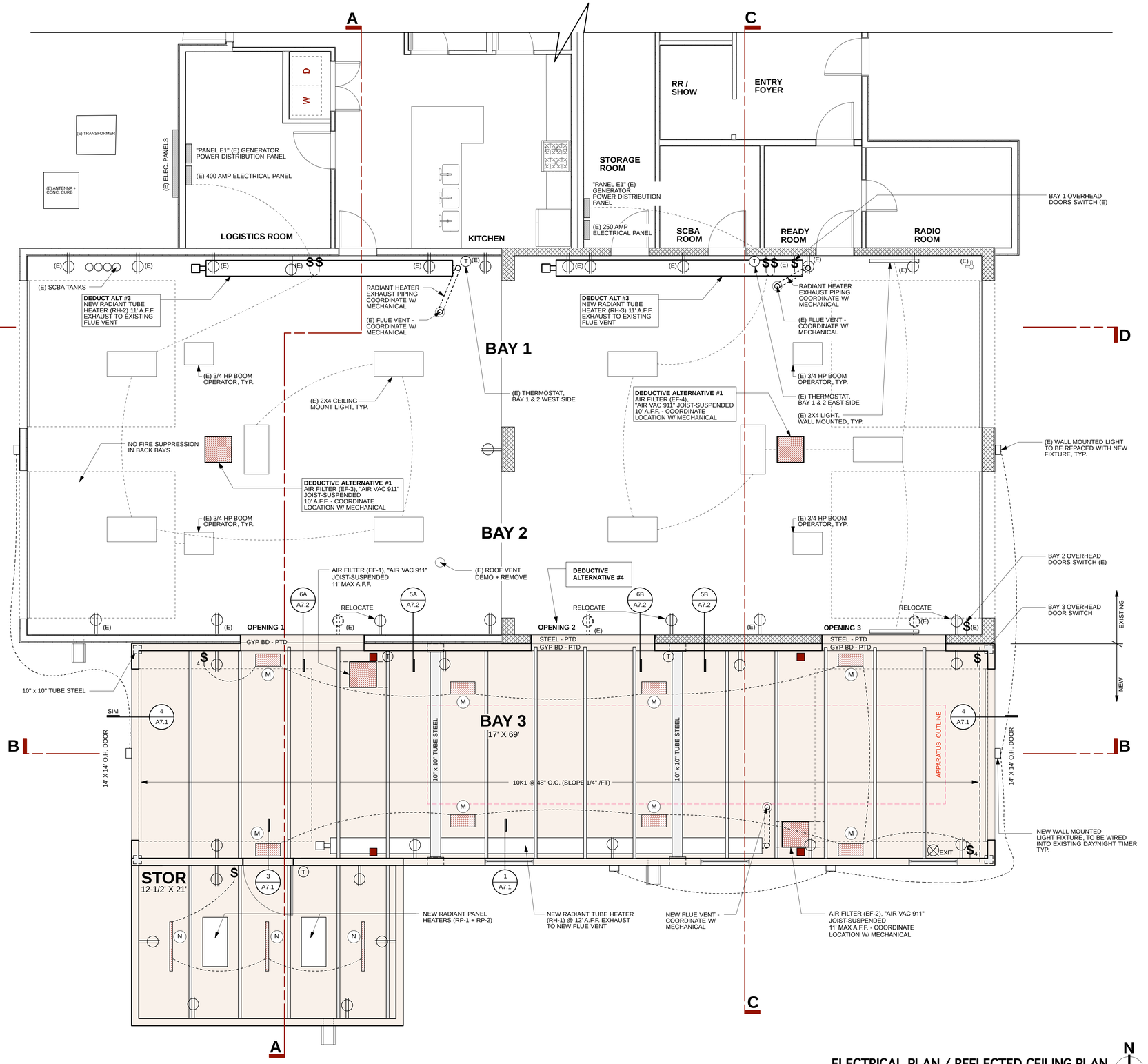

ELECTRICAL PLAN / REFLECTED CEILING PLAN
1/4" = 1'-0"

LEGEND

- NEW 1X2 LED CEILING MOUNT LIGHT. TYP.
- ELECTRICAL PANELS (E)
- FIRE SUPRESSION SPRINKERS
- INFRARED SWITCH @ 8' A.F.F., TURNS ON HVAC AND LIGHTS
- THERMOSTAT SWITCH
- EXIT SIGN

RCP NOTES

1. ALL NEW BAY / NEW STORAGE LIGHTS TO BE MOTION ACTIVIATED, WITH OVERRIDE SWITCHES AT EACH END OF NEW BAY / IN STORAGE ROOM.

2. AIR-VAC SYSTEMS TO BE MOTION ACTIVATED UPON VEHICULAR MOVEMENT, AND/OR UPON OPENING OF NEW BAY DOORS, WITH OVERRIDE SWITCHES AT EACH END OF NEW BAY; 5 MIN. TIMER, AUTO SHUT OFF AFTER ACTIVATION.

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SIGNAGE

ALUMINUM THREE DIMENSIONAL LETTERS, FONT, "HELVETICA". BRUSH FINISH.

EL DORADO FIRE AND RESCUE 12" HIGH
MAIN STATION NO. 1 10" HIGH

REFER TO "EAST ELEVATION" SHEET A5.1

TRUCK DATA

TOWER ENGINE: 42'L x 10'W x 11'H, 2005 SUTPHEN 70' CUSTOM MINI TOWER (52,500 LBS).

WILDLAND ENGINE: 23'4"L x 8'2"W x 7'2"H, 2014 FORD F550 WITH KME TYPE 6 WILDLAND FIRE ENGINE BODY (42,000 LBS).

FINISH / MATERIAL SCHEDULE

ITEM	DESCRIPTION	REMARKS
PTD-1	**WALLS / CEILING - "WHITE" PAINTED 5/8" GYP BOARD FINISH - TBD**	
PTD-2	**EXISTING OVERHEAD DOORS - MATCH COLOR OF NEW DOORS.** "INDUSTRIAL BROWN"	
PTD-3	**CLEAR SEAL FINISH** - LOW LUSTER CLEAR MASONRY SEAL (@ CMU BLOCK BASE).	
CONC.-1	**EPOXY FINISH** - CONCRETE FLOORS TO BE GROUND AND CLEANED. ANY CRACKS OR GAPS TO BE FILLED WITH AN EPOXY FILLER. CONCRETE FLOORS TO HAVE NEW EPOXY FINISH.	
STUCCO-1	**CEMENTITIOUS, 3-COAT, W/ KRAK-MASTER, MATCH EXISTING COLOR, "TAN" BY EL REY - OR EQUAL**	
METAL-1	**PARAPET CAPS, DOWNSPOUTS, SCUPPERS - MATCH EXISTING "TAN"**	

DOOR SCHEDULE

ITEM	QTY.	SIZE	TYPE	SWING	LATCH SET	REMARKS
1	1 EA	(1) 14'-0" wide x 14'-0" high	OVERHEAD SECTIONAL	-	-	**"OVERHEAD DOOR"**, 592 SERIES, STEEL, INSULATED (R=17.5), "INDUSTRIAL BROWN" *OPTION:* ***"RAYNOR"**, TC-200, 24 GA, INSULATED (R=10.25), "BRONZETONE"*
2	1 EA			-	-	
3	1 EA	(1) 3'-0" X 7'-0"	FLUSH STEEL	-	ENTRY LEVER + DEADBOLT	**"BALDWIN"** HARDWARE - KEYED TO MATCH EXISTING
4	1 EA	(1) 4'-0" X 7'-0"		-		

DOOR NOTES

1. ALL DOORS TO HAVE PROPER CLOSERS AND OPERATING RESISTANCE - TO COMPLY WITH CODE REQUIREMENTS.
2. FOR KEYING COORDINATION OF SANTA FE COUNTY FIRE DEPARTMENT - CONTACT:

TERRITORIAL KEY, LOCK + SAFE
1005 S St Francis Dr # 109, Santa Fe, NM 87505
(505) 982-8471

WINDOW SCHEDULE

ITEM	QTY.	SIZE	TYPE	REMARKS
A	4 EA	4'-0"W x 2'-0"H	- METAL CLAD WD. - FIXED	"PELLA WINDOW + DOOR", OR APPROVED EQUAL EXTERIOR FINISH: "PUTTY" OR SIMILAR TO MATCH / AUGMENT STUCCO INTERIOR FINISH: PRIMED PINE, PTD-1 - LOW-E GLASS

WINDOW NOTES

NA

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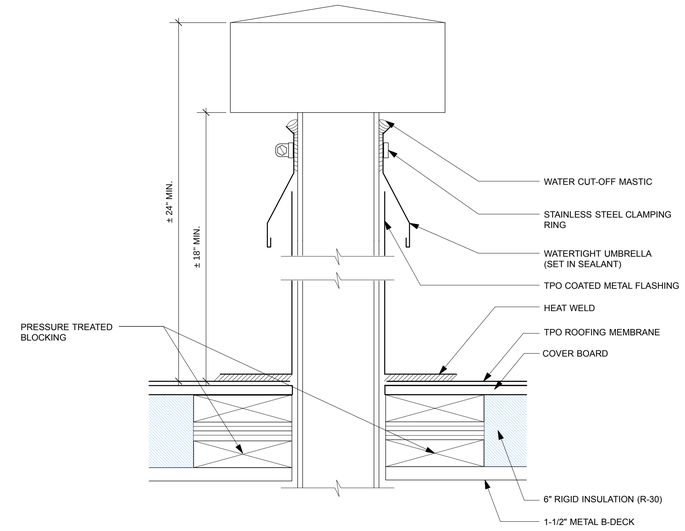
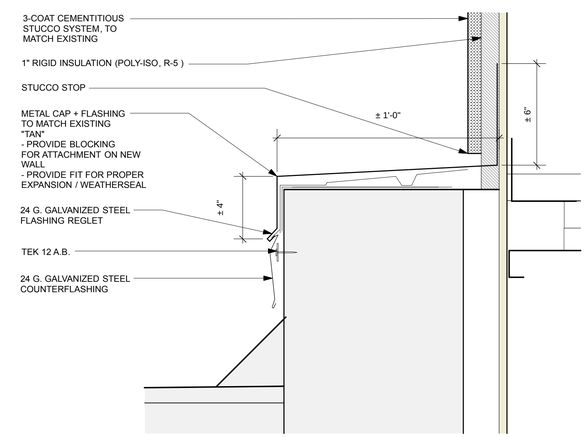
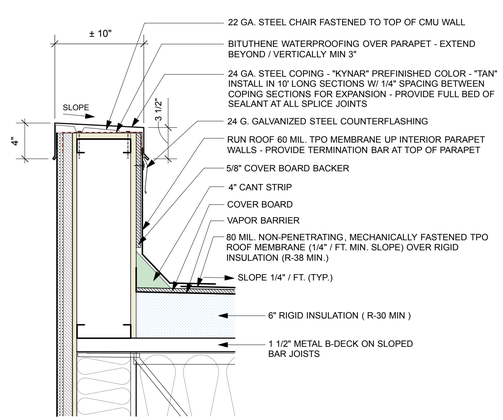
A9



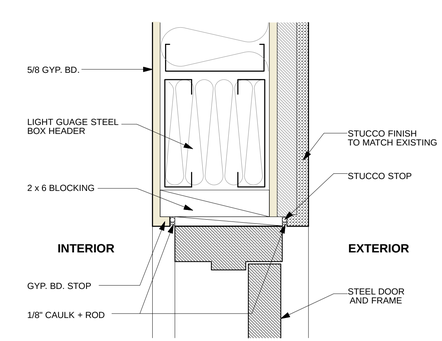
TYPICAL FLUE VENT AND PIPE DETAIL
3" = 1'-0"
3 A10.1



METAL CAP AND FLASHING DETAIL @ EXISTING TO NEW
3" = 1'-0"
2 A10.1



TYPICAL PARAPET AND ROOFING DETAIL
1 1/2" = 1'-0"
4 A10.1



HEAD JAMB DETAIL @ NEW EXTERIOR DOOR
3" = 1'-0"
1 A10.1

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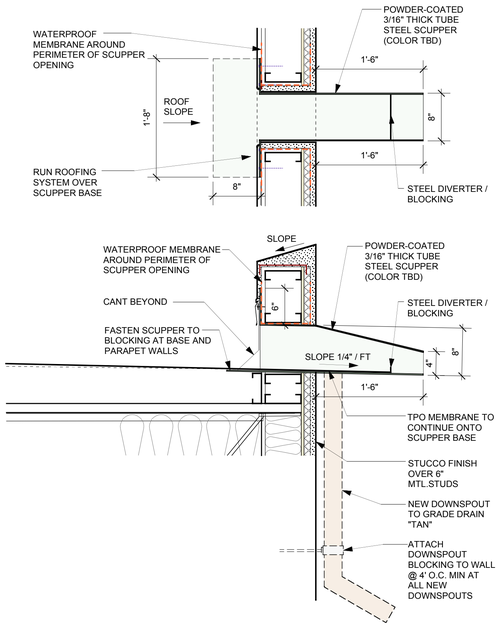
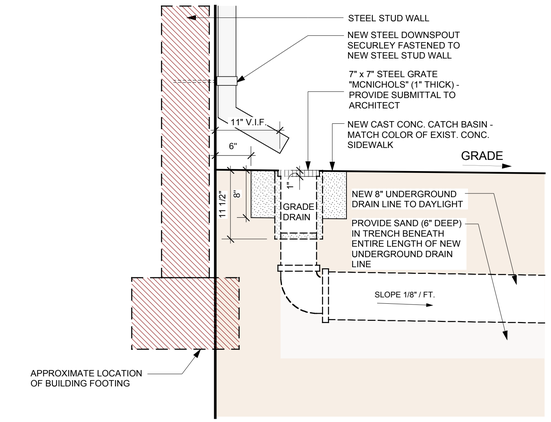
A10.1



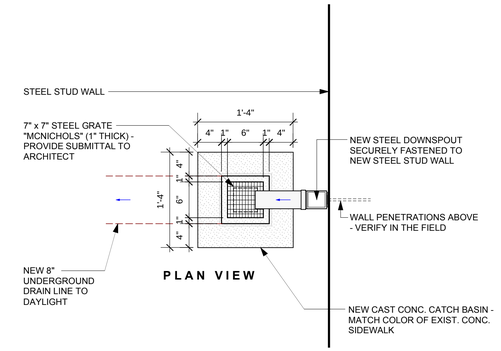
SCUPPER + DOWNSPOUT DETAIL

1" = 1'-0"

8 / A10.2



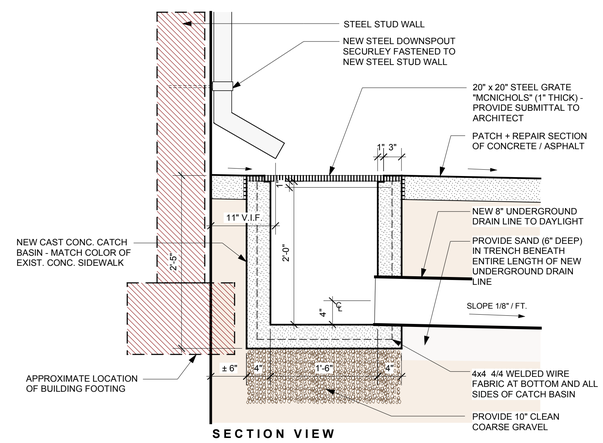
SECTION VIEW



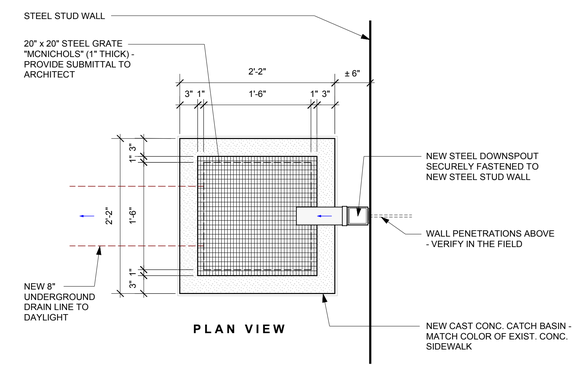
DETAILS - 8" GRADE DRAIN W/ STEEL GRATE

1" = 1'-0"

7 / A10.2



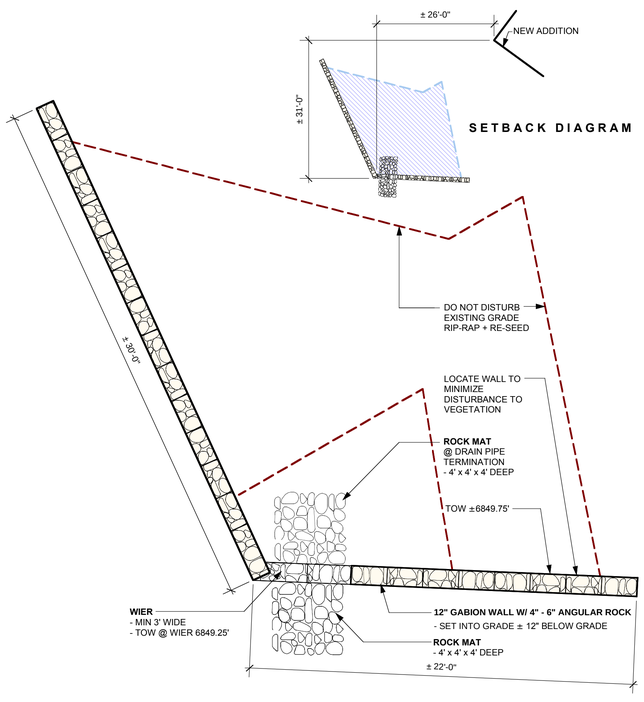
SECTION VIEW



DETAILS - 24" CONCRETE GRADE DRAIN W/ STEEL GRATE

1" = 1'-0"

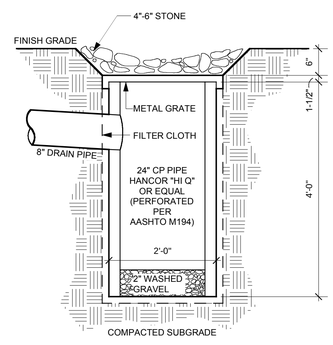
6 / A10.2



CHECK DAM DETAIL

NTS

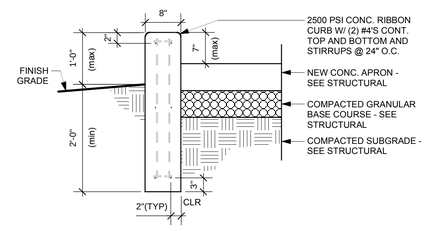
5 / A10.2



DRYWELL SECTION / DETAIL

3/4" = 1'-0"

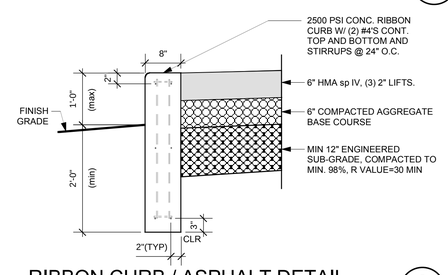
4 / A10.2



RIBBON CURB / CONC. APRON DETAIL

3/4" = 1'-0"

3 / A10.2



RIBBON CURB / ASPHALT DETAIL

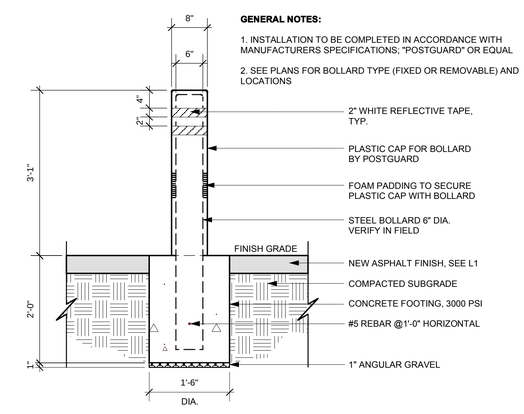
3/4" = 1'-0"

2 / A10.2

GENERAL NOTES:

1. INSTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURERS SPECIFICATIONS; "POSTGUARD" OR EQUAL

2. SEE PLANS FOR BOLLARD TYPE (FIXED OR REMOVABLE) AND LOCATIONS



BOLLARD DETAIL / SECTION

3/4" = 1'-0"

1 / A10.2

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STRUCTURAL OUTLINE SPECIFICATIONS FOR EL DORADO FIRE STATION ADDITION

I. DESIGN CRITERIA & GENERAL NOTES

A. Design Codes and Manuals:
1. 2015 International Building Code (IBC)
2. ASCE 7-10, Minimum Design Loads for Buildings and Other Structures
3. AISC Manual of Steel Construction, Latest Edition
4. ACI 318-14, Building Code Requirements for Reinforced Concrete
5. ACI 530-13, Building Code Requirements for Masonry Structures
6. American Society for Testing and Materials (ASTM)
7. American Wood Council, National Design Specification for Wood Construction 2015
8. American Welding Society (AWS) D1.1, "Structural Welding Code - Steel", Latest Edition.
9. American Welding Society (AWS) D1.3, "Structural Welding Code - Sheet Steel", Latest Edition.

B. VERTICAL DESIGN LOADS:
1. Live Roof Loads
   a) Roof.....20 PSF
2. Snow Loads
   a) Roof Snow Load.....30 PSF
      (1) Ground Snow Load, pg.....30 PSF
3. Dead Loads
   a) Roof.....15 PSF
      (1) Future PV at Bay 3.....15 PSF

C. HORIZONTAL DESIGN LOADS:
1. Wind Loads
   a) Risk Category II
   b) Exposure "C"
   c) Ultimate Design Wind Speed (V) - (3 SECOND GUST) - 115 MPH
   d) Design Wind Pressures for Components and Cladding:
      (1) Roof:
         (a) Zone 1. p = -26.42 psf / +16.63 psf
         (b) Zone 2. p = -45.93 psf / +16.63 psf
         (c) Zone 3. p = -68.00 psf / +16.63 psf
      (2) Roof Overhang:
         (a) Zone 2. p = -58.21 psf
         (b) Zone 3. p = -94.90 psf
      (3) Walls:
         (a) Zone 4. p = -31.31 psf / +28.86 psf
         (b) Zone 5. p = -38.65 psf / +28.86 psf
      (4) Effective Wind Area = 10 sf
2. Seismic Loads
   a) IBC Site Classification "D"
   b) Risk Category II
   c) Seismic Importance Factor: 1.0
   d) Mapped Spectral Response Accelerations
      (1) Short period: Ss = 0.428
      (2) 1 Second period: S1 = 0.129
   e) Spectral Response Coefficients
      (1) Short period: SDs = 0.416
      (2) 1 Second period: SD1 = 0.197
   f) Seismic Design Category: "C"
   g) Basic Seismic-Force-Resisting System
      (1) Storage/E-W Bay: Light framed walls sheathed with wood structural panels rated for shear resistance
      (2) N-S Bay: Steel system not specifically detailed for seismic resistance
   h) Seismic Response Coefficient
      (1) Storage/E-W Bay: Cs = 0.064
      (2) N-S Bay: Cs = 0.1387
   i) Response Modification Factor
      (1) Storage/E-W Bay: R = 6.5
      (2) N-S Bay: R = 3
   j) Analysis Procedure Used = Equivalent Lateral Force Procedure

D. GENERAL NOTES
1. Drawings
   a) Do not scale drawings.
   b) See architectural, mechanical, electrical and plumbing drawings for exact location and arrangement of any pads, support frames, etc., required for mechanical and electrical equipment and not with other trades concerning plates, anchors, notches, etc., to be placed in concrete.
   c) Any conflict between the structural drawings and specifications, and/or other discipline plans and/or specifications shall be brought to the attention of the architect prior to proceeding with the work affected.
   d) Contractor shall verify all edge form setting dimensions as well as the location of elevation changes, off-sets, brick ledges, and block-outs with other disciplines and notify this office of any discrepancies that may exist prior to commencing construction.
2. OPENINGS
   a) Openings, sleeves, etc. to be placed through any structural member shall first be approved by the structural engineer. Sleeves shall be provided for openings prior to placing of concrete. Cutting of hardened concrete shall not be permitted except by special structural approval which will be on an individual basis.
3. EXISTING STRUCTURES
   a) Contract documents have been prepared using available drawings and site observations as permitted by access restrictions during design.
   b) During construction, the contractor may encounter existing conditions which are not known or are at variance with project documentation. Contractor shall notify the architect of all conditions not per the contract documents, including but not limited to:
      (1) Sizes and dimensions other than those shown.
      (2) Damage or deterioration to materials and components
      (3) Conditions of instability or lack of support.
      (4) Items noted as existing on the drawings, but not found in the field.
   c) Prepare dimensional drawings of all discovered items.
   d) Contractor shall field verify all existing structural conditions prior to submitting shop drawings.
   e) Submit a dimensioned drawing of all new openings through existing structure and secure approval prior to cutting. Drawing shall show vertical and horizontal location and size of proposed opening(s).
4. The contractor shall provide all measures necessary to protect the structure during construction. Such measures shall include, but not be limited to bracing and shoring for loads due to hydrostatic, earth, wind or seismic forces, construction equipment, etc. Observation visits to the site by the structural engineer shall not include inspection of the above items.
5. Cost of additional field and office work necessitated by requests by the contractor for an option of due to errors or omissions in construction shall be borne by the contractor. Options are for contractor's convenience, he shall be responsible for all changes necessary if he chooses an option and he shall coordinate all details.

E. Foundation Notes
1. Geotechnical engineering study and recommendations for this project has been performed by Geo-Test, INC, job number 1-80906, dated October 29, 2018 and Addendum 1, dated January 30, 2019.
   a) Important additional information concerning specific soil conditions is contained in this report and shall be reviewed prior to the start of construction.
   b) Design is based on recommendations provided by the geotechnical engineering study:
      (1) Allowable soil Bearing Pressure = 2000 psf
      (2) Frost Depth / Minimum Exterior Footing Embedment = 24"
   c) Requirements for granular base and capillary (vapor) barriers is specified in this report. Areas where the capillary barriers are required shall be coordinated with the architect prior to construction. The barrier shall have a minimum thickness of 10 mils and shall conform to the requirements of ACI 302.1R-04
   d) Contractor shall be responsible for providing positive water drainage away from structures, during and after construction.
      (1) It is important to understand that the performance of the foundation is linked directly to the consistency of the moisture content in the soil. The geotechnical engineering study provides recommendations for natural ground preparation, remedial earthwork, drainage, grading, and landscaping.
2. The geotechnical engineering study contains specific requirements concerning clearing and grubbing, site, subfloor and bearing surface preparation, structural fill requirements, compaction requirements, and drainage and sloping requirements not necessarily shown on these drawings. Refer any conflicts between these drawings and the report to the architect for direction prior to beginning any work.
   a) The contractor shall engage and bear the cost of a geotechnical engineer or designated representative to monitor site preparation, foundation construction and retaining wall construction. The geotechnical engineer shall provide continuous on-site observation by experienced personnel during construction of controlled earthwork. The contractor shall notify the geotechnical engineer at least two working days in advance of any field operations of controlled earthwork or of any resumption of operations after stoppages. Tests of fill materials and embankments shall be made in accordance to the recommendations for observation and testing provided within the geotechnical recommendations, and at the following suggested minimum rates:
      (1) At least one moisture-density (proctor) test, atterberg limits test, and percent finer than #200 sieve test should be performed per each subgrade soil type and engineered fill material. The geotechnical engineer must review the test results for conformance with specifications and approve of fill materials and their intended use, prior to construction.
      (2) A minimum of one field density and moisture test should be performed per 2000 square feet of building pad fill or pavement subgrade per each 1 foot of compacted fill thickness (or at least one test per each 1 foot of compacted fill thickness in each area worked per day if smaller sections).
      (3) A minimum of one field density and moisture test should be performed per 50 linear feet of foundation excavation bottom prior to placement of reinforcing steel and concrete (or at least one test per area worked per day if smaller sections).
      (4) A minimum of one field density and moisture test should be performed per 100 linear feet of retaining wall backfill and/or utility trench backfill per each 1 foot of compacted fill thickness (or at least one test per each 1 foot of compacted fill thickness in each area worked per day if smaller sections).

II. QUALITY ASSURANCE & STATEMENT OF SPECIAL INSPECTION

A. The contractor shall engage qualified independent inspectors to implement special inspection. Special inspection shall conform to the IBC, chapter 17.

B. After each inspection and test, promptly submit copy of laboratory report to owner, architect/engineer, and to contractor. Report shall include:
   1. Date issued, Project title and number, Name of inspector, Date and time of sampling or inspection, Identification of project specifications section, Location of project, Type of inspection or test, Date of tests, Results of tests, Conformance with contract documents

C. Required inspections:
1. Soils - as outlined in Outline Specifications Section titled "Foundation Notes"
2. Concrete - as outlined in the Outline Specifications Section titled "Structural Concrete"
   a) Installation of embedded bolts and plates supporting structure
   b) Reinforcing steel placement
   c) Field bending of reinforcing steel
   d) Reinforcing couplers
   e) Anchored rebar or threaded rods into hardened concrete
3. Wood & Cold-Formed Steel
   a) Hold down anchors/strap ties
   b) Shear wall/diaphragm fastening
   c) Metal connectors
4. Steel - as outlined in Outline Specifications Section titled "Structural Steel"

D. Special inspection is to be provided in addition to inspections conducted by the building department and shall not be construed to relieve the owner or his authorized agent from requesting the period and called inspections required by section 1704 of the International Building Code.
   1. Periodic inspection is defined as the part-time or intermittent observation of work requiring inspection by an approved inspector who is present in the area where the work has been or is being performed at the completion of work.
   2. Special inspection is required for the following:
      a) Steel construction
         (1) High strength bolts.....periodic
         (2) Welding.....periodic
         (3) Structural Steel & Cold-Formed Steel Deck.....periodic
      b) Concrete construction
         (1) Reinforcing steel.....periodic
         (2) Bolts installed prior to and during concrete placement.....periodic
         (3) Mix design(s).....periodic
         (4) At the time fresh concrete is sampled.....periodic
         (5) Inspection of concrete placement.....periodic
         (6) Inspection for maintenance of specified curing techniques.....periodic
      c) Special case
         (1) Expansion or adhesive anchor.....periodic

III. SHOP DRAWING SUBMITTAL

A. Contractor to submit to Structural Engineer:
1. Concrete Mix Designs
2. Structural Steel
3. Reinforced Masonry
4. Cold-Formed Metal Framing
5. Steel Joist Framing
6. Steel Deck
7. Reinforcing Bars

B. All shop drawings and submittals must be reviewed and stamped by the contractor prior to submittal. Shop drawings and submittals shall be accompanied by sealed calculations as required by the specifications. No fabrications shall proceed before shop drawings covering that work have been approved. Allow at least 10 days for shop drawing review.

IV. STRUCTURAL CONCRETE

A. All concrete edges shall be chamfered 3/4" on exposed corners unless otherwise noted.

B. Basis for design, strength at 28 days:
1. Unless indicated otherwise, all concrete shall be ready- mixed concrete with standard stone aggregate (144 PCF).
2. Air entrainment shall conform to the requirements of ACI 318-14 Table 19.3.3.1
3. Structural design is based upon ACI 318-14 and construction shall conform to ACI 301 and ACI 302, latest edition(s).
   a) F'c = 4000 psi (normal weight, air entrained)
      (1) Exposed concrete flatwork, Footings, Tie beams, Stem walls, Grade beams.
   b) F'c = 3000 psi (normal weight)
      (1) All interior slabs-on-ground.
   c) F'c = 4000 psi (normal weight)
      (1) All other concrete
   d) F'c = 6000 psi non-shrink grout for placement under column base plates.
      (1) Grout to comply with ASTM C1107. Non-shrink flowable grout shall be used under base plates with shear lugs.
4. Unless otherwise indicated, concrete cover shall be:
   a) Foundations.....3"
   b) Grade Beams.....3"
   c) Masonry.....Centered
   d) Columns (Vertical Reinf.) .....2"
   e) Slabs (Not exposed to weather) .....3/4"
   f) Slabs (Exposed to weather) .....1 1/2"

C. REINFORCING STEEL
1. Deformed Bars.....ASTM A615 / Grade 60
2. Welded Wire Fabric.....ASTM A185
3. Placing of reinforcing shall conform to CRSI, latest edition.
4. All reinforcing shall be held securely in position with standard accessories during placing of concrete.
5. Slab and beam bolsters and hi-chairs shall have vinyl-tipped turned-up legs where soffits/underside of slab is exposed.
6. All field bending of reinforcing shall be done cold. Heating of bars will not be permitted.
7. Unless otherwise indicated, splice reinforcing as follows:
   a) Reinforcing Bars.....48 Bar Diameters
   b) Welded Wire Fabric.....6"

D. SLAB-ON-GROUND CRITERIA
1. Strict adherence to the specified water-to-cement ratio of 0.45 is required. Water shall not be added to the mix at the time of placement.
2. Shrinkage shall not exceed 0.02% per ASTM C 157 at 28 days. Shrinkage-compensating concrete shall conform to the recommendations of ACI 223.
3. Moist curing of slabs-on-ground is required.
4. Care shall be taken to prevent water intrusion into the subgrade both prior to and after slab pours.
5. Contraction joints (control joints) shall be installed on all concrete slabs on grade. Verify locations of all joints with Architect prior to placing concrete. The joints shall be spaced no further than 36 times the slab thickness or 15 ft. L or T shapes be avoided when placing crack control joints. If the shape of the area contained by the crack control joints is not square, the aspect ratio of this area should not exceed 1.5 to 1. The control joints should be placed such that they are continuous and not staggered or offset. Placement shall be in accordance to ACI 302.1.
   a) Timing of early entry slab saw cuts is critical to slab curing performance. Saw cuts for control joints (contraction joints) shall be made at the earliest possible time that the concrete will support the weight of saw cutting equipment and operations. Timing of early entry saw cuts shall vary between 1 hour in hot weather and 4 hours in cold weather. Early entry dry cut saws shall use a skid plate to prevent spalling.
   b) Early entry dry cut saw should be 1 inch into the depth of the slab. The slab shall be cut to ¼ of the slab depth to deepen the 1 inch nominal early entry saw cut within 24 hours.
   c) A construction or smooth doweled saw cut contraction joint shall be placed at a maximum of 125 ft.
   d) All joints shall be filled to the full joint depth with semi-rigid joint filler in areas exposed to vehicular traffic. Overfill joint and trim joint filler flush with top of joint after hardening.
6. Concrete containing air-entraining admixture shall not be trowel finished.

E. CONCRETE PLACEMENT & TESTING
1. Unless otherwise indicated, five test cylinders shall be made every fifty cubic yards of concrete or fraction thereof on each day's pour. One cylinder shall be tested at 7 days and three at 28 days. The remaining cylinder shall be held in reserve as a spare. The making and testing of cylinders shall be conducted by an approved testing laboratory; contractor shall bear the cost of testing.
   a) Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
   b) Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
4. Maintain ALL reinforcement in position on chairs during concrete placement.

F. COLD WEATHER CONCRETING
1. All cold weather concrete work shall meet the requirements of ACI Committee 306, latest edition for cold weather concreting, if, for 3 consecutive days the average daily temperature drops below 40°F and stays below 50°F for more than one-half of any 24 hour period.
2. Do not use frozen materials containing ice or snow.
3. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
4. The use of calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators is not permitted; contractor shall utilize a high early strength mix design.

G. HOT WEATHER CONCRETING
1. All hot weather concrete work shall be in accordance with ACI 301. Maintain concrete temperature below 90°F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

H. EMBEDDED CONDUIT
1. Embedded conduits and/or pipes shall not be installed in slabs or columns, unless approved by the structural engineer, prior to construction.
2. Conduits and/or pipes shall be protected against rusting. Aluminum conduits and/or pipes shall not be embedded in concrete.

V. REINFORCED MASONRY

A. Unit design and construction per National Concrete Masonry Association.

B. Concrete Masonry Units.....ASTM C90
   1. Design Masonry Compressive, f'm.....1,500 PSI

C. Mortar shall be type "M" or "S"
   1. Type "M" = 2500 PSI at 28 days
   2. Type "S" = 1800 PSI at 28 days

D. Grout for reinforced masonry - f'C = 3,000 PSI @ 28 days. Grout to be an 8 bag mix per cu. yd. with 8" to 9" slump.

E. All masonry shall installed in a running bond patter unless otherwise noted on structural drawings.

F. All cells containing reinforcing steel shall be grouted solid.

G. Foundation dowels shall be provided to match all vertical steel locations in masonry walls,and shall allow for a splice length of 48 bar diameters.

H. All steel shall be braced against movement prior to grouting by bar positioners or an approved alternate.

I. Blocks should not be moistened before grouting.

J. All masonry head joints or end joints must be filled solidly with mortar for a distance in from the face of the wall not less than the thickness of the longitudinal face shells.

K. To insure proper placement of grout in vertical cells, cross webs must be fully bedded on mortar thus minimizing leakage.

L. The minimum continuous unobstructed cell area must not be less than 2" x 4" = 8 in. sq. and mortar fins must be removed before grouting.

M. Mortar droppings must be kept out of cells which are to be grouted.

N. Clean out holes are not required unless grouting is done in more than 4'-8" lifts.

O. Bars need not be tied at splices but should be separated by not less than the nominal diameter of the bar, nor less than 1 in.

P. All vertical reinforcement shall be in place and secured with bar positioners prior to grouting.

Q. All grout to be puddled or rodded to insure cells are completely filled.

R. Grout placement stopped for one hour or more should be stopped 1 1/2" below the top of the masonry unit to provide key for subsequent grouting.

S. Reinforcing steel = A615, Grade 60.

T. High lift grouting, in heights of 4'-8" or more, in hollow masonry units, cleaning holes shall be provided at all cores containing vertical reinforcement.

U. Single-Wythe walls, provide ladder type horizontal joint reinforcing with 9 gauge, side and cross rods at every course. (Dur-O-Wall Ladur Type or Equal)

V. Double-Wythe walls, provide ladder type horizontal joint reinforcing with 3/16" double wire eyes spaced at 16" o.c. with 3/16" wire pintels. (Dur-O-Eye Ladur Type or Equal)

W. Test grout per ASTM 1019.

X. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

Y. Vertical control joints shall be installed at 20' o.c. or within 15' of corner, UON. Coordinate locations of all control joints with Architect prior to installation.

Z. All field bending of reinforcing shall be done cold. Heating of bars will not be permitted.

VI. STRUCTURAL STEEL

A. Work shall conform to all applicable codes and specifications and in accordance with the American Institute of Steel Construction Specifications, latest edition, the AWS D1.1 and ASTM A-36, latest edition.

B. Structural steel shall conform to the American Institute of Steel Construction Specifications:
   1. Hot rolled shapes, must conform to the requirements of ASTM Specifications A-36, A-572 or A-992, with minimum yield of 36 or 50 ksi, respectively.
   2. Round HSS, must conform to the requirements of ASTM A-500 Grade B with minimum yield strength of 42 ksi.
   3. Rectangular HSS, must conform to the requirements of ASTM A-500 Grade B with a minimum yield strength of 46 ksi.
   4. Pipe sections must conform to the requirements of ASTM A53 with a minimum yield strength of 35 ksi.
   5. Steel for Cold-Formed sections must conform to the requirements of ASTM A-1011 or A-1039 Grade 55, or ASTM A-653 Grade 55 with minimum yield strength of 55 ksi.

C. Paint: steel shall be given primer coat of paint and at a rate to provide dry film thickness of not less than 1.5 mils. Field welds, bolts, nuts, abrasions, scrapes, etc., shall be primed after erection.

D. Welding electrodes: welding electrodes for manual shielding metal-arc welding shall conform to E60 or E70 series of the "specifications for mild steel arc-welding electrodes, ASTM A233. Bare electrodes and granular flux used in the submerged arc process shall conform to the provisions of the A15C, Section 1.173, or Part5."

E. Bolts, standard: Shall conform to ASTM A307.

F. Bolts, high strength: Shall conform to ASTM A490, or A325 as shown.

G. Grout for base plates shall be Embeco as manufactured by the Master Builders Company, or approved equal.

H. Provide 1/2" pre-molded expansion joint material where slab on grade is poured around columns unless otherwise shown.

I. Shop drawings shall indicate all structural steel layouts and details showing the type of steel used for each member, sizes of members, connection details, welds, bolts, etc., as required to fabricate and erect all structural steel framing and type of shop paint used conforming to that specified.
   1. Coordinate final column locations based on opening size architectural requirements for finishes.

J. All steel framing shall receive one shop coat of paint.

K. Responsibility for errors of detailing, fabrication and for the correct fit of all structural steel members in accordance with the contract drawings shall lie entirely with the subcontractor for fabrication.

L. Splices not shown on the drawings will not be permitted unless approved by the structural engineer.

M. Structural steel shall be erected in accordance with the AISC specifications and in accordance with the AISC Code of Standard Practice, latest edition.

N. Bolted field connections, unless otherwise noted, shall be standard framed beam connections, and made in accordance with specifications for structural joints using ASTM A-490 bolts, or A-325 bolts as shown.

O. Brace and maintain all steel in alignment until other parts of construction necessary for permanent bracing or support are completed. Install temporary guys and bracing to resist wind loading designated in applicable building code. The contractor is responsible for the stability of the steel frame until such time as all structural elements have been completed and building is enclosed.

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100% CD SET
4 FEB, 2019

REVISION	DATE

ENGINEER'S SEAL
Eric D. Trujillo, PE
New Mexico License
Number 21656

LTSE JOB # 1662

100%
CONSTRUCTION
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STRUCTURAL OUTLINE SPECIFICATIONS FOR EL DORADO FIRE STATION ADDITION

P. The owner shall engage an independent testing and inspection agency to inspect bolted and welded connections. If deemed necessary by the Structural Engineer; radiographic/ultrasonic/magnetic particle testing of structural welds.

Q. Fabricator and installer qualifications

1. A qualified fabricator or installer that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD.
   a) In lieu of participation in the AISC Quality Certification Program or AISC-Certified, the fabricator/erector may employ the services of an approved independent qualified inspector for structural steel. Inspector qualifications and special inspections shall conform to the requirements of the International Building Code, Chapter 17 and shall be in accordance with AWS D1.1.

CARPENTRY

A. Dimensional lumber shall conform to the grading standard of the Western Wood Products Association (WWPA), surface dry, seasoned 90 days, and 19 percent maximum moisture content.

1. Wood-Preservative-Treated Lumber shall be utilized as follows:
   a) Items in contact with concrete or masonry.
   b) Framing less than 18" above ground in crawlspaces.
   c) Floor plates installed over concrete slabs-on-grade.
2. Preservative Treatment: AWPA C2 with chemicals containing no arsenic or chromium.
   a) AWPA C31 inorganic boron may be used in protected locations.

B. Wood Design Values

1. Hem Fir #2
   a) Fb = 850 psi, Ft = 525 psi, Fv = 150 psi, Fc = 1,300 psi, E = 1,300,000 psi
2. Wall sheathing shall be 7/16" O.S.B., Structural 1, blocked. Nailing pattern = 8d common nails @ 6" o.c. edges and 12" o.c. field, UON.
3. Plywood backing panels for telephone and electrical equipment.
4. All pre-fab connectors (Simpson, etc.) shall be fully fastened using type, size and quantity specified by the manufacturer. All exterior connectors shall be galvanized. General contractor to submit connection schedule to architect/engineer prior to installation.

C. FASTENING

1. All fastening to be in accordance with IBC Fastening Schedule Table 2304.10.1, UON.

. COLD-FORMED METAL FRAMING

A. All cold-formed metal framing shall be designed in accordance with "specifications for the design of cold formed steel structural members" as published by AISI, latest edition, and shall be formed from corrosion- resistant steel corresponding to the requirements of ASTM A446.

B. All cold-formed metal components are subject to wind load designs in accordance with the International Building Code 2009 - Wind pressure designs and shop drawings shall be signed and sealed by a structural engineer registered in the state of New Mexico and shall be submitted to the Architect for approval.

C. All welding shall conform to the provisions of AWS D1.1 and ANSI/AWS D1.3. Where the weld throat is not shown on the drawings, the weld throat shall be at least as large as the thickness of the thinnest sheet joined. All welds shall provide complete fusion of the sheets without "blowouts."

D. Fabricate steel-framing accessories from steel sheet, ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of same grade and coating weight used for framing members.

E. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

STEEL JOIST FRAMING

A. Steel manufacturer shall be a member of the Steel Joist Institute.

B. Steel joists shall conform to the requirements of the latest edition of the AISC Standard Specifications for Open Web Steel Joist series.

C. Verify the exact location of all mechanical openings with the mechanical contractor and the equipment to be used prior to fabrication of joists and headers.

D. Provide bottom chord ceiling extensions on all joists.

E. Between panel points of steel joist, the bottom chord shall not support over 50 lbs. vertical load without adequate reinforcing of bottom chord. No vertical load shall be imposed on bridging.

F. Unless otherwise noted, all steel bar joists shall be designed for a net wind uplift of 15 psf.

G. Handling and erection

1. Care shall be exercised at all times to avoid damage through careless handling during unloading, storing and erecting.
2. During the construction period, the contractor shall provide means for the adequate distribution of concentrated loads so that the carrying capacity of any Joist Girder is not exceeded.

STEEL ROOF DECK

A. Submittals

1. For each type of decking specified, including dimensions of individual components, profiles, and finishes.
2. Shop Drawings showing location of deck units, anchorage details, accessories specified on the contract documents, and other information required for a thorough review.
3. Product Certificates (if required) certifying that the supplied products comply with specified requirements
4. If mechanical fasteners are used, independent test reports or evaluation reports shall be provided by the fastener manufacturer

B. Comply with applicable provisions of the following specifications:

1. AISI S1 00-07 w/S2-1 0, North American Specification for the Design of Cold-Formed Steel Structural Members, Including Supplement 2 (February 201 0)
2. AWS 01.3:2008, Structural Welding Code-Sheet Steel ANSI/SOI RD-201 0, Standard for Steel Roof Deck
3. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved, and, if applicable, has undergone recertification.

C. Products

1. A manufacturer offering deck products to be incorporated into the work must be a member of the Steel Deck Institute

D. Materials:

1. Sheet steel for deck and accessories shall conform to ANSI/SOI RD - 20·10, Section 2.1.A, 2.1 .8 , 2.1C, and 2.1.0.
2. Steel deck and accessories shall be galvanized to G60 minimum in accordance with ASTM A653
3. The deck type and thickness shall be as shown on the plans.
4. The deck shall be selected to provide the load capacities shown on the drawings and as determined using the ANSI/SOI RD - 2010 construction loading criteria.
5. The deck shall be three span minimum.
6. The deck type provided shall be capable of supporting the superimposed live loads as shown on the plans.
7. Ridge and valley plates, flat plates at changes of deck direction, sump pans and side closures shall be the standard type provided by the deck manufacturer unless indicated otherwise on the plans
8. End laps shall be installed at all deck ends and shall occur over a joist. At interior positions, panels must be sufficiently overlapped to provide adequate end distances for the connector used. A minimum end distance for fasteners used should be one inch requiring an end lap not less than two inches. Within the system, end laps may be staggered or on a continuous line without particular effect on the diaphragm strength.

E. Execution

1. Examine support framing and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance of work of this section. All OSHA rules for erection must be followed.

F.Repairs

1. Before placement of roof insulation and roof covering, the deck shall be inspected for tears, dents or other damage that may prevent the deck from acting as a structural roof base. The need for repair of damaged deck shall be determined by the Architect or Engineer of Record based on structural performance, unless aesthetics have been specifically addressed in the contract documents

G. Construction Guidelines

1. Do not use deck units as a working platform or storage area until units are in position and permanently attached to the structure.
2. Construction loads must not exceed load carrying capacity of the deck.

XI. ENGINEERED WOOD PRODUCTS

A. Structural Composite Lumber

1. Structural composite lumber shall have a current product evaluation report from the International Code Council (ICC) Evaluation Services. Structural glued laminated timber (glulam) shall be manufactured per standard ANSI 190.1.
2. Structural composite lumber grades shall be as follows
   a) Boise Cascade
      (1) LVL, PSL (ESR 1040):
         (a) VERSA-LAM 1.7 2400
         (b) VERSA-LAM 1.7 2650
         (c) VERSA-LAM 2.0 2800
         (d) VERSA-LAM 2.0 3100

B. Engineered Wood Provisions

1. Contractor shall submit a complete set of design calculations and layout drawings prepared by the manufacturer for review and approval by the architect and project engineer.
2. Contractor shall be responsible for proper installation per detailed installation suggestions and guidelines of the manufacturer.
3. Contractor shall notify the project engineer prior to enclosing the beams and joists to provide opportunity for observation of the installation.
4. Manufacturer shall warrant all products specified to be free from manufacturing error or defects in workmanship and materials.
5. Temporary construction loads which cause stresses beyond the product's design limits are not permitted.
6. All framing hardware must be the type specified by the engineered wood products manufacturer for the product and approved by the hardware manufacturer for installation.
7. Joists and beams shall be erected and installed in accordance with the following:
   a) No building, structure, or part thereof, or any temporary support or scaffolding in connection therewith shall be loaded in excess of its designed capacity.
   b) Bracing.
      (1) Joists and beams shall be braced laterally and progressively during construction to prevent buckling or overturning.
      (2) The first member shall be plumbed, connected, braced and/or guyed against shifting before succeeding members are erected and secured to it.
      (3) The total system shall be adequately braced and stabilized to the foundation, to suitable anchors buried in the ground, or by other equivalent method(s).
      (4) Beams and other material being lifted and placed by cranes or other hoisting apparatus shall not be released from the crane or hoisting apparatus until the person detaching the load has verified that the load has been secured or supported to prevent inadvertent movement.
8. All engineered wood products shall be protected from the weather during construction.
9. Minimum bearing lengths shall be as specified per the design calculations. Bearing across the full width of the beam or joist is required.

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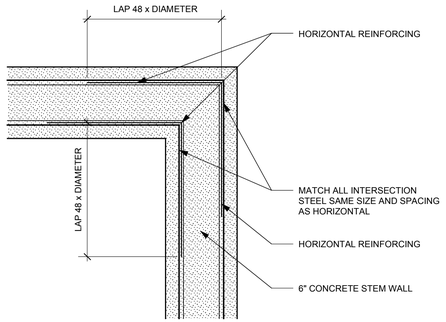
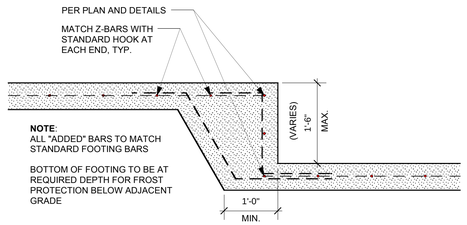


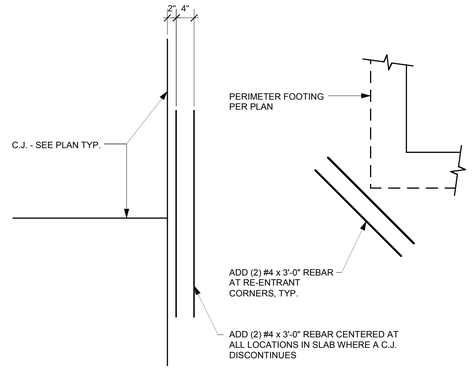
CORNER BAR REINFORCING AT FOOTING (13 / S2)

3/4" = 1'-0"



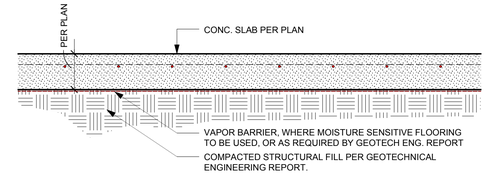
TYP. FOUNDATION STEP (12 / S2)

3/4" = 1'-0"



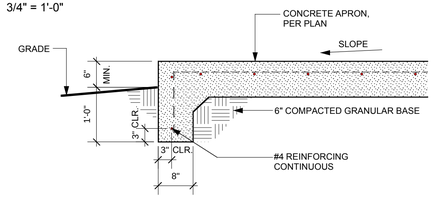
TYP. CRACK WIDTH CONTROL DETAIL (11 / S2)

3/4" = 1'-0"



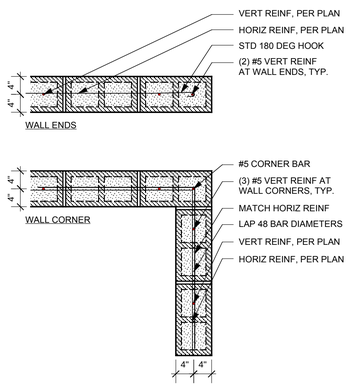
TYP. SLAB ON GOUND (10 / S2)

3/4" = 1'-0"



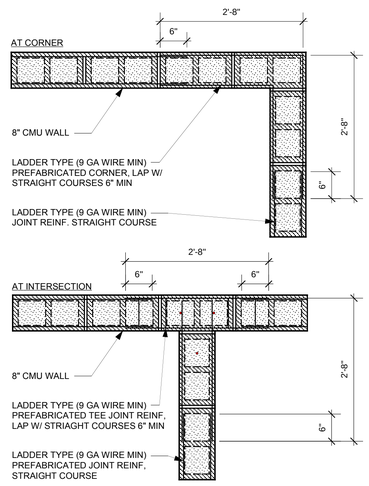
TYP. TURNDOWN FOUNDATION AT CONC. APRON (9 / S2)

3/4" = 1'-0"



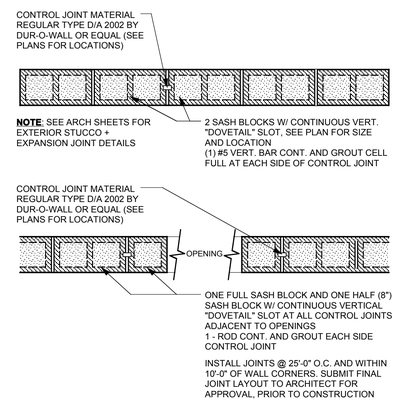
TYP. CMU CORNER AND END WALL REINFORCING (8 / S2)

3/4" = 1'-0"



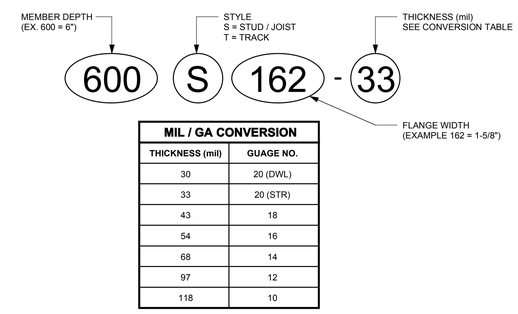
TYP. MASONRY JOINT REINFORCING (7 / S2)

3/4" = 1'-0"



MASONRY JOINT CONTROLS (6 / S2)

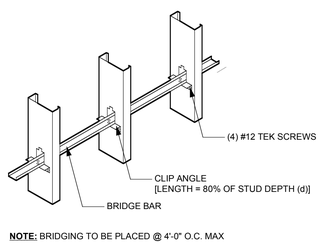
3/4" = 1'-0"



MIL / GA CONVERSION	
THICKNESS (mil)	GUAGE NO.
30	20 (DWL)
33	20 (STR)
43	18
54	16
68	14
97	12
118	10

METAL STUD DESIGNATIONS (5 / S2)

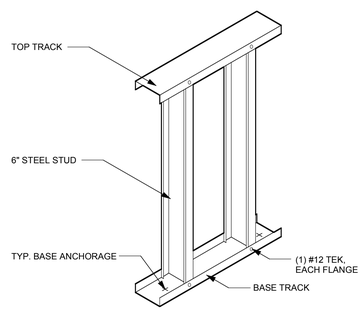
3/4" = 1'-0"



NOTE: BRIDGING TO BE PLACED @ 4'-0" O.C. MAX

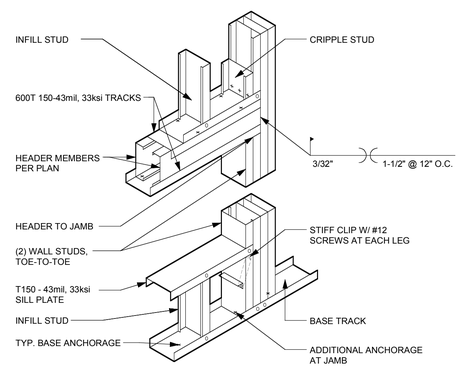
TYP. BRIDGING - COLD ROLLED CHANNEL (4 / S2)

3/4" = 1'-0"



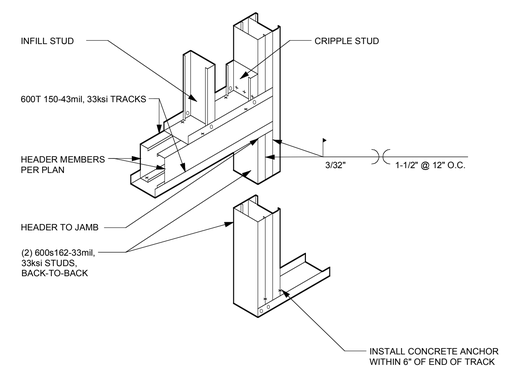
TYP. STUD TO TRACK FASTENING (3 / S2)

3/4" = 1'-0"



TYP. BOX HEADER @ WINDOW OPENING (2 / S2)

3/4" = 1'-0"



TYP. BOX HEADER @ DOOR OPENING (1 / S2)

3/4" = 1'-0"

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EL DORADO FIRE + RESCUE STATION NO. 1

APPARATUS BAY ADDITION

144 AVE VISTA GRANDE, SANTA FE, NEW MEXICO 87508

PROJECT: 18- 11

100% CD SET
4 FEB 2019

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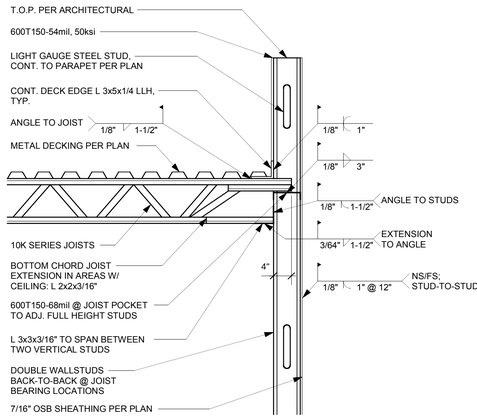
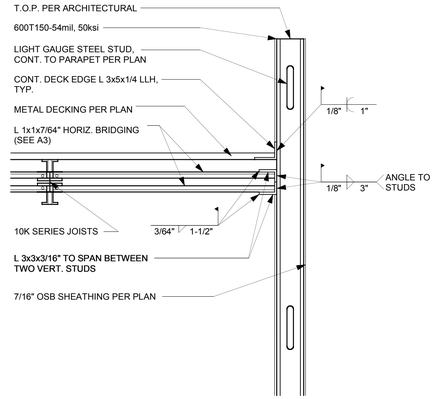
S2



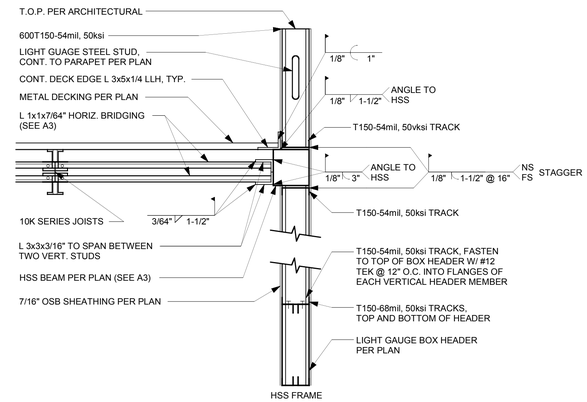
K SERIES JOIST BEARING ON LT GUAGE WALL (12 / S3)

3/4" = 1'-0"



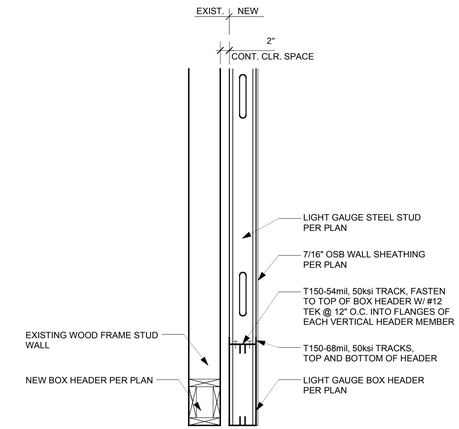
K SERIES JOIST PARALLELL TO EXTERIOR WALL (11 / S3)

3/4" = 1'-0"



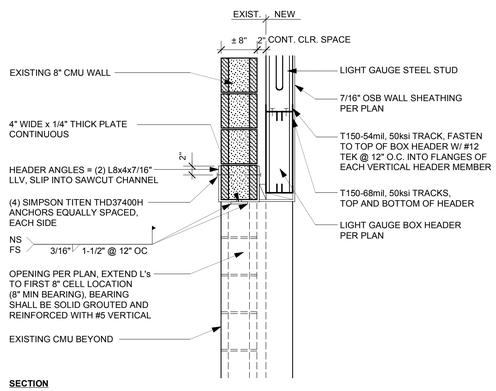
K SERIES JOIST PARALLELL TO HSS FRAME (10 / S3)

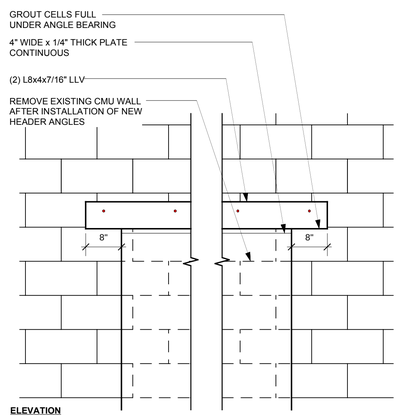
3/4" = 1'-0"



NEW HEADER AT EXIST. WOOD WALL / NEW LT GUAGE HEADER (9 / S3)

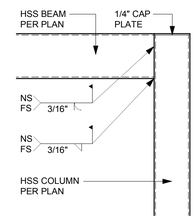
3/4" = 1'-0"





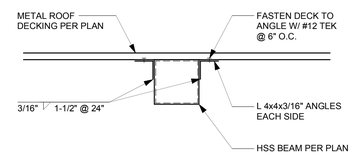
STEEL HEADER ANGLES AT NEW OPENING IN EXISTING MASONRY WALL (8 / S3)

3/4" = 1'-0"



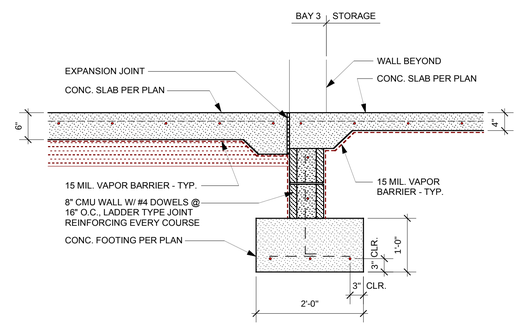
HSS BEAM TO HSS COLUMN CONNECTION (7 / S3)

3/4" = 1'-0"



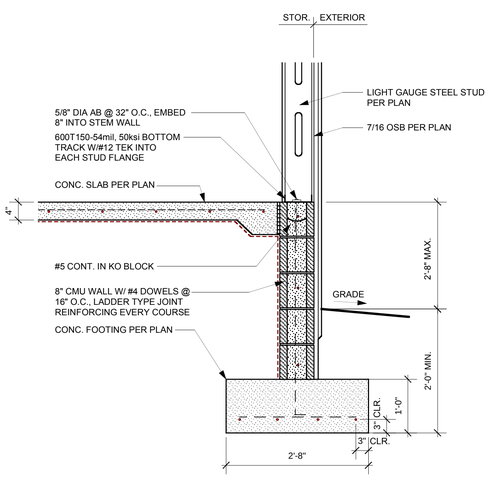
HSS BEAM TO ROOF DECK (6 / S3)

3/4" = 1'-0"



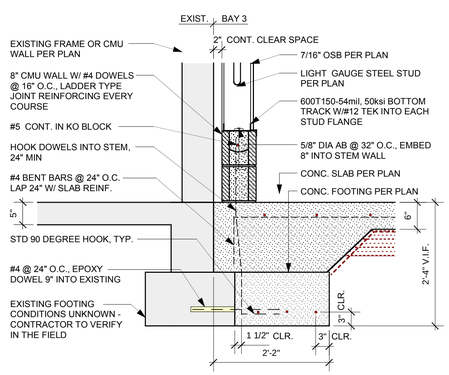
INTERIOR STRIP FOOTING, OPENING FROM BAY 3 TO STORAGE (5 / S3)

3/4" = 1'-0"



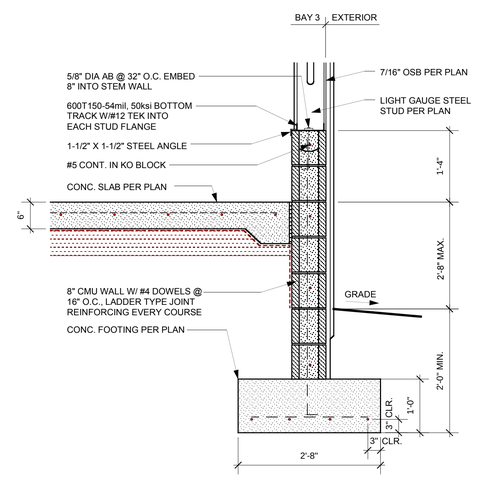
EXTERIOR STRIP FOOTING - STORAGE ROOM (4 / S3)

3/4" = 1'-0"



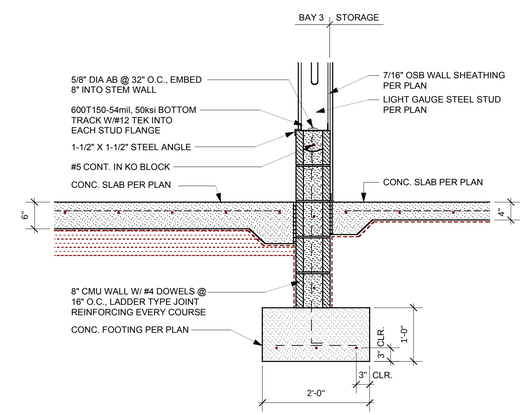
NEW FOOTING AT EXISTING BAYS TO NEW BAY (3 / S3)

3/4" = 1'-0"



EXTERIOR STRIP FOOTING - VEHICLE BAY (2 / S3)

3/4" = 1'-0"



INTERIOR STRIP FOOTING, W/ CMU WALL (1 / S3)

3/4" = 1'-0"

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EL DORADO FIRE + RESCUE STATION NO. 1

APPARATUS BAY ADDITION

144 AVE VISTA GRANDE, SANTA FE, NEW MEXICO 87508

PROJECT: 18- 11

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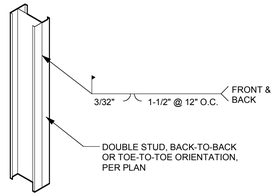
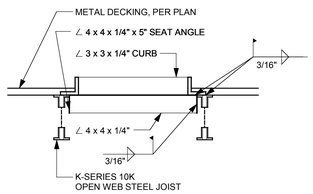
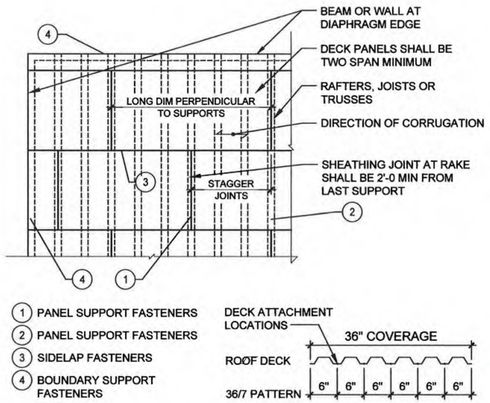
S3



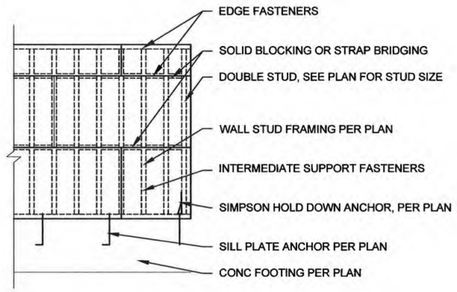
TYP. BUILT-UP STUD COLUMN (9 / S4)
3/4" = 1'-0"



TYP. ROOF PENETRATION (8 / S4)
3/4" = 1'-0"

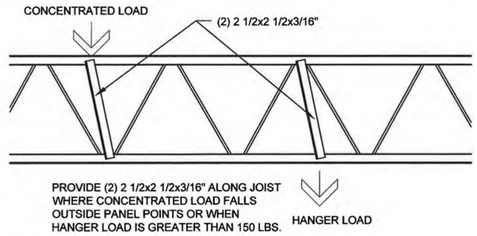


TYP. METAL DECK ROOF DIAPHRAM (TYPE B) (7 / S4)
3/4" = 1'-0"

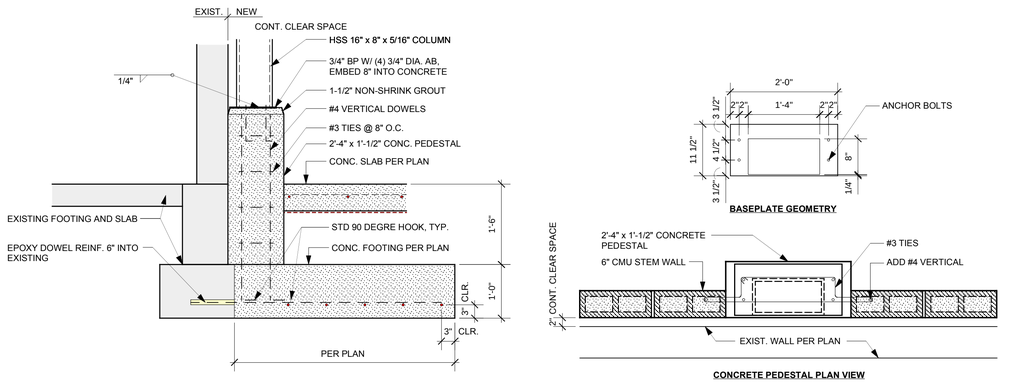


NOTE
1. SHEATHING SHALL BE 7/16" OSB
2. OSB SHEATHED WALLS TO HAVE SOLID BLOCKING BETWEEN FIRST TWO END STUDS
3. REFER TO PLANS AND DETAILS FOR FASTENER SIZE AND SPACING

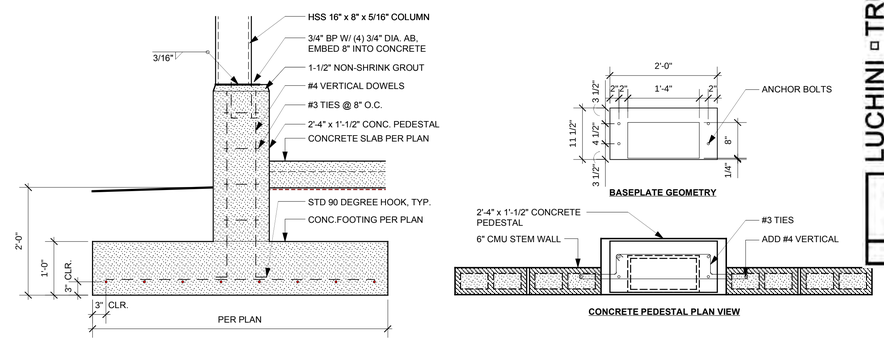
TYP. LIGHT GUAGE FRAMED SHEAR WALL (6 / S4)
3/4" = 1'-0"



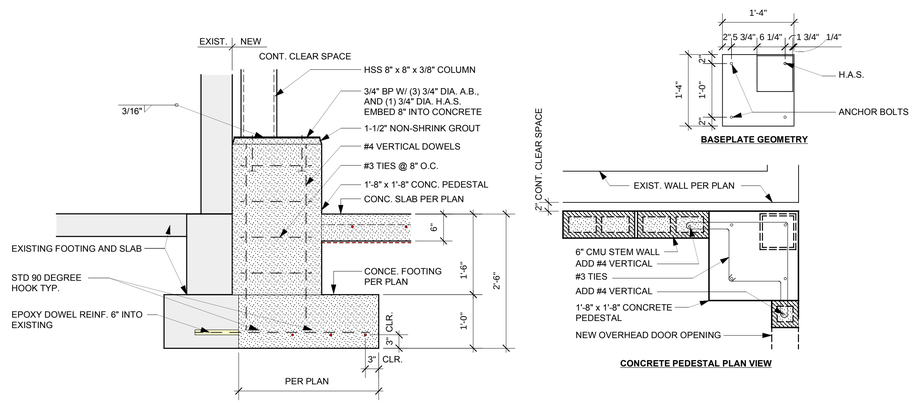
JOIST REINFORCEMENT AT CONCENTRATED LOADS (5 / S4)
3/4" = 1'-0"



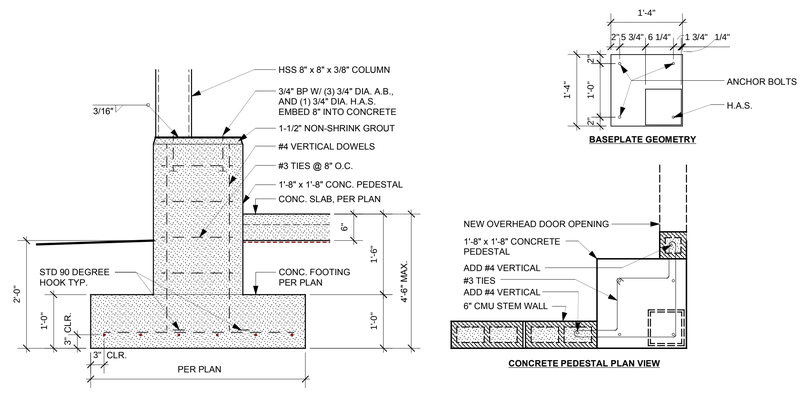
CONCRETE PEDESTAL AT HSS COLUMN EXISTING BAYS TO NEW BAY (4 / S4)
3/4" = 1'-0"



CONCRETE PEDESTAL AT HSS COLUMN AT EXTERIOR WALL (3 / S4)
3/4" = 1'-0"



CONCRETE PEDESTAL AT HSS COLUMN EXISTING BAYS TO NEW BAY, CORNER (2 / S4)
3/4" = 1'-0"



CONCRETE PEDESTAL AT HSS COLUMN AT EXTERIOR WALL, CORNER (1 / S4)
3/4" = 1'-0"

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EL DORADO FIRE + RESCUE STATION NO. 1
APPARATUS BAY ADDITION
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S4

MECHANICAL SHEET INDEX

#	TITLE	DESIGN DEVELOPMENT	50% DESIGN DEVELOPMENT	90% DESIGN DEVELOPMENT
M0	MECHANICAL GENERAL NOTES AND LEGEND	√	√	√
M1	MECHANICAL FLOOR PLANS	√	√	√
M6	MECHANICAL DIAGRAMS AND SCHEDULE	√	√	√
DATE		11.01.2018	12.06.2018	01.04.2019

ISSUE LOG

ISSUE LOG KEY:
'√' ISSUED AS PART OF A SET
' ' NOT PART OF SET
'+' ISSUED FOR INFORMATION ONLY

MECHANICAL SYSTEMS LEGEND

NOTES

1. ALL SYMBOLS, ABBREVIATIONS, AND DESIGNATIONS ON LEGEND SHEET ARE NOT NECESSARILY USED ON THIS PROJECT.
2. THIS DRAWING SET CONSISTS OF DATA GENERATED, IN PART, BY OTHER PARTIES. NOT ALL SYMBOLOGIES AND NOTATION CONVENTIONS OCCURRING IN THIS DRAWING SET ARE NECESSARILY DEFINED ON THESE LEGENDS. CONSULT THE ENGINEER IN THE EVENT SYMBOLOGY OR NOTATION INTERPRETATION IS REQUIRED.

PROJECT ALTITUDE

6677' ABOVE SEA LEVEL

HVAC NOTES:

1. RE: _/M_ SERIES FOR MECHANICAL DIAGRAMS.
2. COORDINATE ROUTING OF CONDENSATE DRAIN LINES WITH ARCHITECT PRIOR TO INSTALLATION.
3. CEILING COORDINATION OF ALL MEP SYSTEMS (LIGHTING, DUCTWORK, DIFFUSERS, ELECTRICAL, FIRE PROTECTION, ETC.) MUST BE COMPLETED BY THE CONTRACTOR PRIOR TO THE START OF ANY INSTALLATIONS.
4. DO NOT ROUTE DUCTWORK OVER ELECTRICAL ROOMS OR ELECTRICAL PANELS; MAINTAIN N.E.C. CLEARANCES. COORDINATE ROUTINGS WITH DIV. 16 CONTRACTOR.
5. CONTRACTOR TO MAINTAIN 8'-6" CLEAR HEAD HEIGHT IN GARAGE AND INFORM THE ENGINEER AND ARCHITECT OF ANY AREAS THAT MAY NOT MEET 8'-6" PRIOR TO INSTALLATION, MINIMUM 8'-2" CLEAR HEAD HEIGHT MUST BE MAINTAINED IN ACCESSIBLE VAN AREAS.
6. PROVIDE FLEXIBLE DUCT AND PIPE CONNECTIONS TO ALL MOTORIZED EQUIPMENT.
7. VERIFY ALL EQUIPMENT ACCESS PANELS WITH MANUFACTURER AND ARCHITECT.
8. ALL SOURCES OF IGNITION ON MECHANICAL EQUIPMENT SHALL BE MOUNTED 18" AFF.
9. PROTECT PIPING ROUTED ALONG COLUMNS, WALLS, ETC. FROM DAMAGE AS NECESSARY WITH CAGES. COORDINATE WITH ARCHITECT.
10. PEX PIPING SHALL NOT BE ALLOWED TO PENETRATE FIRE BARRIERS WHERE FIRE CAULKING IS REQUIRED.
11. THE SPACE ABOVE CEILING IS BEING UTILIZED AS A RETURN AIR PLENUM. ALL RETURN GRILLES SHALL BE PROVIDED WITH SOUND BOOTS AND A DIRECT PATH TO THE AIR HANDLING SYSTEM RETURN DUCT, OPEN TO PLENUM. WHERE FULL HEIGHT WALLS ARE INSTALLED AND THE RETURN AIR PATH IS COMPROMISED, THE SOUND BOOT SHALL EXTEND THROUGH THE WALL OR TRANSFER AIR DUCTS SHALL BE PROVIDED. OTHERWISE, PROVIDE Z- OR U-DUCT TRANSFER THROUGH WALL. TRANSFER DUCTS AND SOUND BOOTS SHALL BE LINED SHEET METAL. NON-METAL DUCT NOT PERMITTED.
12. T-STATS (AND CO2 SENSORS) SHALL BE LOCATED NEAR THE LIGHT SWITCH WITHIN THE ROOM SHOWN. COORDINATE WITH ARCHITECT & ELECTRICAL ENGINEER TO MATCH HEIGHT AND LOCATION.
13. ALL DUCTWORK SHALL BE ROUTED AS HIGH AS POSSIBLE IN THE CEILING SPACE. UTILIZE JOIST SPACE WHEN POSSIBLE, ESPECIALLY WHERE CROSSING OTHER DUCTS, PIPES, AND ELECTRICAL.
14. ACCESS PANELS SHALL BE 24x24, U.N.O. LOCATIONS SHOWN ARE APPROXIMATE, EXACT LOCATIONS SHALL BE COORDINATED WITH THE ARCHITECTS DRAWINGS AND WITH THE LOCATIONS OF THE EQUIPMENT OR APPARATUS THAT THEY SERVE.
15. SEAL ALL DUCT PENETRATIONS OF ACOUSTIC PARTITIONS.
16. MAINTAIN MIN. 3 FT BETWEEN ENVIRONMENTAL EXH TERMINATIONS AND OPENINGS INTO BUILDING.

PIPING DESIGNATIONS

HYDRONIC PIPING

—CS—	CONDENSER SUPPLY
—CR—	CONDENSER RETURN
—CHS—	CHILLED WATER SUPPLY
—CHR—	CHILLED WATER RETURN
—CCS—	CLOSED CONDENSER SUPPLY
—CCR—	CLOSED CONDENSER RETURN
—GLS—	GROUND LOOP SUPPLY
—GLR—	GROUND LOOP RETURN
—GF—	GLYCOL FEED
—GLS—	GEOTHERMAL (OR GROUND) LOOP SUPPLY
—GLR—	GEOTHERMAL (OR GROUND) LOOP RETURN
—HWS—	HEATING WATER SUPPLY
—HWR—	HEATING WATER RETURN
-HWS(LT)-	HEATING WATER SUPPLY (LOW TEMP)
-HWR(LT)-	HEATING WATER RETURN (LOW TEMP)
-HWS(HT)-	HEATING WATER SUPPLY (HIGH TEMP)
-HWR(HT)-	HEATING WATER RETURN (HIGH TEMP)
—SHWS—	SOLAR HEATING WATER SUPPLY
—SHWR—	SOLAR HEATING WATER RETURN
—SMS—	SNOWMELT SUPPLY
—SMR—	SNOWMELT RETURN
—FCS—	FLOOR COOLING SUPPLY
—FCR—	FLOOR COOLING RETURN

STEAM & CONDENSATE PIPING

—HPS—	HIGH PRESSURE STEAM
—HPR—	HIGH PRESSURE CONDENSATE RETURN
—MPS—	MEDIUM PRESSURE STEAM
—MPR—	MEDIUM PRESSURE CONDENSATE RETURN
—LPS—	LOW PRESSURE STEAM
—LPR—	LOW PRESSURE CONDENSATE RETURN
—PC—	PUMPED CONDENSATE

PIPING SYMBOLS

	90° ELBOW DN
	90° ELBOW UP
	TEE DOWN
	TEE UP
	BUTTERFLY VALVE
	SHUT OFF (BALL, GATE, BUTTERFLY)
	GLOBE VALVE
	CHECK VALVE
	FLOW CONTROL VALVE
	BALL VALVE
	PLUG OR BALANCING VALVE
	FLOW BALANCING VALVE
	PLUG VALVE IN RISER
	GATE OR GLOBE VALVE IN RISER
	DRAIN VALVE W/ HOSE END
	TEMPERATURE CONTROL VALVE (2-WAY)
	TEMPERATURE CONTROL VALVE (3-WAY)
	PRESSURE REDUCING VALVE
	SOLENOID VALVE
	VENTURI/FLOW INDICATOR
	PUMP & EQUIPMENT CONNECTOR
	PIPE UNION
	DOUBLE CHECK BACKFLOW PREVENTER
	PIPE ANCHOR
	PIPE EXPANSION JOINT
	FLEXIBLE CONNECTOR
	SAFETY RELIEF VALVE
	AIR VENT
	PRESSURE - TEMP. TAP
	PRESSURE GAUGE W/ PIG TAIL & COCK
	THERMOMETER
	VACUUM BREAKER
	STRAINER W/ BLOW-OFF VALVE
	SHOCK ABSORBER
	FLOW SWITCH
	STEAM TRAP TEST CHAMBER
	STEAM TRAP: FT-FLOAT & THERMOSTATIC TD-THERMODYNAMIC IB-INVERTED BUCKET TS-THERMOSTATIC BP-BALANCED PRESSURE

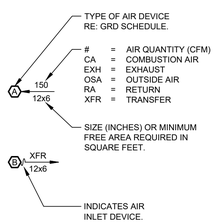
EQUIPMENT ABBREVIATIONS

AHU	AIR HANDLING UNIT
AS	AIR SEPARATOR
B	BOILER (HOT WATER)
BB	BASE BOARD
BT	BUFFER TANK
CC	COOLING COIL
CH	CHILLER
CP	CIRC PUMP
CT	COOLING TOWER
CUH	CABINET UNIT HEATER
CV	CONSTANT VOLUME BOX
DC	DUCT COIL
DEF	DISHWASHER EXHAUST FAN
EBH	ELECTRIC BASEBOARD HEATER
ECU	EVAPORATIVE COOLING UNIT
EF	EXHAUST FAN
ERU	ENERGY RECOVERY UNIT
ET	EXPANSION TANK
EWH	ELECTRIC WATER HEATER
F	FURNACE
FC	FAN COIL
FP	FAN POWERED BOX
GF	GLYCOL FEEDER
H	HUMIDIFIER
HC	HEATING COIL
HP	HEAT PUMP
HX	HEAT EXCHANGER
KEF	KITCHEN EXHAUST FAN
MAU	MAKE-UP AIR UNIT
MCC	MOTOR CONTROL CENTER
MV	MIXING VALVE
P	PUMP
RF	RETURN (OR RELIEF) AIR FAN
RZ	RADIANT ZONE
SA	SNOWMELT AREA
SB	SUMP BASIN
SF	SUPPLY FAN
SP	SUMP PUMP
ST	STORAGE TANK
TMV	THERMOSTATIC MIXING VALVE
UH	UNIT HEATER
VR	VARIABLE VOLUME BOX W/ REHEAT
VV	VARIABLE VOLUME BOX
WH	WATER HEATER

PLAN SYMBOLS

	CONTROL PANEL/RADIANT MANIFOLD
CO2	CARBON DIOXIDE SENSOR
CO	CARBON MONOXIDE SENSOR
H	HUMIDISTAT
S	REMOTE TEMPERATURE SENSOR
T	THERMOSTAT
SP	DUCT STATIC PRESSURE SENSOR
P	ROOM PRESSURE SENSOR
EPO	EMERGENCY POWER OFF SWITCH
	PLUMBING/HVAC RISER
	DIAGRAM CONTINUATION REFERENCE
	SECTION CUT LETTER/SHEET SHOWN ON
	POINT OF DISCONNECTION
	POINT OF NEW CONNECTION
	ACCESS PANEL
	SNOWMELT MANIFOLD

AIR DEVICE DESIGNATION KEY



NOTE:
FOR STANDARD MODULE SIZE REGISTERS, SIZE GIVEN IS NECK SIZE. REFER TO GRD SCHEDULE FOR MODULE SIZE.

PLAN ABBREVIATIONS

AAV	AIR ADMITTANCE VALVE
ABV	ABOVE
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AUTO	AUTOMATIC
BCS	BUILDING CONTROL SYSTEM
BDD	BACK DRAFT DAMPER
BFG	BELOW FINISHED GRADE
BLDG	BUILDING
B/N	BETWEEN
C	COMMON (OR CLOSED)
CA	COMBUSTION AIR
CC	CONTROLS CONTRACTOR
CDBBC	CONTINUATION DESIGN BUILD BY CONTRACTOR
CFM	CUBIC FEET PER MINUTE (AIR FLOW RATE)
CIP	CAST IN PLACE
CLG	CEILING (OR COOLING)
CO	CLEANOUT
CONC	CONCRETE
COND	CONDENSATE
CONN	CONNECT (OR CONNECTION)
CONTR'R	CONTRACTOR
COTG	CLEANOUT TO GRADE
CW	COLD WATER
DHR	DOMESTIC HOT WATER RECIRC
DHW	DOMESTIC HOT WATER
DN	DOWN
DW	DOMESTIC WATER
DWR	DOMESTIC HOT WATER RECIRC
(E)	EXISTING
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EC	ELECTRICAL CONTRACTOR
EWT	ENTERING WATER TEMPERATURE
EXH	EXHAUST
(F)	FUTURE
FA	FREE AREA
FBO	FURNISHED BY OWNER
FCO	FLOOR CLEANOUT
FCT	FOR CONTINUATION
FD	FIRE DAMPER
FFI	FOR FURTHER INFORMATION
FSD	COMBINATION FIRE/SMOKE DAMPER
GC	GENERAL CONTRACTOR
GHX	GROUND HEAT EXCHANGER
GPM	GALLONS PER MINUTE (WATER FLOW RATE)
HP	HORSEPOWER
HW	DOMESTIC HOT WATER
HWC	HOT WATER RECIRC
ILO	IN LIEU OF
KW	KILOWATTS
LAT	LEAVING AIR TEMPERATURE
LF	LINEAR FOOT
LWT	LEAVING WATER TEMPERATURE
MC	MECHANICAL CONTRACTOR
MFG	MANUFACTURER
MOD	MOTOR OPERATED DAMPER
(N)	NEW
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRIC CODE
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
OA	OUTSIDE AIR
OBD	OPPOSED BLADE VOLUME DAMPER
OC	ON CENTER
OSA	OUTSIDE AIR
RA	RETURN AIR
RE:	REFER TO:
REQ'D	REQUIRED
REQ'MTS	REQUIREMENTS
SA	SUPPLY AIR
SF	SQUARE FOOT (FEET)
SP	STATIC PRESSURE
SS	STAINLESS STEEL
TA	THROW-AWAY (TRANSFER AIR)
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
W/	WITH
W/O	WITHOUT
WCO	WALL CLEANOUT
WRT	WITH REGARD TO
W/C	WATER COOLED
VTR	VENT THRU ROOF
XFR	TRANSFER
Ø	DIAMETER

DUCTWORK LEGEND

SINGLE LINE	DESCRIPTION	DOUBLE LINE
	90° ELBOW DOWN (ROUND DUCT ONLY)	
	ROUND 90° ELBOW UP (ROUND DUCT ONLY)	
D	OFFSET TO CHANGE ELEVATION (AT 30° WHEN POSSIBLE) D = DROP R = RISE	D
	ROUND RADIUS ELBOW	
	90° STRAIGHT TEE	
	90° CONICAL TEE	
	45° BRANCH	
	45° CONICAL TEE	
	SIZE OR SHAPE TRANSITION	
	ROUND FLEXIBLE DUCT	
	90° ELBOW DN (NEGATIVE PRESSURE)	
	90° ELBOW DN (POSITIVE PRESSURE)	
	90° ELBOW UP (NEGATIVE PRESSURE)	
	90° ELBOW UP (POSITIVE PRESSURE)	
	90° RADIUS ELBOW	
	90° RADIUS ELBOW W/TURNING VANES	
	SQUARE DUCT SPLIT	
	ROUND DUCT SPLIT	
	SPLIT BRANCH TAKE-OFF WITH SQUARE ELBOW & SPLITTER DAMPER	
	SPLIT BRANCH TAKE-OFF WITH RADIUS ELBOW & SPLITTER DAMPER	
	POSITIVE PRESSURE RISER, TYPICALLY SUPPLY	
	NEGATIVE PRESSURE RISER, TYPICALLY RETURN, EXHAUST OR OUTSIDE AIR	
F/S	COMBINATION FIRE & SMOKE DAMPER	F/S
	FIRE DAMPER	
	SMOKE DAMPER	
	MOTOR OPERATED DAMPER (MOD)	
	MANUAL VOLUME DAMPER, SINGLE BLADE DAMPER (SBD) FOR ROUND OR <10" TALL, OPPOSED BLADE DAMPER (OBD) >10" TALL	
BDD	BACKDRAFT DAMPER	BDD
SD	SMOKE DETECTOR	SD
24x36	DUCT SIZE: FIRST NUMBER IS PLAN WIDTH, SECOND NUMBER IS DEPTH.	24x36

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SEAL

EL DORADO FIRE + RESCUE STATION NO. 1
APPARATUS BAY ADDITION
144 AVE VISTA GRANDE, SANTA FE, NEW MEXICO 87508

Current Issue:
100% Construction Documents

Issued:
XXX xx.xx.xx

Sheet Title:

Date:	4 FEB 2019
Designed:	
Reviewed:	MBR
Project No:	10017.00

Sheet No:
M0

Scale: As Shown

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NOTES:

A. REFER TO M0 FOR GENERAL NOTES AND LEGENDS.

B. REFER TO M6 FOR DIAGRAMS AND SCHEDULES.

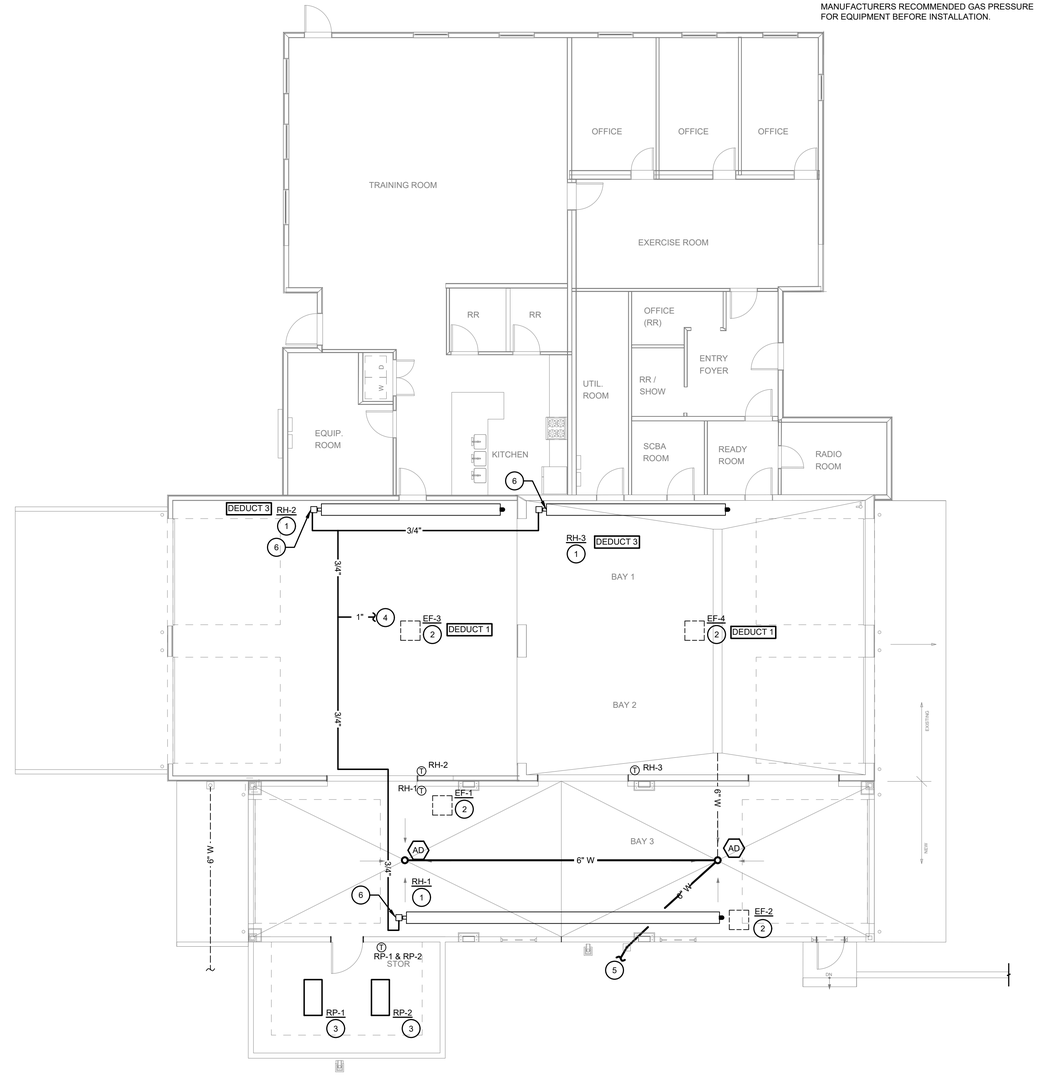
DEMOLITION NOTES:

1. DISCONNECT AND REMOVE EXISTING ELECTRIC HEATERS. REFER TO ELECTRICAL SHEET FOR FURTHER INFORMATION.
2. DISCONNECT AND REMOVE EXISTING GAS HEATERS. PERMANENTLY CAP EXISTING NATURAL GAS PIPING ABOVE CEILING. CONTRACTOR TO VERIFY EXISTING NATURAL GAS PIPING SIZE, LOCATION AND PRESSURE.
3. EXISTING TRENCH DRAIN TO REMAIN. CONTRACTOR TO VERIFY EXISTING PIPING SIZE AND INVERT IN FIELD.

FLAG NOTES:

1. RADIANT TUBE HEATERS. REFER TO SHEET M6 FOR INFORMATION ON INSTALLATION.
2. INSTALL FILTRATION SYSTEM PER MANUFACTURE. INCLUDE COMPLETE FACTORY CONTROLS. REFER TO SHEET M6.
3. ELECTRIC RADIANT PANEL HEATER.
4. CONNECT TO EXISTING PROPANE GAS PIPING.
5. CONNECT TO NEW PIPING. SEE CIVIL SHEETS.
6. REGULATE GAS BEFORE CONNECTION TO MECHANICAL EQUIPMENT. CONTRACTOR TO VERIFY MANUFACTURERS RECOMMENDED GAS PRESSURE FOR EQUIPMENT BEFORE INSTALLATION.

MECHANICAL FLOOR PLAN - DEMO
1/8" = 1'-0"



MECHANICAL FLOOR PLAN - NEW
1/8" = 1'-0"

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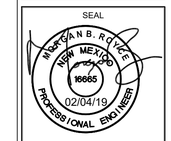

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144 AVE VISTA GRANDE, SANTA FE, NEW MEXICO 87508

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MECHANICAL FLOOR PLANS

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M1

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HEATER SCHEDULE

MARK	TYPE	TUBE LENGTH	INPUT	ELECTRICAL		MANUFACTURER* & MODEL NUMBER	ACCESSORIES	REMARKS
				AMPS	VOLT / PH			
RH-1	TUBULAR RADIANT	35 FT.	70 MBH	3	120 / 1	REZNOR VPTP80A	TWO STAGE	
RH-2	TUBULAR RADIANT	20 FT.	45 MBH	3	120 / 1	REZNOR VPTP60A	TWO STAGE	DEDUCT 3
RH-3	TUBULAR RADIANT	20 FT.	45 MBH	3	120 / 1	REZNOR VPTP60A	TWO STAGE	DEDUCT3
RP-1	RADIANT PANEL	N/A	750W	6.3	120 / 1	QMARK CP751F		ELECTRIC
RP-2	RADIANT PANEL	N/A	750W	6.3	120 / 1	QMARK CP751F		ELECTRIC

MANUFACTURERS:

1. RH-1, RH-2 & RH-3 SPACE-RAY OR EQUAL PERFORMANCE. RP-1 & RP-1 MARLEY OR EQUAL PEROFORMANCE

GENERAL NOTES:

1. PROVIDE ALL REQUIRED SERVICE AND OPERATIONAL CLEARANCES
2. INCLUDE FACTORY PROVIDED THERMOSTAT FOR EACH TUBULAR RADIANT GAS HEATERS
3. INCLUDE FACTORY THERMOSTAT M600S. SIMULTANEOUS CONTROL OF TWO HEATING CIRCUITS

ACCESSORIES: PROVIDE ON ALL UNITS UNLESS NOTED OTHERWISE.

A. INCLUDE FLUE KIT WITH ROOF CAP, AND BIRDSCREEN. INSTALL FLUE PER MANUFACTURES RECOMMENDATIONS.
B. LP GAS HEATING ORIFICE SET FOR 6677 FT
C. PROVIDE FACTORY HANGER KIT TO MOUNT AT 55 DEG ANGLE.

AIR FILTRATION SYSTEM SCHEDULE

MARK	SERVICE	TYPE	WEIGHT LBS.	CONTROL	ELEC			MANUFACTURER* & MODEL NUMBER	ACCESSORIES	REMARKS
					HP	FLA	VOLT/ PH			
EF-1	BAY 3	EXHAUST REMOVAL	190	TRACK MOUNTED DOOR SWITCH	3/4	13	120 / 1	AIRVAC 911		
EF-2	BAY 3	EXHAUST REMOVAL	190	TRACK MOUNTED DOOR SWITCH	3/4	13	120 / 1	AIRVAC 911		
EF-3	BAY 1 AND BAY 2	EXHAUST REMOVAL	190	TRACK MOUNTED DOOR SWITCH	3/4	13	120 / 1	AIRVAC 911		DEDUCT 1
EF-4	BAY 1 AND BAY 2	EXHAUST REMOVAL	190	TRACK MOUNTED DOOR SWITCH	3/4	13	120 / 1	AIRVAC 911		DEDUCT 1

MANUFACTURER

* OR EQUAL PERFORMANCE

GENERAL NOTES

A. INCLUDE PRE-FILTER, MAIN MEDIA FILTER AND FOUR STAGE FILTER RACK.
B. PROVIDE GAS-PHASE EXTRACTOR, MULTISORB.
C. PROVIDE INFRARED DOUBLE BEAM SENSOR PB-60TK.
D. INCLUDE CONTROL PANEL AVEC-6C/T2
E. INCLUDE ACTIVATION PACKAGE - PB030TK 200 FT. PHOTO EYE. MOTION ACTIVATED TIMER WITH 5 MIN. TIMER.
F. INCLUDE TRACK MOUNTED DOOR SWITCH N-505ATM.
G. MANUFACTURES REP.FOR THE AIRVAC 911: NORMAN S.WRIGHT CO., 4303 ELLISON NE., ALB., NM 87109/ PH (505) 345 8811

PLUMBING FIXTURE SCHEDULE

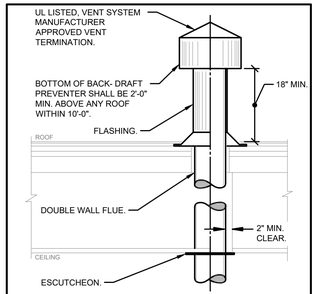
SYMBOL	TYPE	A.D.A	FINISH	MANUFACTURER* & MODEL #	INSTALLATION	REMARKS	POWER REQUIREMENTS
AD	AREA DRAIN	N/A	POLISHED NICKEL BRONZE	ZURN Z513ZN	CONCRETE FLOOR	9 IN. SQUARE TOP DRAIN, DURA-COATED CAST IRON. DEEP SUMP BODY WITH BOTTOM OUTLET, SEEPAGE PAN AND COMBINATION FLASHING CLAMP AND FRAME FOR HINGED HEAVY-DUTY SLOTTED GRATE WITH SUSPENDED SEDIMENT BUCKET.	N/A

*MANUFACTURERS:

FIXTURE: AS APPROVED BY ARCHITECT/OWNER/ENGINEER
FAUCET: N/A
DRAIN: JR SMITH, WATTS

GENERAL NOTES:

A: ALL FINAL FIXTURE SELECTIONS MUST BE APPROVED BY OWNER.
B:



FLUE THRU ROOF DIAGRAM
NO SCALE

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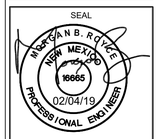

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ELECTRICAL LEGEND

NOTE:
ALL SYMBOLS SHOWN ON LEGEND ARE NOT NECESSARILY USED.

LIGHTING FIXTURE SYMBOLS

- RECESSED LIGHTING FIXTURE
- DIRECTIONAL/ADJUSTABLE RECESSED LIGHTING FIXTURE
- SURFACE MOUNTED LIGHT
- PENDANT MOUNTED LIGHT
- WALL MOUNTED LIGHT
- WALL MOUNTED UP-LIGHT
- MONO-POINT LIGHTING FIXTURE
- RECESSED STEP LIGHT
- FLUORESCENT STRIP LIGHT
- WALL MOUNTED LINEAR FLUORESCENT LIGHT
- RECESSED OR SURFACE MOUNTED FLUORESCENT TROFFER
- FIXTURE WITH EMERGENCY BACKUP OR ON EM CIRCUIT
- CEILING MOUNTED EXIT SIGN W/ FACES & ARROWS AS SHOWN
- WALL MOUNTED EXIT SIGN W/ FACES & ARROWS AS SHOWN
- EMERGENCY LIGHTS
- EXTERIOR POLE MOUNTED LIGHT
- EXTERIOR POST (BOLLARD) MOUNTED LIGHT

LIGHTING CONTROL SYMBOLS

- S SWITCH
- S^3 THREE-WAY SWITCH
- S^4 FOUR-WAY SWITCH
- S^J DOOR JAMB SWITCH
- S^K KEY SWITCH
- S^V VARIABLE SPEED SWITCH
- S^T THERMAL OVERLOAD SWITCH
- D DIMMER
- D^3 THREE-WAY DIMMER
- LV LOW VOLTAGE SWITCH
- S^O WALL OCCUPANCY SENSOR/SWITCH
- OS OCCUPANCY SENSOR - WALL MOUNTED
- OS OCCUPANCY SENSOR - CEILING MOUNTED
- OS OCCUPANCY SENSOR - CORRIDOR CEILING MOUNTED
- DL DAYLIGHT PHOTO SENSOR

NOTES:

- LIGHT LINEWEIGHT INDICATES EXISTING.
- HATCHED AREAS INDICATE DEMOLITION.
- 'C' ADJACENT TO A DEVICE INDICATES MOUNTING ABOVE COUNTERTOP. C

ONE-LINE DIAGRAM SYMBOLS

- DISCONNECT SWITCH
- FUSE
- CIRCUIT BREAKER
- CURRENT TRANSFORMER
- POTENTIAL TRANSFORMER
- M METER
- V VOLT-METER
- A AMP-METER
- SS SURGE SUPPRESSION DEVICE
- SELECTOR SWITCH
- GF GROUND FAULT PROTECTION
- ST SHUNT TRIP
- NORMALLY OPEN CONTACT
- NORMALLY CLOSED CONTACT
- GROUND
- COLD WATER GROUND CONNECTION
- BUILDING STEEL GROUND CONNECTION

ELECTRONIC SAFETY & SECURITY SYMBOLS

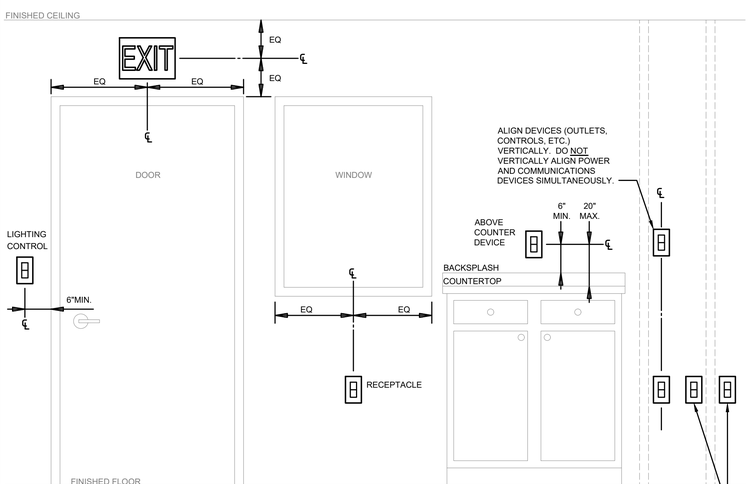
- CEILING MOUNTED CAMERA
- WALL MOUNTED CAMERA
- CORNER MOUNTED CAMERA
- 180° 180° VIEW DOME CAMERA
- 360° 360° VIEW DOME CAMERA
- FE HEMISPHERIC DOME FISHEYE CAMERA
- MON CCTV MONITOR
- ACP ACCESS CONTROL MAIN PANEL
- REX REQUEST TO EXIT PIR
- SPU SECURITY CENTRAL PROCESSING UNIT
- WS SECURITY/ACCESS CONTROL WORKSTATION
- ADA ADA ACCESS CONTROL MAIN PANEL
- P CR CARD READER - PROXIMITY
- S CR CARD READER - PROXIMITY
- S ELECTRIC LOCK - STRIKE
- M ELECTRIC LOCK - MAGNETIC
- R ELECTRIC LATCH / ROD RETRACTOR
- M MAGNETIC DOOR CONTACT SWITCH
- MAGNETIC DOOR CONTACT SWITCH
- MS MOTION SENSOR
- P PANIC BUTTON
- K SECURITY KEYPAD

POWER SYMBOLS

- SINGLE RECEPTACLE
- DUPLEX RECEPTACLE
- C DUPLEX RECEPTACLE MOUNTED ABOVE COUNTER
- DOUBLE DUPLEX RECEPTACLE
- GFCI DUPLEX RECEPTACLE
- DUPLEX RECEPTACLE; HALF SWITCHED
- ISOLATED GROUND DUPLEX RECEPTACLE
- MULTI-OUTLET PLUG STRIP
- FLUSH FLOOR MOUNTED DUPLEX RECEPTACLE
- FLUSH FLOOR MOUNTED DOUBLE DUPLEX RECEPTACLE
- FLUSH FLOOR MOUNTED DUPLEX RECEPTACLE; HALF SWITCHED
- FLUSH FLOOR MOUNTED DUPLEX RECEPTACLE AND TELECOM
- WALL MOUNTED SPECIAL OUTLET AS NOTED
- SPECIAL OUTLET AS NOTED
- J JUNCTION BOX
- J WALL MOUNTED JUNCTION BOX
- J FLOOR MOUNTED JUNCTION BOX
- DIVISION 15 EQUIPMENT POWER CONNECTION
- TS TIMER SWITCH
- FUSED DISCONNECT
- NON FUSED DISCONNECT
- MOTOR STARTER
- CB ENCLOSED CIRCUIT BREAKER
- PB PULL BOX
- PUSH BUTTON
- TC TIME CLOCK
- PC PHOTO-CELL
- T TRANSFORMER
- PANELBOARD OR LOADCENTER
- C CONTACTOR
- ELECTRIC MOTOR
- METER
- THERMOSTAT
- ATS AUTOMATIC TRANSFER SWITCH
- CIRCUIT HOMERUN
- CONDUIT RUN
- CONDUIT RUN BELOW GRADE
- CONDUIT UP
- CONDUIT DOWN
- S SWITCH
- S^T THERMAL OVERLOAD SWITCH
- S^V VARIABLE SPEED SWITCH
- S^K KEY SWITCH

ABBREVIATIONS

AFC	-	ABOVE FINISHED CEILING
AFF	-	ABOVE FINISHED FLOOR
AFG	-	ABOVE FINISHED GRADE
AHJ	-	AUTHORITY HAVING JURISDICTION
AL	-	ALUMINUM
AP	-	ACCESS POINT
AWG	-	AMERICAN WIRE GAUGE
BAS	-	BUILDING AUTOMATION SYSTEM
BFG	-	BELOW FINISH GRADE
BMS	-	BUILDING MANAGEMENT SYSTEM
C	-	CONDUIT
CATV	-	COMMUNITY (CABLE) ANTENNA TELEVISION SYSTEM
CCTV	-	CLOSED CIRCUIT TELEVISION
CKT	-	CIRCUIT
CPU	-	CENTRAL PROCESSING UNIT
CT	-	CURRENT TRANSFORMER
DISP	-	GARBAGE DISPOSAL
DW	-	DISHWASHER
(E)	-	EXISTING
EM	-	EMERGENCY
EWC	-	ELECTRIC WATER COOLER
FA	-	FIRE ALARM
FACP	-	FIRE ALARM CONTROL PANEL
FBO	-	FURNISHED BY OTHERS
GC	-	GENERAL CONTRACTOR
GFI	-	GROUND FAULT CIRCUIT INTERRUPTER
GRD	-	GROUND
IAW	-	IN ACCORDANCE WITH
IC	-	INTERMEDIATE CROSS-CONNECT
IDF	-	INTERMEDIATE DISTRIBUTION FRAME
IG	-	ISOLATED GROUND
IR	-	INFRARED
LAN	-	LOCAL AREA NETWORK
MDF	-	MAIN DISTRIBUTION FRAME
(N)	-	NEW
NIC	-	NOT IN CONTRACT
NL	-	NIGHT LIGHT
NTS	-	NOT TO SCALE
OC	-	ON CENTER
PA	-	PUBLIC ADDRESS
REF	-	REFRIGERATOR
TTB	-	TELECOMMUNICATIONS TERMINAL BOARD
TVSS	-	TRANSIENT VOLTAGE SURGE SUPPRESSOR
TVTB	-	TELEVISION TERMINAL BOARD
UG	-	UNDERGROUND
UNO	-	UNLESS NOTED OTHERWISE
V	-	VOLT
W	-	WATT
WAN	-	WIDE AREA NETWORK
WAP	-	WIRELESS ACCESS POINT
WLAN	-	WIRELESS LOCAL AREA NETWORK
WP	-	WEATHERPROOF
XP	-	EXPLOSIONPROOF
+18"	-	MOUNTING HEIGHT TO CENTERLINE OF DEVICE ABOVE FINISH FLOOR (VERIFY W/ ARCH ELEVS)



TYPICAL DEVICE ALIGNMENT

NO SCALE

NOTES:

1. IF ALIGNMENT OF DEVICES INDICATED HERE IS IN CONFLICT WITH ADA REQUIREMENTS DUE TO INSTALLATION DETAIL, ADA DIMENSIONS SHALL GOVERN.
2. REFERENCE ARCHITECTURAL INTERIOR ELEVATIONS. LOCATIONS SHOWN ON INTERIOR ELEVATIONS SHALL SUPERCEDE LOCATIONS SHOWN HERE, UNLESS LOCATIONS SHOWN ON INTERIOR ELEVATIONS ARE NOT CODE COMPLIANT.

OFFSET COMMUNICATIONS DEVICES FROM POWER DEVICES TO EITHER OPPOSITE SIDE OF STUD BAY, OR ADJACENT STUD BAY.

MECHANICAL EQUIPMENT WIRING AND CONNECTIONS

	ITEM	FURNISHED UNDER	SET IN PLACE OR MTD. UNDER	WIRED / CONNECTED UNDER
1.	EQUIPMENT MOTORS AND THERMAL OVERLOADS, RESISTANCE HEATERS	MD	MD	ED
2.	VFDs, MOTOR CONTROLLERS, MAGNETIC STARTERS, REDUCED VOLTAGE STARTERS AND OVERLOAD RELAYS	MD	ED(a)	ED
3.	DISCONNECT SWITCHES (FUSED OR NON-FUSED), HP RATED SWITCHES, THERMAL OVERLOAD SWITCHES AND FUSES, AND MANUAL OPERATING SWITCHES	ED(a)	ED(a)	ED
4.	PUSHBUTTON STATIONS, PILOT LIGHTS, MULTI-SPEED SWITCHES, FLOAT SWITCHES, THERMOSTATS, CONTROL RELAYS, TIMECLOCKS, CONTROL TRANSFORMERS, CONTROL PANELS, MOTOR VALVES, DAMPER ACTUATORS, SOLENOID VALVES, EP AND PE SWITCHES AND INTERLOCKS	MD	MD	MD(b)
5.	120 VOLT POWER FOR BAS PANELS, FIRE PROTECTION AND BOILER CONTROLS	ED	ED	ED
6.	FIRE/SMOKE DAMPERS AND ELEVATOR VENT DAMPERS	MD	MD	ED(c)

MD = MECHANICAL DIVISION
ED = ELECTRICAL DIVISION

NOTES:

(a) IF FURNISHED AS PART OF FACTORY-WIRED EQUIPMENT, THEN WIRING AND CONNECTIONS ONLY BY ED

(b) IF ANY OF THESE DEVICES CARRY THE FULL LOAD CURRENT TO ANY MOTOR THEY SHALL BE CONNECTED BY ED. CONTROL DEVICES CARRYING FULL LOAD CURRENT FURNISHED BY MD AND WIRED BY ED SHALL BE LOCATED AT THE DEVICE BEING CONTROLLED, UNLESS SHOWN ON DRAWINGS OR MUTUAL AGREEMENT IS MADE BETWEEN THE CONTRACTORS WITH NO CHANGE IN THE CONTRACT PRICE.

(c) WIRING FROM ALARM CONTACTS TO ALARM SYSTEM BY ED; ALL CONTROL FUNCTION WIRING BY MD. DUCT DETECTORS FURNISHED BY ED, SET IN PLACE BY MD

GENERAL NOTE: THE ABOVE LIST DOES NOT ATTEMPT TO INCLUDE ALL COMPONENTS. ALL ITEMS NECESSARY FOR A COMPLETE SYSTEM SHALL BE INCLUDED IN THE BASE CONTRACT.

ELECTRICAL SHEET INDEX

#	TITLE	SD SET	DD SET	90% CD SET	100% CD SET
E0	ELECTRICAL COVER SHEET	✓	✓	✓	✓
E1	ELECTRICAL PLANS	✓	✓	✓	✓
E2	ELECTRICAL SCHEDULES	✓	✓	✓	✓

ISSUE LOG

ISSUE LOG KEY:
'.' ISSUED AS PART OF A SET
' ' NOT PART OF SET
'*' ISSUED FOR INFORMATION ONLY

DATE
10.29.2018
12.06.2018
01.04.2019
02.04.2019

GENERAL NOTES:

1. DO NOT SCALE DRAWINGS. VERIFY DIMENSIONS ON ARCHITECTURAL DRAWINGS AND IN FIELD PRIOR TO COMMENCEMENT OF WORK.
2. VISIT SITE PRIOR TO BID AND VERIFY THAT CONDITIONS ARE AS INDICATED. CONTRACTOR SHALL INCLUDE IN HIS BID COSTS REQUIRED TO MAKE HIS WORK MEET EXISTING CONDITIONS.
3. SYSTEM OUTAGES SHALL BE PERMITTED ONLY AT TIMES APPROVED BY OWNER – IN WRITING. WORK WHICH COULD RESULT IN AN ACCIDENTAL OUTAGE (BEYOND BRANCH CIRCUITS) SHALL BE PERFORMED WITH THE OWNER'S MAINTENANCE PERSONNEL ADVISED OF SUCH WORK.
4. SERVICE SHALL BE MAINTAINED TO EXISTING AREAS DURING CONSTRUCTION. CONTRACTOR SHALL PROVIDE PORTABLE GENERATORS, CABLES, OUTLETS, ETC. AS REQUIRED TO MAINTAIN CONTINUITY OF SERVICE. PLACEMENT OF SUCH PORTABLE EQUIPMENT SHALL BE SUBJECT TO OWNER APPROVAL.
5. REVIEW ARCHITECTURAL, MECHANICAL AND OTHER DRAWINGS PRIOR TO BID.
6. WORK SHALL BE PERFORMED IN A WORKMANLIKE MANNER TO THE SATISFACTION OF THE ARCHITECT.
7. WORK, MATERIALS, AND EQUIPMENT SHALL CONFORM TO THE LATEST EDITIONS OF LOCAL, STATE, AND NATIONAL CODES AND ORDINANCES.
8. PROVIDE PERMITS AND INSPECTIONS REQUIRED.
9. PROVIDE 1/4" SCALE LAYOUT DRAWINGS OF ROOMS WITH ELECTRICAL SWITCHBOARDS AND TRANSFORMERS WITH SHOP DRAWING SUBMITTAL. LAYOUTS SHALL SHOW LOCATIONS OF, AND SHALL BE COORDINATED WITH MECHANICAL EQUIPMENT. ALL EQUIPMENT SHALL BE DRAWN TO SCALE.
10. CONTRACTOR'S FAILURE TO ORDER OR RELEASE ORDER FOR MATERIALS AND/OR EQUIPMENT WILL NOT BE ACCEPTED AS A REASON TO SUBSTITUTE ALTERNATE MATERIALS, EQUIPMENT, OR INSTALLATION METHODS.
11. VERIFY EXACT LOCATIONS OF EXISTING AND NEW UNDERGROUND UTILITIES, PIPING AND RACEWAY SYSTEMS PRIOR TO TRENCHING. PROVIDE NECESSARY TRENCHING, BACKFILL, EXCAVATION, SUPPORTS, SERVICE FEEDERS (CONDUIT AND/OR WIRE), PULLBOXES, TRANSFORMER PADS, SAWCUTTING AND PATCHING, CONCRETE/PAVING, ETC. REQUIRED. BACKFILL TRENCHES TO 90 PERCENT COMPACTION AND PATCH TO MATCH EXISTING. CONTRACTOR SHALL OBTAIN AND VERIFY EXACT UTILITY COMPANY DRAWINGS AND REQUIREMENTS. ELECTRICAL CONTRACTOR IS TO SUBMIT A COMPLETE CONSTRUCTION DRAWING SET TO THE ELECTRICAL UTILITY COMPANY WITH-IN 10 DAYS OF AWARD OF CONTRACT. COORDINATE TIMELINE OF THEIR REVIEW, APPROVAL, CONSTRUCTION SCHEDULING AND INSTALLATION OF THE UTILITY TRANSFORMER WITH THE UTILITY COMPANY. NOTIFY OWNER OF ANY SCHEDULING CONFLICTS.
12. EXISTING SYSTEMS AND CONDITIONS SHOWN ON DRAWINGS FOR EXISTING BUILDINGS ARE TO BE NOTED "FOR GUIDANCE ONLY". THE ELECTRICAL CONTRACTOR TO FIELD CHECK ALL EXISTING CONDITIONS PRIOR TO BIDDING AND TO INCLUDE IN HIS BID AN ALLOWANCE FOR REMOVAL AND/OR RELOCATION OF EXISTING CONDUITS, WIRES, DEVICES, FIXTURES, OR OTHER EQUIPMENT AS INDICATED ON THE PLANS OR AS REQUIRED TO COORDINATE AND ADAPT NEW AND EXISTING ELECTRICAL SYSTEM TO ALL OTHER WORK AS REQUIRED
13. PROVIDE ELECTRICAL DEMOLITION REQUIRED. REFER TO ARCHITECTURAL AND ELECTRICAL DEMOLITION DRAWINGS FOR LOCATION AND EXTENT OF DEMOLITION REQUIRED. CONTRACTOR SHALL VISIT SITE PRIOR TO BID TO DETERMINE EXTENT OF WORK INVOLVED.
14. PROVIDE ALL NECESSARY DEMOLITION TO REMOVE EXISTING UNUSED CONDUIT, WIRE, CABLE, J-BOXES, RECEPTACLES, SWITCHES, LIGHTS, FIRE ALARMS DEVICES, ETC. COMPLETE WITH ASSOCIATED CIRCUITING TO SOURCE. WHERE IT IS NOT FEASIBLE TO REMOVE THE ABOVE, OUTLET SHALL BE ABANDONED, WIRE REMOVED, AND BLANK COVER PLATES PROVIDED.
15. ALL (E) EQUIPMENT, LAMPS, BALLASTS, ETC. BEING REMOVED SHALL BE DISCARDED IN ACCORDANCE WITH APPLICABLE EPA REQUIREMENTS.
16. EXISTING LIGHT FIXTURES, ELECTRICAL EQUIPMENT, ETC. BEING REMOVED SHALL BE OFFERED TO THE OWNER, EXCEPT FOR THOSE ITEMS BEING RELOCATED. ANY ITEMS REJECTED BY THE OWNER SHALL BE DISPOSED OF IN A LEGAL MANNER..
17. VERIFY EXACT LOCATION OF EQUIPMENT TO BE FURNISHED BY OTHERS PRIOR TO ROUGH-IN.
18. INSTALL ALL MATERIALS IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. ANY DEVIATIONS SHALL BE BROUGHT TO THE ARCHITECT/ENGINEER'S ATTENTION PRIOR TO INSTALLATION.
19. FINAL CONNECTIONS TO EQUIPMENT SHALL BE IN ACCORDANCE WITH MANUFACTURER'S APPROVED WIRING DIAGRAMS, DETAILS, AND INSTRUCTIONS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE MATERIALS AND EQUIPMENT COMPATIBLE WITH EQUIPMENT ACTUALLY SUPPLIED.
20. CONTRACTOR SHALL BE RESPONSIBLE FOR REPLACING EQUIPMENT WHICH IS DAMAGED DUE TO INCORRECT FIELD WIRING PROVIDED UNDER THIS SECTION, OR FACTORY WIRING IN EQUIPMENT PROVIDED UNDER THIS SECTION.
21. ALL ELECTRICAL SYSTEMS COMPONENTS SHALL BE LISTED OR LABELED BY U.L. OR OTHER RECOGNIZED TESTING FACILITY.
22. WIRING DEVICES SHALL BE SPECIFICATION GRADE AND RATED AT 20 AMPERES FOR LIGHT SWITCHES, AND 20 AMPERES FOR DUPLEX RECEPTACLES. THE COLOR OF THE DEVICES AND COVER PLATES SHALL BE WHITE.
23. ALL WIRING SHALL BE INSTALLED IN LISTED METALLIC RACEWAYS. EMT FITTINGS SHALL BE MALLEABLE IRON OR STEEL. CONNECTORS SHALL BE INSULATED THROAT TYPE. MINIMUM CONDUIT SIZE IS 3/4". FOLLOW NEC FOR MAXIMUM NUMBER OF CONDUCTORS PER CONDUIT. CONDUIT SHALL BE OF SUFFICIENT SIZE AND CONDUCTOR QUANTITY SHALL BE LIMITED TO ELIMINATE THE NEED TO DE-RATE CONDUCTORS. METAL CLAD CABLE IS PERMITTED.
24. ALL EMPTY RACEWAY SYSTEMS SHALL HAVE A 200LB NYLON PULL STRING OR EQUAL, AND SHALL BE IDENTIFIED AT ALL JUNCTION, PULL AND TERMINATION POINTS, USING PERMANENT METALLIC TAGS. TAG SHALL INDICATE INTENDED USE OF CONDUIT, ORIGINATION, AND TERMINATION POINTS OF EACH INDIVIDUAL CONDUIT.
25. WIRE SHALL BE COPPER, 75 DEGREE CELSIUS RATED FOR GENERAL USE. WIRING WITHIN 3 INCHES OF FLUORESCENT BALLASTS SHALL BE COPPER, MINIMUM 90 DEGREE CELSIUS RATED. SIZES INDICATED ARE FOR INSTALLATION IN A MAXIMUM 30 DEGREE CELSIUS AMBIENT. CONDUCTOR AMPACITY SHALL BE DERATED FOR HIGHER AMBIENT INSTALLATIONS.
26. PROVIDE NEW UPDATED PANELBOARD DIRECTORIES FOR EXISTING AND NEW CIRCUITS BEING UTILIZED FOR COMPLETION OF PROJECT.
27. PANEL DIRECTORIES SHALL BE REMOVABLE. ROOM NAMES AND NUMBERS SHALL BE AS DIRECTED BY OWNER. DIRECTORIES SHALL BE TYPED AND INSTALLED UNDER CLEAR PLASTIC COVERS.
28. FINAL CONNECTIONS TO MOTORS, TRANSFORMERS, AND OTHER VIBRATING EQUIPMENT SHALL BE SEAL TITE FLEX AND APPROVED FITTINGS. DO NOT SECURE CONDUITS, DISCONNECTS, OR DEVICES TO DUCTWORK OR MECHANICAL EQUIPMENT.
29. FIRE ALARM, SOUND, TELEPHONE, COMPUTER AND SIMILAR SYSTEMS CONDUITS LARGER THAN 1" SHALL HAVE LONG RADIUS SWEEPS (12 TIMES THE DIAMETER).
30. SYSTEMS SHALL BE TESTED FOR PROPER OPERATION. IF TESTS SHOW THAT WORK IS DEFECTIVE, CONTRACTOR SHALL MAKE CORRECTIONS NECESSARY AT NO COST TO OWNER.
31. GUARANTEE THE INSTALLATION AGAINST DEFECTS IN MATERIALS AND WORKMANSHIP WHICH MAY OCCUR UNDER NORMAL USAGE FOR A PERIOD OF ONE YEAR AFTER OWNER'S ACCEPTANCE. DEFECTS SHALL BE PROMPTLY REMEDIED WITHOUT COST TO THE OWNER.
32. SYSTEMS SHALL BE COMPLETE, OPERABLE, AND READY FOR CONTINUOUS OPERATION. LIGHTS, SWITCHES, RECEPTACLES, MOTORS, ETC. SHALL BE CONNECTED AND OPERABLE.

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SEAL

EL DORADO FIRE + RESCUE STATION NO. 1
APPARATUS BAY ADDITION
144 AVE VISTA GRANDE, SANTA FE, NEW MEXICO 87508

Current Issue:
100% Construction Documents

Issued:
XXX xx.xx.xx

Sheet Title:

Date:	4 FEB 2019
Designed:	PJM
Reviewed:	MBR
Project No:	10017.00

Sheet No:
E0

Scale: As Shown

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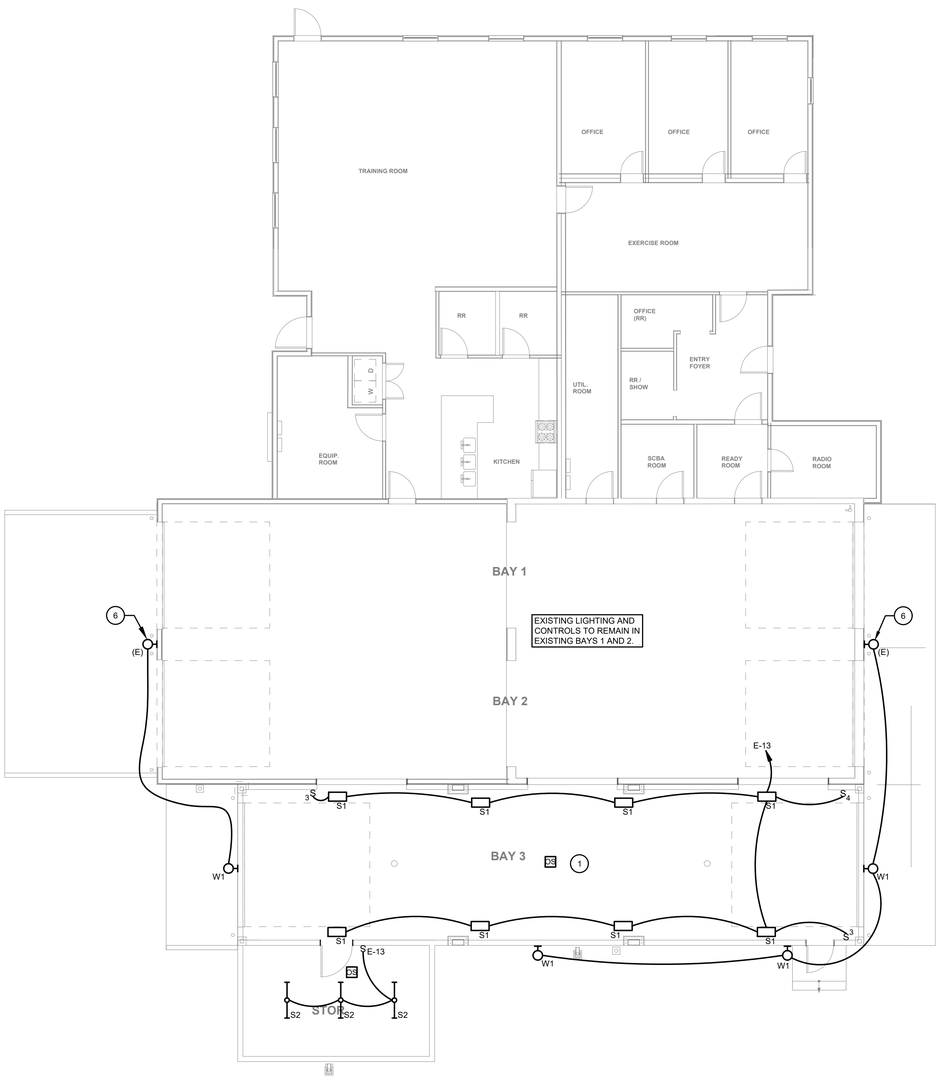
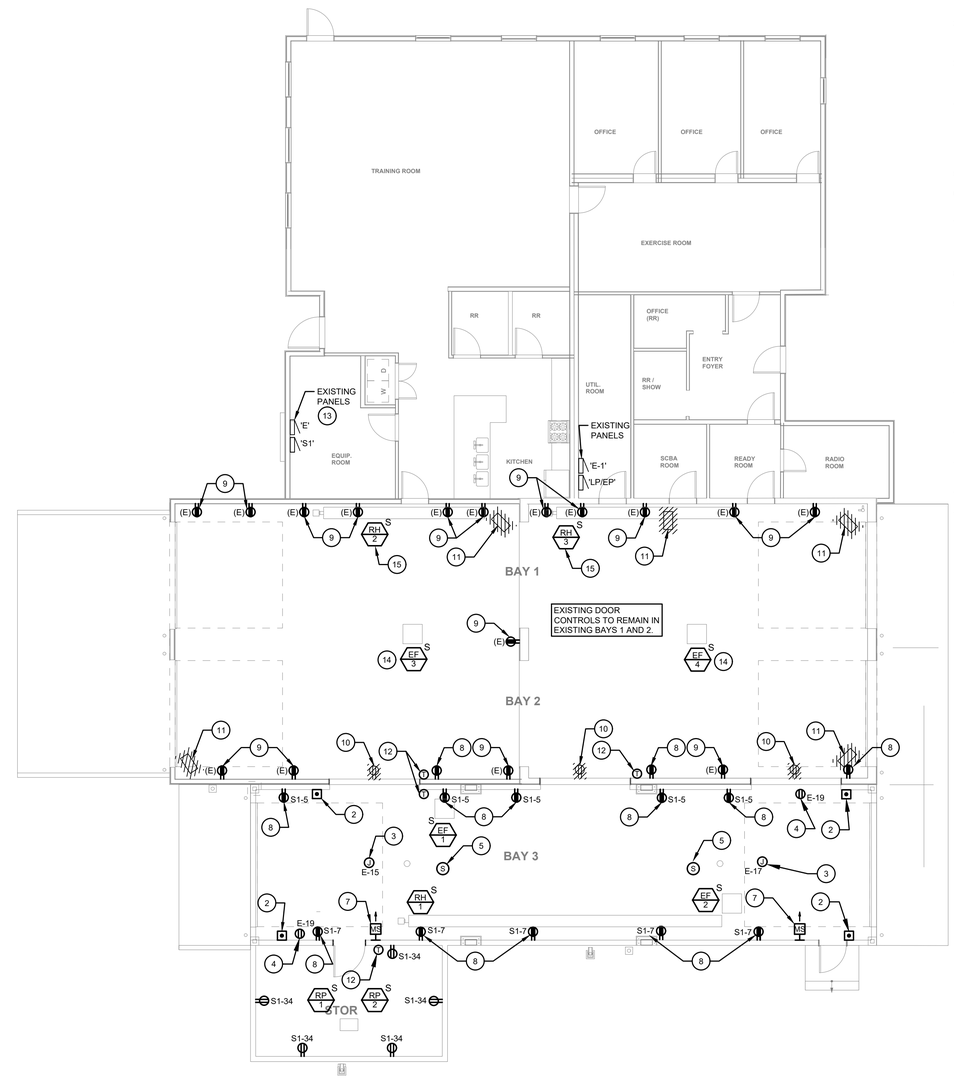


LIGHTING PLAN
1/8" = 1'-0"



ELECTRICAL PLAN
1/8" = 1'-0"

NOTES:

A. LIGHTING FIXTURES SHALL BE LED SOURCE WITH 0-10V DIMMING UNLESS NOTED OTHERWISE. REFER TO SHEET E2 FOR LIGHTING FIXTURE SCHEDULE.

B. REFER TO ARCHITECTURAL REFLECTED CEILING PLAN FOR EXACT PLACEMENT OF LIGHTING FIXTURES.

C. ALL CONDUITS SHALL BE CONCEALED IN WALLS, FLOOR SLAB OR IN FLUTE OF DECK, WHERE POSSIBLE. EXPOSED CONDUITS SHALL BE KEPT AS CLOSE TO TRANSVERSE BEAMS AS POSSIBLE. CONTRACTOR SHALL COORDINATE THE EXACT LOCATION OF ALL EXPOSED CONDUITS WITH ARCHITECT PRIOR TO ROUGH-IN.

D. MINIMUM WIRE SIZE SHALL BE #12 AWG AND MINIMUM CONDUIT SIZE SHALL BE 3/4" UNLESS NOTED OTHERWISE. REFER TO SHEET E2 FOR WIRING SCHEDULE.

E. REFER TO THE ARCHITECTURAL COVER SHEET (CS) FOR DESCRIPTION OF DEDUCTIVE ALTERNATE BIDS.

FLAG NOTES:

1. CONNECT TO EXISTING TIMECLOCK AND SWITCHING IN BAYS 1 AND 2.
2. CONNECT 3-BUTTON (UP, DOWN, STOP) OVERHEAD DOOR CONTROLLER. SEE WIRING DIAGRAM, SHEET E2.
3. PROVIDE 120V POWER AND CONTROLS FOR ROLL-UP DOORS. COORDINATE POWER REQUIREMENTS WITH VENDOR.
4. CEILING MOUNTED L5-20R RECEPTACLE FOR CORD REEL FOR TRUCK DRYDOCK. PROVIDE CORD REEL WITH L5-20R ON FEEDER CORD AND 5-15P ON 30' CORD. PROVIDE A BALL STOP ON CORD SO PLUG STOPS AT 90" AFF. COORDINATE LOCATION WITH OWNER.
5. CONNECT SPEAKER TO EXISTING SYSTEM.
6. CONNECT TO EXISTING EXTERIOR LIGHTING CIRCUIT AND SWITCHING.
7. MOTION SENSOR AT 8' AFF TO ACTIVATE LIGHTS AND VENTILATION ON TRUCK MOVEMENT. ADJUST/MASK SENSOR LENS TO SEE MOTION AT 8' AFF AND HIGHER.
8. PROVIDE WITH A WEATHERPROOF WHILE-IN-USE COVER. TAYMAC #MM510C OR EQUIVALENT.
9. REPLACE EXISTING RECEPTACLE WITH GFCI. PROVIDE WITH A WEATHERPROOF WHILE-IN-USE COVER. TAYMAC #MM510C OR EQUIVALENT.
10. DEMOLISH RECEPTACLE. REROUTE CIRCUITING TO NEW RECEPTACLE LOCATED TO THE EAST MARKED WITH FLAG NOTE 8. REMOVE ALL ABANDONED CONDUIT AND WIRING.
11. DISCONNECT GAS FIRED HEATER AND REMOVE ABANDONED CONDUIT AND WIRING. INCLUDE IN DEDUCT ALTERNATE #3.
12. PROVIDE JUNCTION BOX AND CONDUIT FOR THERMOSTAT. SEE DETAIL, SHEET E2.
13. PROVIDE NEW CIRCUIT BREAKERS AS NEEDED IN THESE PANELS FOR NEW BRANCH CIRCUITS.
14. INCLUDE IN DEDUCT ALTERNATE #1.
15. INCLUDE IN DEDUCT ALTERNATE #3.

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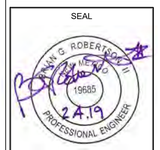

EL DORADO FIRE + RESCUE STATION NO. 1
APPARATUS BAY ADDITION
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LUMINAIRE SCHEDULE

TYPE	DESCRIPTION	MOUNTING	RECESS DEPTH	LUMEN OUTPUT	COLOR TEMP. (K)	INPUT WATTS	VOLT	MANUFACTURER	CATALOG NUMBER	SPECIFIC NOTES
S1	SURFACE MOUNTED 1X2 LOW BAY LED FIXTURE, 0-10V DIMMING, FROSTED LENS	SURFACE	N/A	11750	4000	110	120	KOMEE	KMLHX-11040FL-W-UD	1
S2	SURFACE MOUNTED 4' LED STRIP FIXTURE, DIMMING, FROSTED LENS	SURFACE	N/A	3850	4000	30	120	KOMEE	KMIL4-3040F-WH-UD	1
W1	12" W X 9.25" D X 5.5" H WALL PACK, FULL CUT OFF OPTICS (B1-U0-G1), DARK BRONZE, BUILT-IN MOTION SENSOR, WET LOCATION, COLD WEATHER	WALL SURFACE	N/A	6609	4000	52	120	PHILIPS	102L-32L-530-NW-G1-3-120-IMIR2-BK	

GENERAL NOTES:

A. THE LUMINAIRE SCHEDULE CAN NOT BE USED INDEPENDENTLY OF THE DRAWINGS AND SPECIFICATIONS TO OBTAIN LUMINAIRE COSTS. THE INDIVIDUAL ESTABLISHING LUMINAIRE COSTS SHALL NOT QUOTE PRICING WITHOUT FIRST SEEING APPLICABLE ELECTRICAL DRAWINGS AND ELECTRICAL DIVISION SPECIFICATIONS. THE CONTRACTOR IS REPONSIBLE FOR PROVIDING NECESSARY DRAWINGS AND SPECIFICATIONS TO THE INDIVIDUAL QUOTING LUMINAIRE PRICING.

B. REFER TO DRAWINGS FOR FIXTURES REQUIRING EMERGENCY BATTERY BACKUP OPTION (SHOWN BY HATCH IN/OVER SYMBOL). MINIMUM LIGHT OUTPUT FOR EM BALLAST SHALL BE 600 LUMENS.

C.

SPECIFIC NOTES:

(1) SURFACE MOUNT FIXTURE UNLESS GAS PIPING OR OTHER SYSTEMS REQUIRE FIXTURE TO BE SUSPENDED BY CHAINS BELOW PIPING.
(2)
(3)
(4)

MECHANICAL EQUIPMENT SCHEDULE

MARK	DESCRIPTION	VOLT / PHASE	HP	WATTS	FLA	MCA	MOCP	STARTER	DISCONNECT/ FUSE SIZE	FEEDER	CIRCUIT	SPECIFIC NOTES
EF-1	AIR-VAC 911 INTERIOR AIR FILTER	120 / 1	3/4 HP	-	13.0 A	-	-	-	SNAP SWITCH	20(2WG)	S1-24	
EF-2	AIR-VAC 911 INTERIOR AIR FILTER	120 / 1	3/4 HP	-	13.0 A	-	-	-	SNAP SWITCH	20(2WG)	S1-26	
EF-3	AIR-VAC 911 INTERIOR AIR FILTER	120 / 1	3/4 HP	-	13.0 A	-	-	-	SNAP SWITCH	20(2WG)	S1-36	2
EF-4	AIR-VAC 911 INTERIOR AIR FILTER	120 / 1	3/4 HP	-	13.0 A	-	-	-	SNAP SWITCH	20(2WG)	S1-38	2
RH-1	TUBULAR RADIANT GAS FIRED HEATER	120 / 1	-	-	-	3.0 A	-	-	SNAP SWITCH	20(2WG)	S1-28	
RH-2	TUBULAR RADIANT GAS FIRED HEATER	120 / 1	-	-	-	3.0 A	-	-	SNAP SWITCH	20(2WG)	S1-3	1, 3
RH-3	TUBULAR RADIANT GAS FIRED HEATER	120 / 1	-	-	-	3.0 A	-	-	SNAP SWITCH	20(2WG)	S1-3	1, 3
RP-1	ELECTRICAL RADIANT PANEL	120 / 1	-	-	-	6.0 A	-	-	SNAP SWITCH	20(2WG)	S1-30	
RP-2	ELECTRICAL RADIANT PANEL	120 / 1	-	-	-	6.0 A	-	-	SNAP SWITCH	20(2WG)	S1-30	

GENERAL NOTES:

A. SEE SPECIFICATIONS FOR ELECTRICAL DIVISION AND MECHANICAL DIVISION MOTOR STARTER COORDINATION.
B. PROVIDE PHASE PROTECTION FOR ALL THREE PHASE MOTORS ABOVE 7-1/2 HP.
C. PROVIDE ALL EXTERIOR DISCONNECTS WITH NEMA 3R RATING.
D. WHEN EQUIPMENT IS LISTED WITH ONLY A HORSEPOWER RATING THE DISCONNECT AND FEEDER ARE SIZED PER THE N.E.C.

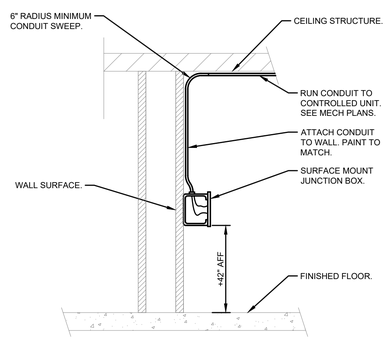
SPECIFIC NOTES:

(1) EXTEND EXISTING CIRCUIT TO NEW RADIANT HEATER.
(2) INCLUDE IN DEDUCT ALTERNATE #1.
(3) INCLUDE IN DEDUCT ALTERNATE #3.
(4)

WIRING SCHEDULE - COPPER

AMPS	(2WG) 1Ø, 2 WIRE, GROUND	(3WG) 1Ø, 3 WIRE, GROUND OR 3Ø, 3 WIRE, GROUND	(4WG) 3Ø, 4 WIRE, GROUND
20	(2#12 & 1#12 G) 3/4"C	(3#12 & 1#12 G) 3/4"C	(4#12 & 1#12 G) 3/4"C
30	(2#10 & 1#10 G) 3/4"C	(3#10 & 1#10 G) 3/4"C	(4#10 & 1#10 G) 3/4"C
40	(2#8 & 1#10 G) 3/4"C	(3#8 & 1#10 G) 3/4"C	(4#8 & 1#10 G) 1"C
50	(2#6 & 1#10 G) 3/4"C	(3#6 & 1#10 G) 1"C	(4#6 & 1#10 G) 1"C
60	(2#4 & 1#10 G) 1"C	(3#4 & 1#10 G) 1"C	(4#4 & 1#10 G) 1 1/4"C
70	(2#4 & 1#8 G) 1"C	(3#4 & 1#8 G) 1 1/4"C	(4#4 & 1#8 G) 1 1/4"C
80	(2#2 & 1#8 G) 1"C	(3#2 & 1#8 G) 1 1/4"C	(4#2 & 1#8 G) 1 1/2"C
90	(2#2 & 1#8 G) 1"C	(3#2 & 1#8 G) 1 1/4"C	(4#2 & 1#8 G) 1 1/2"C
100	(2#1 & 1#8 G) 1 1/4"C	(3#1 & 1#8 G) 1 1/2"C	(4#1 & 1#8 G) 1 1/2"C

CONDUCTOR SIZES ARE BASED ON 60° TERMINATIONS LESS THAN 100A AND 75° TERMINATIONS GREATER THAN 100A
CONDUIT SIZES ARE BASED ON NEC TABLE 4 (RNC) AND TABLE 5 (THHN INSULATION).



3 THERMOSTAT ROUGH-IN DETAIL - SURFACE MOUNT
SCALE: NTS

LOAD CALCULATIONS:

THE EXISTING SERVICE DEMAND LOAD IS NOT KNOWN. THE CALCULATION FOR PANEL S1 IS AN ESTIMATE ONLY. THE CONTRACTOR SHALL PROVIDE TO THE ENGINEER EITHER 12 MONTHS OF DEMAND METERING UTILITY BILLS DATA OR 30 DAYS OF DEMAND METERING PER NEC 220.87. UPON DELIVERY OF EITHER SETOF DATA, THE ENGINEER SHALL CONFIRM SERVICE SIZE IS ADEQUATE TO SUPPORT THE NEW ELECTRICAL LOADS OR WILL PROVIDE A DESIGN TO UPGRADE THE SERVICE CAPACITY.

PANEL:	S1 (EXISTING)
LOCATION:	EQUIP ROOM
MOUNTING:	RECESSED

VOLTAGE:	120/240V, 1PH, 3W
MINIMUM BUS:	400
MAIN:	400/2 CB
MINIMUM AIC:	

NO.	LOAD A	LOAD B	TYPE	LOAD DESCRIPTION	BREAKER POLE	BREAKER TRIP	BUS A	BUS B	BREAKER TRIP	BREAKER POLE	TYPE	LOAD DESCRIPTION	LOAD A	LOAD B	NO.
1				SPACE			+		20	1	E	GENERATOR HEATER	800		2
3		720	E	**RH-2, RH-3**	1	20		+	20	1	R	COUNTER RECEPT		720	4
5	900		R	**BAY-3 RECEPT**	**1**	**20**	+					SPACE			6
7		900	R	**BAY-3 RECEPT**	**1**	**20**		+	20	1	R	PANEL RM RECEPT		540	8
9	2400		E	KITCHEN BASEBOARD	2	30	+		20	1	R	BATH GFCI RECEPT	360		10
11		2400	E					+	30	2	A	DRYER		2000	12
13	2400		E	BATH/ELEC B.B.	2	30	+				A		2000		14
15		2400	E					+	20	2	E	OFFICE 1, 2, 3 B.B.		1000	16
17	2400		E	BASEBOARD	2	30	+				E		1000		18
19		2400	E					+	20	2	E	BASEBOARD		1200	20
21	2400		E				+				E		1200		22
23		2400	E	WELDER	2	30		+	**20**	**1**	M	**BAY 3 EF-1**		1560	24
25				SPARE	2	30	+		**20**	**1**	M	**BAY 3 EF-2**	1560		26
27								+	**20**	**1**	E	**BAY 3 RH-1**		360	28
29				SPARE	1	20	+		20	1	E	**BAY 3 RH-1, RP-1, RP-2**	1440		30
31		4500	A	RANGE	2	50		+	20	1	A	RANGE HOOD		800	32
33	4500		A				+		**20**	**1**	R	**STORAGE RECEPT**	900		34
35				SPACE				+	**20**	**1**	M	**EF-3**		1560	36
37	540		R	GARAGE RECEPT	1	20	+		20	1	M	**EF-4**	1560		38
39		1200	A	WASHER	1	20		+	125	2		PANEL E		9374	40
41	720		R	COUNTER GFCI RECEPT	1	20	+						8220		42

LOAD TYPE	PANEL TOTAL	FEED THRU TOTAL	SUBFEED TOTAL	FEEDER SUBTOTAL	DEMAND	FEEDER TOTAL
(L) LIGHTING	0		6618	6618	125%	8273
(R) RECEPTACLES	5580		4320	9900	NEC 220	9900
(LM) LRG. MOTOR	0		0	0	25%	0
(M) MOTORS (ALL)	6240		5016	11256	100%	11256
(E) EQUIPMENT	26920		1640	28560	100%	28560
(A) APPLIANCES	15000		0	15000	4	12000
				PANEL TOTAL (KVA):		70.0
				PANEL TOTAL (A):		292

GENERAL NOTES:

A. EXISTING PANEL LABELS AND ESTIMATED LOADS
SHOWN ARE FOR REFERNCE ONLY.
B. NEW CIRCUITS AND CB SHOWN IN BOLD.
C.
D.

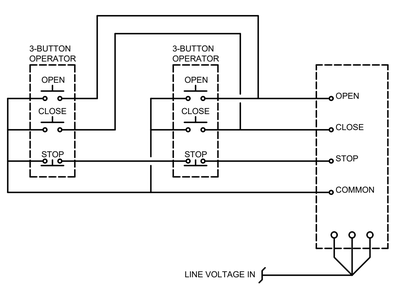
SPECIFIC NOTES:

(1)
(2)
(3)
(4)
(5)

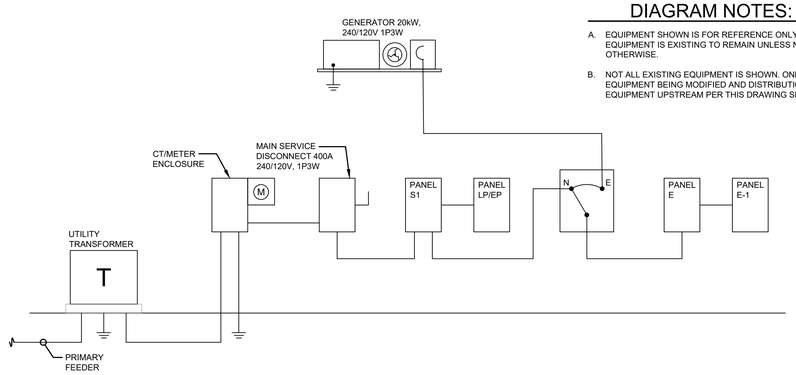
ELECTRICAL ONE-LINE DIAGRAM NOTES:

A. EQUIPMENT SHOWN IS FOR REFERENCE ONLY. ALL EQUIPMENT IS EXISTING TO REMAIN UNLESS NOTED OTHERWISE.

B. NOT ALL EXISTING EQUIPMENT IS SHOWN. ONLY EQUIPMENT BEING MODIFIED AND DISTRIBUTION EQUIPMENT UPSTREAM PER THIS DRAWING SET.



2 ROLL-UP DOOR CONTROL WIRING DIAGRAM
SCALE: NTS



1 ELECTRICAL ONE-LINE DIAGRAM
SCALE: NTS

PANEL:	E (EXISTING)
LOCATION:	EQUIP ROOM
MOUNTING:	RECESSED

VOLTAGE:	120/240V, 1PH, 3W
MINIMUM BUS:	250
MAIN:	MLO
MINIMUM AIC:	

NO.	LOAD A	LOAD B	TYPE	LOAD DESCRIPTION	BREAKER POLE	BREAKER TRIP	BUS A	BUS B	BREAKER TRIP	BREAKER POLE	TYPE	LOAD DESCRIPTION	LOAD A	LOAD B	NO.
1	720		R	BAY OUTLETS WEST	1	20	+		60	2		PANEL E-1	3088		2
3		912	M	GARAGE DOOR	1	20		+						2760	4
5	512		L	TRAINING RM LIGHTS	1	20	+		20	1	E	FRIDGE OUTLET	800		6
7		512	L	KITCHEN/BATH LIGHTS	1	20		+	20	1	R	COMP/CHIEF OFFICE		720	8
9	912		M	GARAGE DOOR	1	20	+		20	1	L	OFFICE LIGHTS	512		10
11		256	E	EQUIPMENT RM LIGHTS	1	20		+	20	1	L	BAY LIGHTS		1200	12
13	970		L	**BAY 3/STOR LIGHTS**	**1**	**20**	+		20	1	R	NETWORK OFFICE OUT	720		14
15		1140	M	**BAY 3 GARAGE DOOR**	**1**	**20**		+				SPACE			16
17	1140		M	**BAY 3 GARAGE DOOR**	**1**	**20**	+					SPACE			18
19		720	R	**BAY-3 CORD REEL**	**1**	**20**		+				SPACE			20
21				SPACE			+					SPACE			22
23				SPACE				+				SPACE			24
25				SPACE			+					SPACE			26
27				SPACE				+				SPACE			28
29				SPACE			+					SPACE			30

LOAD TYPE	PANEL TOTAL	FEED THRU TOTAL	SUBFEED TOTAL	FEEDER SUBTOTAL	DEMAND	FEEDER TOTAL
(L) LIGHTING	3962		2656	6618	125%	8273
(R) RECEPTACLES	2880		1440	4320	NEC 220	4320
(LM) LRG. MOTOR	0		0	0	25%	0
(M) MOTORS (ALL)	4104		912	5016	100%	5016
(E) EQUIPMENT	800		840	1640	100%	1640
(A) APPLIANCES	0		0	0	0	0
				PANEL TOTAL (KVA):		19.2
				PANEL TOTAL (A):		80

GENERAL NOTES:

A. EXISTING PANEL LABELS AND ESTIMATED LOADS
SHOWN ARE FOR REFERNCE ONLY.
B. NEW CIRCUITS AND CB SHOWN IN BOLD.
C.
D.

SPECIFIC NOTES:

(1)
(2)
(3)
(4)
(5)

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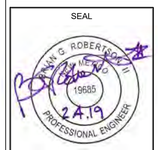
SEAL



EL DORADO FIRE + RESCUE STATION NO. 1
APPARATUS BAY ADDITION
144 AVE VISTA GRANDE, SANTA FE, NEW MEXICO 87508

Current Issue:
100% Construction Documents

Issued:
XXX xx.xx.xx

Sheet Title:

Date:	4 FEB 2019
Designed:	PJM
Reviewed:	MBR
Project No:	10017.00

Sheet No:
E2

Scale: As Shown

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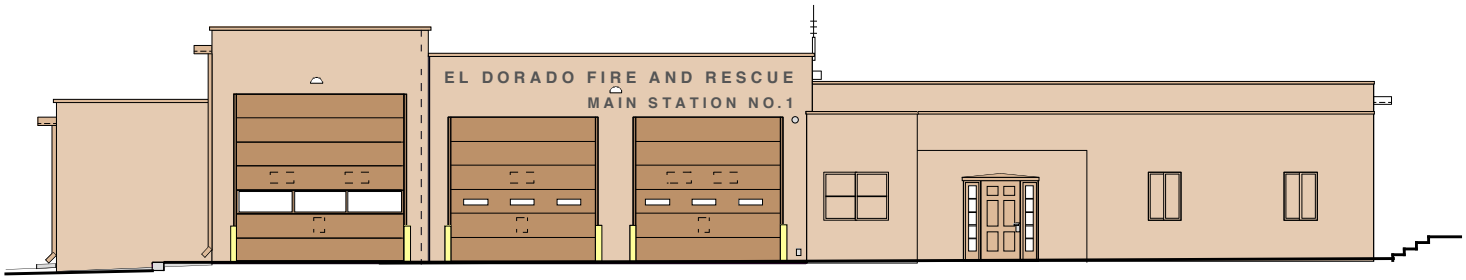
EL DORADO FIRE + RESCUE

SANTA FE COUNTY

EL DORADO FIRE STATION ADDITION

SANTA FE, NM 87507

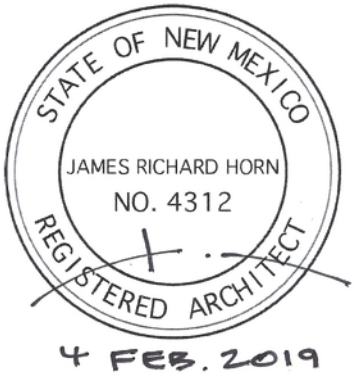
PROJECT 18-11



SPECIFICATIONS / CUT SHEETS MANUAL

FEBRUARY 4, 2019

100% CD SET



SET NO.

SPEARS HORN ARCHITECTS

1334 Pacheco Street, Santa Fe, NM 87505 505-983-6966

A. SPECIFICATIONS

DIVISION 00
PROCUREMENT AND CONTRACTING

Provided as separate document by Santa Fe County.

DIVISION 01
GENERAL REQUIREMENTS

01 10 00 SUMMARY
01 10 10 DOCUMENTS AND PROCEDURES
01 30 00 PROJECT MANAGEMENT AND COORDINATION
01 33 00 SUBMITTAL PROCEDURES
01 40 00 QUALITY REQUIREMENTS
01 50 00 TEMPORARY FACILITIES AND CONTROLS
01 60 00 PRODUCT REQUIREMENTS
01 70 00 EXECUTION AND CLOSEOUT REQUIREMENTS

DIVISION 02
EXISTING CONDITIONS

02 20 10 VEGETATION PROTECTION
02 22 20 SITE DEMOLITION
02 30 00 EARTHWORK

DIVISION 03
CONCRETE

SEE STRUCTURAL SPECIFICATION SHEETS (S0 + S1)

DIVISION 04
MASONRY

SEE STRUCTURAL SPECIFICATION SHEETS (S0 + S1)

DIVISION 05
METAL

SEE STRUCTURAL SPECIFICATION SHEETS (S0 + S1)

DIVISION 06
WOOD AND PLASTIC

06 10 00 ROUGH CARPENTRY

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DIVISION 07
THERMAL AND MOISTURE PROTECTION

07 13 26 SELF-ADHERING SHEET WATERPROOF
07 19 00 WATER REPELLENTS AND SEALANTS
07 21 00 BUILDING INSULATION
07 26 16 INTEGRALLY BONDED UNDERSLAB VAPOR RETARDER
07 54 23 TPO ROOFING – MECHANICALLY FASTENED
07 60 00 FLASHING AND SHEET METAL
07 90 00 SEALANTS

DIVISION 08
OPENINGS

08 10 00 METAL DOORS AND FRAMES
08 36 00 OVERHEAD DOORS
08 50 00 CLAD WOOD WINDOWS + ENTRANCES
08 71 00 DOOR HARDWARE

DIVISION 09
FINISHES

09 24 00 PORTLAND CEMENT PLASTER
09 25 00 GYPSUM BOARD
09 67 23 RESINOUS FLOORING
(AIRCRAFT HANGAR / INDUSTRIAL PLANT COATING SYSTEM)

09 91 13 EXTERIOR PAINTING
09 91 23 INTERIOR PAINTING
09 97 23 CONCRETE AND MASONRY COATINGS

DIVISION 10
SPECIALTIES

10 00 00 METAL LETTERS SIGNAGE
10 42 00 JOB CONSTRUCTION SIGN
10 52 20 FIRE EXTINGUISHERS

DIVISION 22
PLUMBING

22 00 10 MECHANICAL GENERAL PROVISIONS (**BGBW**)
22 00 50 MECHANICAL BASIC MATERIALS AND METHODS (**BGBW**)
22 13 13 SANITARY WASTE AND VENT PIPING (**BGBW**)
22 40 00 PLUMBING FIXTURES (**BGBW**)

DIVISION 23
HEATING, VENTILATING AND AIR CONDITIONING (HVAC)

23 05 93 TESTING, ADJUSTING, AND BALANCING FOR HVAC (**BGBW**)

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DIVISION 26
ELECTRICAL

26 00 51 COMMON WORK RESULTS FOR ELECTRICAL (**BGBW**)
26 05 29 HANGER AND SUPPORTS FOR ELECTRICAL SYSTEMS (**BGBW**)
26 05 33 RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS (**BGBW**)
26 05 48 VIBRATION AND SEISMIC CONTROLS FOR ELEC. SYSTEMS (**BGBW**)
26 05 53 IDENTIFICATION FOR ELECTRICAL SYSTEMS (**BGBW**)
26 09 23 LIGHTING CONTROL DEVICES (**BGBW**)
26 27 26 WIRING DEVICES (**BGBW**)
26 51 19 LED INTERIOR LIGHTING (**BGBW**)
26 52 19 EMERGENCY AND EXIT LIGHTING (**BGBW**)
26 56 19 EXTERIOR LIGHTING (**BGBW**)

DIVISION 32
EXTERIOR IMPROVEMENTS

32 12 16 ASPHALTIC PAVING
32 17 23 PAVEMENT STRIPING
32 92 19 SEEDING

DIVISION 34
TRANSPORTATION

34 71 13 VEHICLE BARRIERS

B. CUT SHEETS AND PRODUCTS

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SECTION 01 10 00 SUMMARY

PART 1 - GENERAL

1.01 SUMMARY

A. Project Name and Location:

EL DORADO FIRE AND RESCUE STATION NO. 1
APPARATUS BAY ADDITION
SANTA FE COUNTY FIRE DEPARTMENT
144 AVENIDA VISTA GRANDE, SANTA FE, NM 87508

Project Scope - This work includes, but is not limited to the following:

1. **Provide and or oversee all phases of construction of Architectural, Civil, Structural, Mechanical, Electrical, Plumbing Drawings for a 1,550 SF addition to the existing 3,080 SF El Dorado Fire + Rescue building on an existing 2 acre site in Eldorado, NM. The building addition includes an 18' wide x 70' long Apparatus Bay and a 13' x 22' Storage Room. The new Apparatus Bay is intended to blend with the existing facility with materials and colors, and will include large 14' x 14' Overhead Doors, new heating and exhaust filtration system, and new metal signage.**

   The existing building renovation will include re-painting existing overhead doors, restuccoing adjacent surfaces to addition, existing roof adjusted to accommodate proper drainage, and openings between existing and new bays will be provided.

   Site work includes retiring the existing septic system that is in the area of addition, and providing a new septic system. Adjusting asphalt driveway around new bay doors and water retention from roof run-off will also be part of work.

   If funds available the existing bays will receive repainting and new heating and exhaust filtration system.

PART 2 – EXECUTION

2.01 SPECIAL REQUIREMENTS

A. Construction Barrier:
- The above-mentioned project is located in El Dorado just outside of Santa Fe, NM and maintaining access for the fire department is paramount during demolition and construction. Temporary fencing will be required by Contractor to enclose the staging / mobilization area and provide neighborhood safety and control noise, dirt, etc. Prior to demolition areas of chain link fencing + gates are to be reviewed and discussed by Contractor, Project Manager, and Architect for final approval of implementation.

SECTION 01 10 00 SUMMARY

B. **100% CD SET -** 2/4/2019 includes the following:
   1. This specification booklet.
   2. Drawing Set.

D R A W I N G I N D E X

CS COVER SHEET

CIVIL / SURVEY

- TOPO MAP (2/14/18 DAWSON) 1" = 20'
C101 SITE UTILITY PLAN 1"=10'
C501 MISCELLANEOUS DETAILS

ARCHITECTURAL

L0 SITE PLAN – STAGING + DEMO 1/16" = 1-0"'
L1 SITE PLAN - GRADING + DRAINAGE 1/16" = 1-0"'

A0 CODE ANALYSIS 1/4" = 1'-0"

A1 FLOOR PLAN - DEMO 1/4" = 1'-0"
A2 FOUNDATION PLAN 1/4" = 1'-0"
A3 ROOF FRAMING PLAN 1/4" = 1'-0"
A4 FLOOR PLAN - NEW 1/4" = 1'-0"

A5.1 EXTERIOR ELEVATIONS 1/4" = 1'-0"
A5.2 EXTERIOR ELEVATIONS 1/4" = 1'-0"
A5.3 ROOF PLAN 1/4" = 1'-0"

A6.1 BUILDING SECTIONS 1/4" = 1'-0"
A6.2 BUILDING SECTIONS 1/4" = 1'-0"

A7.1 WALL SECTIONS 3/4" = 1'-0"
A7.2 WALL SECTIONS 3/4" = 1'-0"

A8 REFLECTED CEILING PLAN 1/4" = 1'-0"
A9 WINDOW / DOOR / FINISH SCHEDULES

A10.1 DETAILS - BUILDING
A10.2 DETAILS - SITE

STRUCTURAL

S0 STRUCTURAL SPECIFICATIONS
S1 STRUCTURAL SPECIFICATIONS
S2 STRUCTURAL DETAILS
S3 STRUCTURAL DETAILS
S4 STRUCTURAL DETAILS

SECTION 01 10 00 SUMMARY

MECHANICAL

M0 MECHANICAL NOTES
M1 MECHANICAL PLAN - **DEMO + NEW** 1/8" = 1'-0"
M6 MECHANICAL SCHEDULES

FIRE PROTECTION
N/A

ELECTRICAL

E0 ELECTRICAL NOTES
E1 ELECTRICAL LIGHTING PLAN 1/8" = 1'-0"
E2 ELECTRICAL SCHEDULES

END OF SECTION

SECTION 01 10 10 DOCUMENTS AND PROCEDURES

PART 1 - GENERAL

1.01 Documents

A. All work shall be according to the requirements of the Contract Documents. It is the responsibility of the Contractor and Subcontractors to fully inform themselves and to comply with all requirements of the Contract Documents. Requirements of the Owner-Contractor Agreement, General and Supplemental Conditions, and General Requirements apply to all Work of the Project.

1.02 Specifications

A. The following specifications are complementary to the requirements of the Drawings and other Contract Documents and what is required by one shall be as binding as if required by all. In the case of discrepancy between the specifications and drawings, the contractor shall ask the Architect for clarification, and shall be held to the most stringent requirement unless otherwise directed in writing by the Architect.

1.03 Scope

A. Under an agreed upon **stipulated sum price** with the Owner, the Contractor shall provide in conformance with the Contract Documents, all labor, materials, fees, payments, equipment and transportation required for the site work, construction and cleanup for a completely finished and functional project. It is the intent of the Contract Documents to provide the Owner with new construction built from materials of the specified quality, and constructed with the best quality of workmanship available in northern New Mexico.

B. **ALTERNATES**
Provide in bid itemized DEDUCTIVE ALTERNATIVES based on list on the Cover Sheet of the Construction Documents.

1.04 Compliance with Codes

A. The Contractor's work shall be performed in compliance with all applicable codes, laws and regulations and with all governing authorities having jurisdiction over the Project in respect to all aspects of the Work including materials, assemblies, methods and safety measures. (Applicable codes include the International Building Code, Life Safety Code, the National Plumbing Code, the National Electrical Code, the Uniform Mechanical Code, and the American National Standards Institute, etc.).

SECTION 01 10 10 DOCUMENTS AND PROCEDURES

1.05 Compliance by Subcontractors

A. It is the responsibility of the Contractor to see that all the Work of this Contract is done according to all the provisions of the Contract Documents. Each Subcontractor shall have a complete set of Contract Documents and shall be aware that the General Conditions and the Supplemental General Conditions, as a minimum, including: Quality control, Submittals, Product Requirements, and Documents and Procedures (Division 01) apply to his portion of the Work

1.06 Permits, Inspections, Fees, Law and Regulations

A. Permits and licenses necessary for the execution of the Work shall be secured and paid for by the Contractor unless otherwise agreed. The Contractor shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the Work. The Contractor shall obtain inspections required by governing authorities and submit approved inspection tags or reports, including final inspections, with the Application for Final Payment. The Contractor shall pay all taxes required for performance of this Work including gross receipts taxes as a part of the Contract Sum. All required testing referenced in Section 01 10 00 shall be at the Contractor's expense. Contractor shall notify Architect and Owner's Representative of Inspection times and dates should they need to be in attendance.

1.07 Coordination and Supervision

A. The Contractor shall give efficient supervision to the Work and shall see to the coordination and proper phasing of the various trades and subcontractors that affect the conduct and progress of the Work under this Contract. The Superintendent shall represent the Contractor in his absence and all directions given to him shall be binding as if given to the Contractor. Important directions shall be confirmed in writing to the Contractor.

1.08 Intent of Drawings

A. The Drawings are schematic, drawn to scale, and show intended operations, dimensions, configurations, locations, relationships and requirements for proper execution and completion of the Work. It is the intent of the Architect that all necessary dimensions are given in the set of Drawings. If particular dimensions are needed but not apparent on the Drawings, the Contractor shall request such dimensions from the Architect. The Drawings are not to be scaled.

1.09 Field Measurements

A. Contractor shall verify all measurements at the project site, and shall be responsible for their correctness. No compensation shall be allowed because of differences between the dimensions shown on the Drawings and actual field dimensions. Any difference found shall be brought to the attention of the Architect, thus rendering a decision before proceeding further with the Work. In addition, when unforeseen conditions are uncovered during construction, such that the Work as described in the Drawings and Specifications cannot be achieved without modifications thereto, the Architect shall be notified immediately before the Work proceeds further.

1.10 Contractor's Contract Documents

A. The Contractor shall purchase Drawings and Project Manuals as necessary for the execution of the Work. The Contractor shall lend these to his Subcontractors as needed. The Contractor shall maintain at the site one set of all Drawings, Specifications, Project Manual, approved Shop Drawings, change orders and field orders. These shall be available to the Architect and the Owner at all times.

1.11 As-Built Drawings

A. The Contractor is to keep one set of Drawings on which is recorded every change made in the Work shown in the Drawings during the course of construction. This set is to be delivered to the Architect along with all other Contract Document sets as required by SECTION 01 33 00 SUBMITTAL PROCEDURES.

1.12 Standards

A. Whenever the Contract Documents refer to Standard Specifications of an agency or association, or the manufacturer's direction, this shall mean the latest edition or revision thereof, and these specifications or directions shall become part of this Specification with the same effect as though herein written out in full. All other work shall not be less than the minimum standards specified in the current edition of the "New Mexico Standard Specifications for Public Works Construction" as prepared by the New Mexico Chapter of American Public Works Association. These standards are referred to herein as APWA". Contractor to provide own copy(s) of APWA.

1.15 Protection of Surrounding Property

A. The Contractor will take all necessary precautions to protect surrounding property including fencing, walls, trees, utilities, existing building, and concrete walks. The Contractor will repair to the Owner and Architect's satisfaction, and at the Contractor's expense, any damage done to existing property either on the project site or on adjacent properties.

1.16 Cleanup

A. The Contractor at all times shall keep the premises free from accumulation of waste materials or rubbish caused by his operations. At the completion of the Work he shall remove all his waste materials and rubbish from and about the Project as well as all his tools, construction equipment, machinery, temporary utility lines, temporary facilities and surplus materials, and shall clean all surfaces and leave the Work "broom clean" or its equivalent, except as otherwise specified. If the Contractor fails to clean up, the Owner may do so and the cost thereof shall be charged to the Contractor.

1.17 Guarantee

A. The Contractor shall warranty all Work of the Project against all defects or malfunction due to inferior materials or faulty workmanship. If any aspect of the Work fails in the course of normal use during a 1 Year period beginning at the Date of Substantial Completion, the Contractor shall, at his own expense, repair, mend or replace the Work as necessary to restore it to the original required condition as set forth in the Contract Documents.

1.18 Safety Standards

A. Comply with the safety standards required by all applicable laws, building and construction codes, and OSHA.

B. Exercise every precaution at all times for the prevention of accidents and the protection of persons (employees and non-employees) and property.

C. Maintain, at a well-known place at the job site, all articles necessary for giving first aid to the injured, and make standing arrangements for the immediate removal to a hospital or a doctor's care of persons who may be injured on the job site.

D. Proper barricading and fencing between construction areas and general public, visitors, and user agencies (pedestrian, bike, and automobile) will be provided by the contractor and temporarily installed by the contractor to allow

for safe accessibility.

PART 2 - PRODUCTS

Products and installation methods to be the quality specified or greater. Substitutions to the manufacturers and models specified in this document and on any drawing shall be submitted and approved by the architect prior to instillation. Substitutions not approved by the Architect and Owner will be replaced with the specified product by the Contractor, at no additional cost to the Owner.

PART 3 - EXECUTION – *NOT USED*

END OF SECTION

SECTION 01 30 00 PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.01 PROJECT SCHEDULE

A. The Contractor shall prepare and submit for the Architect's approval, within two weeks from the Contract Date, an estimated project schedule for the Work. The project schedule shall be related to the standard divisions of the Construction Specifications Institute. This schedule shall indicate the dates for the starting and completion of various stages of construction and shall be revised as required by the conditions of the Work, subject to the Architect's approval.

B. Project is estimated to take approximately 6 months from Notice to Proceed to Project Completion.

1.02 SCHEDULE OF VALUES

A. The Contractor shall prepare and submit for the Architect's approval, within two weeks from the Contract Date, a cost breakdown for the entire amount of the Contract. This is to be done by the standard Construction Specifications Institute divisions. Include overhead, profit and taxes in each line item. List allowances separately.

1.03 REQUIRED INSPECTIONS

A. The Contractor shall obtain inspections and approvals by the Architect at completion of the following phases and prior to proceeding with subsequent operations:

1. **COMPLETION OF STAKING, PRELIMINARY GRADING & COMPACTION**

2. **COMPLETION OF FORMWORK, SUBSLAB WATERPROOFING BARRIER & REBAR, PRIOR TO POURING OF CONCRETE.**

3. **COMPLETION OF ALL CONCRETE WORK, PRIOR TO FRAMING.**

4. **COMPLETION OF ALL FRAMING (WALLS/ROOF), PRIOR TO INSTALLATION OF WATERPROOFING.**

5. **COMPLETION OF ROOF, INCLUDING COMPLETION OF INSTALLATION OF NEW DRAIN LINES AND GUTTER / DOWNSPOUT SYSTEM.**

6. **COMPLETION OF INSTALLATION OF WINDOW UNITS & WATERPROOFING .**

7. **COMPLETION OF NEW STUCCO SYSTEM.**

8. **WALK-THRU PRIOR TO ROUGH IN OF EACH: PLUMBING, ELECTRICAL, MECHNICAL.**

9. **COMPLETION OF ROUGH IN OF EACH: MECHANICAL, ELECTRICAL, PLUMBING.**

10. **COMPLETION OF GYP. BOARD, FLOORING PRIOR TO PROTECTION.**

11. **COMPLETION OF INSTALLATION OF PLUMBING AND ELECTRICAL FITTINGS / FIXTURES.**

12. **PRIOR TO/ COMPLETION OF PAINTING AND APPLICATION OF SPECIAL FINISHES.**

13. **PRIOR TO / COMPLETION OF INSTALLATION OF FURNISHINGS.**

14. **PRELIMINARY WALK-THROUGH(S) & PUNCH-LIST(S) (REPEATED AS NEEDED).**

15. **FINAL WALK-THROUGH UPON COMPLETION OF ALL PUNCH-LISTED ITEMS.**

B. All required inspections from CID.

C. If such inspections and approvals are not obtained, the Contractor shall be required to totally expose such work to obtain inspection and approval, and shall reconcile it at no expense to the Owner or the Architect. The Contractor shall give at least 24 hours notice, and preferably 48, for requested inspections.

1.4 CONSTRUCTION MEETINGS

A. To be held **bi-weekly** at the construction site and conducted by **Contractor**, to include **Santa Fe County Project Manager** and **Architect**.

B. To include meeting minutes and project schedule updates provided by **Contractor**.

SECTION 01 30 00 PROJECT MANAGEMENT AND COORDINATION

1.05 INSPECTION OF PREVIOUS WORK:

A. The Contractor, or his subcontractors, shall be responsible for the inspection and approval of previous Work which affects his Work, and shall determine if such previous Work conforms to the standards of cleanliness, trueness, adequacy, soundness or other conditions required for the proper execution of his Work. Should the previous Work not conform to the required standards, the Contractor or his Subcontractors shall notify the Architect of such nonconformance and shall take corrective measures to obtain results in accordance with the Contract Documents. Failure of the Contractor, or of his Subcontractors, to notify the Architect of such discrepancies implies approval and acceptance of the nonconforming condition by the Contractor or by his Subcontractors. If this condition adversely affects his Work it shall be redone to satisfy the requirements of the Contract Documents with no additional expense to the Owner, and no such claim for extra cost shall be allowed. Initiation of Work in a location shall indicate the Contractor's acceptance of substrates and previous Work.

PART 2 - PRODUCTS – *NOT USED*

PART 3 - EXECUTION – *NOT USED*

END OF SECTION

SECTION 01 33 00 SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.01 Shop Drawings and Samples

A. The Contractor shall review, verify conformance with the Contract Documents, and promptly submit all Shop Drawings and samples required by the Contract Documents. Shop Drawings and samples shall be fully identified. At the time of submission the Contractor shall inform the Architect in writing of any deviation in the Shop Drawings or samples from requirements in the Contract Documents. The Architect's approval of a separate item shall not indicate approval of an assembly in which the item functions. The Contractor shall make any corrections required by the Architect, and shall resubmit the required Shop Drawings or new samples until approved. Provide at least three copies of each submittal. Architect will generally keep one copy, file one copy for the owner, and return the remainder copy. These include but are not limited to:

SAMPLES:
- Glazing (all types used).
- Color coat stucco, color and texture.
- Metal coping and Flashing.
- Window weatherproofing.
- Paints and Floor finishes.
- Aluminum Building Name letters
- Door and window color samples on specified base material.

SHOP DRAWINGS - minimum:
- Steel
- Windows and Doors
- Mechanical, Electrical, Plumbing Equipment
- Septic System

1.02 Timely Performance

A. Immediately upon execution of the Contract the Contractor will commence the preparation of submittals so that materials, equipment, hardware and specialty items can be delivered on time. The Contractor will provide submittals within **thirty working days** of the signing of the contract for all items that could potentially cause a project delay.

1.03 Approvals

A. The Architect's approval of Shop Drawings or samples shall not relieve the Contractor of responsibility for any deviation from the requirements of the

Contract Documents unless the Contractor has informed the Architect in writing of such specific deviation at the time of submission and the Architect has given written approval of the specific deviation; nor shall the Architect's approval relieve the Contractor from responsibility for errors or omissions in the Shop Drawings and samples.

B. No portion of the Work requiring a Shop Drawing or sample submission shall be commenced until the submission has been approved by the Architect. The Architect will respond to all materials submittals within **five working days** except items, which must be reviewed by the Architect's consultants. The Architect will respond to materials submittals that require review by the Architect's consultants within **fifteen working days**.

C. Approval by Architect for any submission, including shop drawings, samples, and substitutions, does not indicate additional funds to be provided outside of contract amount.

1.04 Final Submittal

A. Upon issuance of the Certificate of Substantial Completion, but before final payment, the Contractor shall submit to the Architect the following:

01. All warranties certificates of inspection, releases of lien, Consent of Surety to Final Payment, and other performance document.
02. All suppliers' and Subcontractors' names and addresses, with a list of the work or equipment each furnished.
03. Trade name and manufacturer colors and types of all paints and applied finishes.
04. All manufacturers' information on equipment, products, or systems, including instructions, manuals, warranties, warnings, etc.
05. All sets of Contract Documents given to or purchased by the Contractor, including the marked up as-built set.
06. **Contractor to provide maintenance schedule for window/door elements, mechanical, plumbing systems.**

B. Certificates of Inspection, Certificate of Occupancy, and Items No. 3 and 4 shall be submitted as received / executed. All other items shall be submitted upon project closeout.

PART 2 - PRODUCTS *– NOT USED*
PART 3 - EXECUTION *– NOT USED*

END OF SECTION

SECTION 01 40 00 QUALITY REQUIREMENTS

PART 1 – GENERAL

1.01 SCOPE OF WORK OR REQUIREMENTS:

A. Requirements in this Section: This Section covers general requirements for quality control throughout the Work including qualifications of contractors, installers, and manufacturers, testing and inspection procedures, product handling, delivery and storage, and general coordination.

1. Requirements Not in this Section:

a. Specific qualification requirements, which pertain to various Sections.

b. Specific testing of materials and products by other agencies other than those specified within this Section.

c. Specific handling, delivery, and storage requirements which pertain to the various Sections.

d. Other quality control and assurance requirements, which are specific in nature and pertain only to the various Sections.

1.02 QUALIFICATIONS OF CONTRACTORS, INSTALLERS AND MANUFACTURERS:

A. Qualifications of Contractors and Installers: The contractor and subcontractors shall use only qualified journeyman installers or applicators who are completely familiar with and thoroughly trained and experienced in the skills and methods required for the proper installation of the products and materials specified and the requirements of the work. Furthermore, the Contractor or subcontractors shall provide at least one (1) thoroughly knowledgeable English speaking person who shall be present at all times during the execution of their specific work. In acceptance or rejection of the Work, no allowance will be made for lack of skill on the part of installers, applicators, subcontractors or the Contractor.

B. Qualifications of Manufacturer: The manufacturer of the products and materials shall demonstrate by submittals to the Architect if requested or as expressly specified in the various Sections of the Specifications that the products and materials meet or exceed the requirements specified or intended.

1.03 TESTING AND INSPECTION REQUIREMENTS AND PROCEDURES:

SECTION 01 40 00 QUALITY REQUIREMENTS

A. General Testing and Inspection Requirements and Procedures:

1. Materials to be furnished under the various Sections of the Specifications are subject to testing and inspection for compliance with requirements of the Drawings and Specifications.

2. Testing Laboratory or Agency shall be a diversified licensed Testing Laboratory or Agency capable of testing and evaluating the materials and assemblies specified hereinafter and shall meet the requirements of ASTM E329. Testing Laboratory shall be currently approved and certified by I.C.B.O., approved by Architect and shall be engaged at Contractor's expense and referred to hereafter as the Testing Laboratory. Testing Laboratory duties shall include, but shall not necessarily be limited to performing testing and evaluation reports on and Specification Sections: Concrete and compaction at excavations and trenches.

3. Disqualified Material: Material shipped or delivered to the site by Contractor from the source of supply prior to having satisfactorily passed required testing and inspection, shall not be incorporated in the work, until such time as approval is rendered.

B. Test Samples and Procedures:

1. Test Samples: Furnish and deliver samples of materials to be tested at no extra cost to Owner. Test samples shall be selected by Architect or Testing Laboratory and not by Contractor.

2. Test Procedure: Testing Laboratory shall perform tests according to ASTM or other methods of test specified for the various materials under other Sections. If no procedure or test method is specified, Testing Laboratory shall tag, seal, label, record, or otherwise suitably identify the materials samples for testing and no such materials shall be used in the Work until the test result reports are submitted and approved, excepting only the materials specified to be placed or installed prior to testing.

3. Testing Repeating: Applicable tests shall be repeated at the specified intervals, whenever the source of supply is changed, or whenever the characteristics of the materials change or vary in the opinion of Architect or when initial tests fail to meet requirements as specified in the various Sections of the Specifications.

C. Test Costs and Test Reports:

1. Test Costs: The Contractor shall pay for all testing performed as specified in the Contract Documents. The Contractor shall pay for all tests and for costs of additional tests made on materials or work failing to meet the requirements of the Contract Documents.

2. Test Reports: Testing Laboratory shall submit copies of each test result report directly to Architect in accordance with SECTION 013100 of these Specifications, signed and certified by the Testing Laboratory Supervising Engineer.

D. Inspections, Continuous and Special:

1. If the laws, ordinances, rules, regulations, or orders of any public agency having jurisdiction require any of the Work to be specifically inspected, tested, or approved by some authority other than Architect, the Contractor shall give all required notices and make all arrangements. Contractor shall deliver to Architect certificates of inspection, testing, or approval of such public agency, and shall pay all costs thereof unless otherwise provided in the Contract Documents.

E. Contractor Furnished Assistance:

1. Whenever requested, Contractors shall furnish access, facilities, and labor assistance as necessary for the inspection to be performed at the site by the Testing Laboratory, Architect and Owner, including furnishing ladders, hoisting, temporary lighting and water supply and like services.

1.04 PRODUCT HANDLING, DELIVERY AND STORAGE:

A. Deliver products and materials to jobsite in a timely manner to ensure uninterrupted progress. In general and to the greatest extent possible, deliver products and materials in manufacturer's original unopened containers and/or packaging with labels indicating brand names, components and quantity designations or grade marks legible and intact. Do not open containers or packaging, or remove markings until materials are inspected and accepted. Store materials off of ground and in accordance with manufacturer's directions. Protect pre-finished surfaces and existing finishes from damage. Use all means necessary to protect the installed work and materials of other trades. In the event of damage, immediately make repairs and replacements necessary for the acceptance and approval of Architect and repair and replace at Contractor's expense.

1.05 COORDINATION:

SECTION 01 40 00 QUALITY REQUIREMENTS

A. General: Coordinate the installation of products and materials specified, required or as indicated on Drawings with other related trades. Prior to installing the work required, confirm the location of interfacing trades. Verify that preparatory work is complete to the point where the installation of the specified product or material may properly commence. In the event of discrepancy or conflicts between interrelating or interfacing trades, materials, etc., immediately notify Architect. Do not proceed with the installation in areas of discrepancy until discrepancies have been fully resolved.

B. Conflicts or Discrepancies: Should conflicts or discrepancies result among the Contract Documents the most stringent requirements or provisions shall govern.

1.06 OPERATION AND MAINTENANCE INSTRUCTIONS:

A. The Owner or Owner's representative is to be instructed fully in the operations, adjustment and maintenance of equipment furnished. Provide at least two (2) weeks notice in writing to Architect in advance of this period.

B. Refer to the Electrical General Provisions and General Provisions for operation, maintenance, testing, and instruction of systems and equipment.

PART 2 – PRODUCTS - NOT USED

PART 3 – EXECUTION - NOT USED

END OF SECTION

SECTION 01 50 00 - TEMPORARY FACILITIES & CONTROL

PART 1 - GENERAL

1.01 Scope

A. Furnish materials and labor to provide temporary facilities and controls during construction, for trades.

1.02 Temporary Sanitary Facilities

A. The Contractor shall furnish a temporary suitable chemical toilet enclosed and weather-tight, of sufficient size to accommodate personnel employed on the job. It shall be maintained in sanitary conditions, and removed at the completion of the Work. The Owner must approve the location before delivery.

1.03 Storage Facilities

A. Owner must approve of storage sheds and shop buildings erected at the site. Storage trailers and storage containers may be accepted. The Owner must approve of the location before delivery.

1.04 Temporary Controls

A. The Contractor shall be responsible for the protection and safety of all Work in progress or completed until the final completion of the Project. The Contractor shall erect construction fences and barriers and safety signs. Such structures must be maintained in a safe, neat condition and must be removed from the Site before final project acceptance by the Owner.

1.05 Temporary Roads and Parking

A. Designate temporary roads and parking. Limit traffic and parking to these designated sites.

1.06 Protection of Site Improvements and Vegetation

A. Protect all existing vegetation on the site. Tag and protect all existing utilities and existing site elements.

1.07 Limit of Operations

A. The location of required construction fencing, access and parking is shown on the Drawings. Contractor must contain all his operations, storage and equipment within the designated area, leaving the remainder of the site

unobstructed and clear.

1.08 Utilities

A. The Owner shall pay for all power and water during construction.

1.9 Temporary Facilities

A. Installation of all temporary facilities shall be at the expense of the general contractor.

PART 2 - PRODUCTS – *NOT USED*

PART 3 - EXECUTION – *NOT USED*

END OF SECTION

SECTION 01 60 00 PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.01 Material Quality

A. Unless otherwise specified, all materials incorporated into the Project shall be new, undamaged, and shall be properly assembled to produce systems, which perform according to the requirements of the Contract Documents. If requested by the Owner, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials.

1.02 Proposed Substitutions

A. The intention of the Contract Documents in using brand names of materials is to indicate type, quality, and performance required and is not intended to preclude competitive bidding. However, the Architect shall not be held to accept any substitutions, which the Contractor may assume to be suitable in his bid, and the Architect shall be considered the sole judge of the quality of any proposed substitution. No oral requests will be considered.

B. The procedure shall be as follows:

01. The Contractor will submit written requests for any substitution **within thirty working days** after the execution of the Contract, including manufacturer's catalog literature, technical drawings and data and samples. Certified quotations from both suppliers of specified items and suppliers of proposed items shall be given to the Architect if requested.

02. Inability of a product to match color, texture, dimensions, quality, performance, or other individual characteristics of a specified product shall be considered as a valid reason for not accepting the substitution.

1.03 Manufacturers' Instructions

A. Manufactured materials incorporated in the work shall be handled and installed according to the directions of the manufacturer unless specifically designated otherwise by the Contract Documents.

1.04 Workmanship

A. All work shall be performed by people who are experienced and skilled in the performance of that particular trade and type of construction.

SECTION 01 60 00 PRODUCT REQUIREMENTS

PART 2 - PRODUCTS – *NOT USED*

PART 3 - EXECUTION – *NOT USED*

END OF SECTION

SECTION 01 70 00 – EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 - GENERAL

1.01 Procedure

A. When the Contractor determines that the Work is substantially complete, the Contractor shall prepare for submission to the Architect a list of items 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. When the Architect, on the basis of an inspection, determines that the Work is substantially complete, will then prepare a Certificate of Substantial Completion, which shall establish the Date of Substantial Completion. The time within which the Contractor shall complete the items listed therein will be **twenty working days**. The Certificate of Substantial Completion shall be submitted to the Owner and the Contractor for their written acceptance of the responsibilities assigned to them in such Certificate. See SECTION 01 33 00 for required final submittals.

1.02 Final Payment

A. Upon receipt of 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 he finds the Work acceptable under the Contract Documents and the Contract fully performed, he will promptly issue a final Certificate for Payment stating that to the best of his knowledge, information and belief, and on the basis of his observations 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 in said final Certificate, is due and payable.

PART 2 - PRODUCTS – *NOT USED*

PART 3 - EXECUTION – *NOT USED*

END OF SECTION

SECTION 02 20 10 – VEGETATION PROTECTION

PART 1 - GENERAL

1.01 Scope:

A. Provide all labor, materials and equipment to install barrier fencing on site to protect existing vegetation.

1.02 Work in Other Sections

A. Final grading and all other planting.

1.03 Warranty

A. Guarantee protection of areas designated on the Drawings. Should Contractor fail to protect these areas, Contractor will restore them to their original condition to the satisfaction of the Architect and at no extra expense to the Owner. Such work will involve replacement of trees and other species at the Architect's discretion.

1.04 Timing

A. The protection barriers must be installed prior to commencement of any work on the site. If the barriers need to be removed for site utility work, tree relocation or other purpose, approval in writing must be obtained from the Architect prior to such work.

PART 2 - PRODUCTS

2.01 Fencing

A. Fencing shall be orange plastic webbing or flagged three strand wire fencing or woven wire fencing and shall be 36" minimum height.

PART 3 - EXECUTION:

3.01 Fencing Location

A. Install fencing as shown on the Drawings. Locate so as to protect tree branches and soil around base of trees. Do not encroach upon the drip line of trees. If unable for any reason to follow the locations shown on the Drawing, obtain approval from Architect prior to any deviation from Drawing.

SECTION 02 20 10 – VEGETATION PROTECTION

3.02 Installation

A. Install fencing securely and neatly with adequate posts to prevent sagging.

3.03 Maintenance

A. Maintain fencing in good condition throughout the job until directed by the Architect to remove it. Immediately repair or replace any damaged fencing.

END OF SECTION

SECTION 02 22 20 SITE DEMOLITION

PART 1 – GENERAL

1.01 SUMMARY

A. Definition:

1. Cutting and Patching:

a. Cutting and patching includes cutting into existing construction to provide for the installation or performance of other work and subsequent fitting and patching required to restore surfaces to their original condition.
b. Perform for coordination of the work, to uncover work for access or inspection, to obtain samples for testing, to perform alterations to be made or for other similar purposes.

B. Coordination:

1. Refer to other sections of these specifications for specific cutting and patching requirements and limitations applicable to individual units of work.

C. Demolition: Required demolition work shall be done by the Contractor. Dispose of debris at a legal dump. Demolition and removal work is indicated on the Drawings and as specified.

1. Demolition, disassembly and removal work as indicated on the Drawings and as specified.

D. Related Sections:

1. Summary of Work: SECTION 01 10 00
2. Project Management and Coordination: SECTION 01 31 00
3. Submittals: SECTION 01 33 00
4. Quality Requirements: SECTION 01 40 00
5. Temporary Facilities and Controls: SECTION 01 50 00
6. General Construction: DIVISIONS 2 THRU 16 as related to this work.

SECTION 02 22 20 SITE DEMOLITION

1.03 DEFINITIONS

A. REMOVE: As used herein, the term remove means remove and legally dispose of items except those indicated to be reinstalled, salvage, or to remain the Owner's property.

B. REMOVE AND SALVAGE: As used herein, the term remove and salvage means items indicated to be removed and salvaged remain the Owner's property. Remove, clean and pack or crate items to protect against damage. Identify contents of containers and deliver to designated storage area.

C. EXISTING TO REMAIN: As used herein, the term existing to remain means protect construction indicated to remain against damage and soiling during demolition. When permitted by the Architect, items may be removed to a suitable, protected storage location during demolition and then cleaned and reinstalled in their original locations.

1.04 SUBMITTALS

A. SCHEDULE OF DEMOLITION ACTIVITIES: Submit detailed schedule indicating detailed sequence of demolition and removal work, with starting and ending dates for each activity.

1.05 QUALITY ASSURANCE

A. Codes and Standards: Comply with the following codes and standards including current editions, revisions and supplements.

1. International Building Code.

2. OSHA – 29CFR Parts 1910, 1915, 1917, 1926, and 1928 Occupational Health and Safety Standards for the Construction Industry, with Amendments.

3. NFPA 241, Building Construction and Demolition Operations.

4. New Mexico Department of Public Health, Licensing Regulations, Part 2. Including Legislative Mandate House Bill 95 as amended Chapter 178, 38th Legislature 1st Session, Law 1987.

B. Coordination:

1. Trades and subcontractors shall coordinate their work, checking with one another before commencing with work to be sure of limits of required work.

2. The Contractor will be ultimately responsible for coordination.

3. Contractor shall coordinate work to ensure shortest possible demolition time in existing building. No work shall be started until material, products and equipment are on hand and all trades ready for a total combined coordinated effort.

C. All equipment and finishes shall be thoroughly protected from water, dust, dirt, paint, debris, and damage at all times.

1.06 HAZARDOUS MATERIAL

A. Hazardous materials and materials/finishes ladened with hazardous materials shall be encapsulated or removed and disposed of in accordance with Federal Statutes which apply to the type of hazardous material. The Contractor assumes responsibility for their encapsulation or removal and disposal once uncovered and identified. Contractor shall remove or encapsulate hazardous materials encountered on site within Ten (10) days of receipt of written notice so that Operations may resume as soon as possible.

1. Lead
2. Asbestos
3. Others

1.07 CONSTRUCTION DOCUMENTS

A. The Drawings and Specifications indicate, in general, items of material and equipment which must be removed, revised, reworked or otherwise modified. No attempt has been made to indicate each and every portion of demolition and remodeling work. Rather, the intent of the Drawings and Specifications is to provide a guide to the contractors to better enable them to anticipate the entire scope of the work.

B. Likewise no attempt has been made to indicate each and every bit of patching, whether masonry, concrete, finishes, painting, etc. Again the intent of the Drawings and these specifications is to provide a guide to the contractors to better enable them to anticipate the entire scope of the work.

1.08 JOB CONDITIONS

A. Conditions of Structures: Architect assumes no responsibility for condition of items or structures to be demolished.

B. Damage created to existing site materials designated as “to remain in place” by operations of contractors under this contract shall be repaired to original condition at Contractor’s expense. Extreme caution shall be exercised to prevent damage to existing areas not scheduled to be demolished or removed.

C. Contractor shall be responsible for maintenance, operation, and control of all new or temporary (where approved by Architect) electrical or mechanical facilities put into operation before final acceptance of project until final acceptance.

D. Protection of Persons and Property: Provide temporary barricades and other forms of protection as required to protect personnel, etc., from injury due to selective demolition work.

E. Explosives: Use of explosives shall not be permitted.

F. Environmental Controls:

1. Use water sprinkling, temporary enclosures, and other suitable methods to limit dust and dirt rising and scattering in air to lowest practical level. Comply with governing regulations pertaining to environmental protection.

2. Do not use water when it may create hazardous or objectionable conditions such as ice, flooding, pollution, or mechanical failure.

3. Burning of removed materials is not permitted.

G. Coordinate electrical work with that of architectural trades so that all are accomplished simultaneously.

H. Maintenance, operation, and control of new or temporary (where approved by Architect) electrical facilities put into operation before final acceptance of project will be complete responsibility of Contractor until final acceptance.

I. Salvaged Materials: Various existing materials to be removed shall be salvaged as directed by the Owner. Contractor shall coordinate the extent with the Owner and relocate salvaged materials specified storage area

PART 2 – PRODUCTS

2.01 MATERIALS

A. General: Except as otherwise indicated, or as directed by the Architect, use materials for patching that are identical to existing materials. If identical materials are not available, or cannot be used, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect and with approval from Architect. Use materials for cutting and patching that will result in equal-or-better performance characteristics.

B. Other Materials: Materials not specifically described in each individual Section

of the Specifications but required for a complete and proper installation of the Work of that Section or Sections shall be new, first quality of their respective kinds, selected by Contractor and submitted to Architect in accordance with SECTION 01300. SUBMITTALS contained within Project Manual. Materials shall be furnished and installed at Contractor's expense.

PART 3 – EXECUTION:

3.01 PREPARATION

A. Building Inspection:

1. Prior to Work of this Section, carefully inspect the entire area designated to be altered and note objects designated to be removed, modified or preserved.

2. Locate existing active utilities and determine requirements for disconnection, reconnection, rerouting, or capping. Contractor shall protect utilities, designated not to be altered or changed, from damage by necessary means.

3. Photograph existing damage to structure, surfaces, equipment or to surrounding properties which could be misconstrued as damage resulting from selective demolition work; file photographs with Architect prior to starting work.

3.02 DEMOLITION AND REMOVAL

A. General: Demolition work shall be executed in orderly, careful manner, with due consideration for public and personnel working in adjacent areas. Perform demolition work in a systematic manner and in accordance with demolition schedule and governing regulations.

1. Housekeeping: Contractor shall work neatly, maintaining entire existing area to be remodeled and adjacent spaces clean and secure at all times until completion of new work. Contractor shall prevent accumulation of debris, and overloading of any parts shall be prohibited.

2. Protective Equipment: Install surface protection, barricades, and drop cloths as required to protect parts of exisiting work scheduled or designated to remain. Do not commence demolition operations until Contractor has installed protective equipment and has received approval by Architect.

B. Removal of Demolished Materials: Accumulation of demolished materials is prohibited, unless directed otherwise by the Owner. Regardless of nature of debris, it shall be immediately cleared from working area as demolition

progresses. Care shall be taken to avoid spilling debris. Any spilled materials shall be promptly cleaned up.

C. Cutting and Patching:

1. Cutting and patching required for architectural and electrical work. Where existing masonry or wood items are indicated to be revised or modified, these systems shall be revised as indicated or as reasonably implied as required to match existing and to restore to original condition, to maintain continuity and integrity of existing systems, etc.

D. Welding and Cutting Safety:

1. The Contractor shall furnish source of power for operation of any electric welding apparatus. The Facility's electrical power is not available for any welding purpose.

2. Where electric or gas welding or gas cutting work is done above or within ten feet of combustible material or above space may be occupied by persons, interposed shields of incombustible material shall be used to protect against fire damage or injury due to sparks and hot metal.

3. Contractor shall have a fire watch and continuously monitor work area for potential fire hazards or combustible materials. Fire watch shall have in-hand portable fire extinguisher. Inspect work area at completion of operations for any live sparks or embers. Reinspect work area thirty (30) minutes after work completion, then reinspect work area sixty (60) minutes later.

4. Cutting and welding will be permitted only in areas that are, or have been, made fire safe as required by Architect. Such areas shall be essentially free of combustible and flammable contents and suitably segregated from adjacent areas. Any combustibles that cannot be moved shall be suitably protected. Welding equipment shall not be used around flammable liquids or vapors, or on tanks containing such materials. Where cutting or welding is done near walls or roof of combustible construction, where conduction or radiation may cause ignition, fire-resistant shields or guards shall be provided to prevent ignition.

5. No acetylene or oxygen tanks shall be allowed within present structure or within 10'-0" of present structure. Such tanks shall be securely fastened and maintained in an upright position where applicable, and when stored for use shall be remote from any combustible material and free from exposure to rays of sun or high temperatures.

6. Fire extinguishing equipment shall be maintained near all welding and cutting operations as approved by Architect. When operations cease for noon

hour or at end of day, surroundings adjacent to welding and cutting operations shall be thoroughly wet down as directed.

E. Cutting:

1. Cut the work using methods that are least likely to damage work to be retained or adjoining work.

2. In general, where cutting is required, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut through concrete and masonry using methods, materials and techniques to ensure a neat hole. Cut holes and slots neatly to size required with minimum disturbance of adjacent work. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces. Temporarily cover openings when not in use.

F. Patching: Patch with seams which are durable and as invisible as possible. Comply with specified tolerances for the work.

1. Where feasible, inspect and test patched areas and where necessary extend finish restoration into retained adjoining work in a manner which will eliminate evidence of patching and refinishing.

2. Restore exposed finishes of patched areas and where necessary extend finish restoration into retained adjoining work in a manner which will eliminate evidence of patching and refinishing.

3. Where removal of walls or partitions extends on finished area into another finished area, patch and repair floor and wall surfaces in the new space to provide an even surface of uniform color and appearance. If necessary to achieve uniform color and appearance, remove existing floor and wall coverings and replace with salvaged materials.

3.03 CLEANING

A. Upon completion of demolition and remodeling work, remove dirt, debris, scraps, trash, etc. from Project site. Remove soiled spots, repair imperfections to invisible state, wash and clean surfaces including vacuum cleaning. Leave Project site absolutely clean.

3.04 REPAIR

A. Repair demolition performed in excess of that required. Return structures and surfaces to remain to condition existing prior to commencement of selective

demolition work. Repair any adjacent construction or any surfaces soiled or damaged by selective demolition work.

END OF SECTION 02 22 20

SECTION 02 30 00 EARTHWORK

PART 1 - GENERAL

1.1 Scope: The Work covered by this Section includes the furnishing of all labor, materials and equipment necessary to perform every operation of cut, excavation, fill, backfill, grading, compaction, preparation of subgrades and all other earthwork as shown on the Drawings, noted herein, and as required for the finished Project.

1.2 Standards: All Work shall not be less than the minimum standards specified in the current edition of the "New Mexico Standard Specifications for Public Works Construction" as prepared by the New Mexico Chapter of American Public Works Association. These standards are referred to herein as "APWA".

1.3 Tests: Compaction tests will be ordered by the Architect and paid for by the Contractor. Compaction beneath slabs will be tested and any filled or backfilled areas may be tested for the required compaction.

PART 2 - MATERIALS

2.1 General Fill: Provide satisfactory fill and backfill materials of sand and earth from site or imported, free of debris and rubbish, organic materials, and rocks larger than 4".

PART 3 - EXECUTION

3.1 Drainage: Perform all Work so that each stage and the completed Work provides positive and continuous drainage within and immediately surrounding the area of Work.

3.2 Water Accumulation: Prevent water from accumulating in excavations at all times, or otherwise softening the subgrade. Perform excavating, installation and backfill as expediently as possible. Notify Architect immediately in the event of any water accumulation.

3.3 Excavation: Excavation for footings and slabs on grade should not exceed the required depth. Over excavated areas must be backfilled and compacted as specified and tested, or the depth of the concrete footing may be increased.

3.4 Compaction Methods and Equipment: Mechanical compaction shall be used in all grading operations and beneath all concrete slabs. In no case shall "water settling" or jetting be employed. Fill shall be spread in layers not to exceed 8" in depth and fully compacted before the next layer is spread.

SECTION 02 30 00 EARTHWORK

3.5 Compaction Standards: All engineered fill shall be compacted to a minimum of 95 percent of maximum density as determined in accordance with ASTM D1557. Compaction beneath gravel driveways, slabs, or footings must be 95%. Compaction shall be accomplished at the optimum moisture content or higher. For purposes of acceptance, the in-place density of the fill shall be defined as that determined by the sand cone method (ASTM D1557) or by nuclear methods (ASTM D2922).

Compaction requirements shall apply to the backfill of all utility trenches, footings, retaining walls and beneath slabs and driveways.

3.6 Weather Limitations: Controlled fill shall not be constructed when the atmospheric temperature is below 35 degrees F. It shall be the responsibility of the Contractor to protect all areas of completed surface against any detrimental effects by methods approved by the soils engineer. Any areas that are damaged by freezing shall be reconditioned and reshaped and recompacted by the Contractor in conformance with the requirements of this Specification without additional cost to the Owner.

3.7 Compaction of Surface of Native Soils: The upper 6 inches of native soils upon which fills are to be constructed and the upper 6 inches of soils beneath cut surfaces shall be scarified, brought to the optimum moisture content or higher, and compacted to the requirements given in paragraph 3.5.

3.8 Grass and Topsoil: Grass, grass roots and the incidental topsoil shall not be left beneath a fill area, nor shall this material be used as fill material. Grass, grass roots and topsoil may be stockpiled and later used in the top 6 inches of fills outside roadways and building pads.

3.9 Protection of Graded Areas: Protect newly graded areas from traffic and erosion, and keep free of trash and debris. Repair and re-establish grades in settled, eroded and rutted areas.

3.10 Clean-up: All rubbish produced by grading operations or already in existence on the site or in the public right-of-way adjacent to the site, including uprooted trees, dumped concrete, unearthed boulders and trash, shall be discarded at a legal dumping site.

END OF SECTION

SECTION 06 10 00 ROUGH CARPENTRY

PART 1 - GENERAL

1.01 Scope

A. Provide labor, materials and equipment necessary for all rough carpentry including blocking, and sheathing as necessary for the Work.

1.02 Standards

A. Follow IBC requirements for joining and nailing. Comply with National Design Specifications for Stress Grade Lumber for each intended use.

1.03 Inspection

A. Obtain approval from the Architect of all wood framing before covering up the work.

1.04 Coordination

A. Coordinate work with other trades to allow for correct installation of items passing between and attached to wood framing and blocking.

PART 2 - MATERIALS

2.01 Blocking and Bridging

A. No. 2 pine, structurally sound.

2.02 Plywood

A. Shall be grade and thicknesses shown on the Drawings, and shall bear the American Plywood Association seal and grade marking on every sheet. Allowable support spacing shall not exceed Identification Index numbers.

2.03 Delivery and Storage

A. Keep materials dry at all times. Protect against exposure to weather and contact with damp surfaces. Stack lumber and plywood, and provide air circulation within stacks.

PART 3 - EXECUTION

3.01 Planar Surface

A. New framing shall result in maximum plane variation of not more than 1/8” in 10’ and without voids or bulges.

3.02 Connections

A. All nailing, bolting and blocking shall conform to IBC requirements.

3.03 Notching

A. Notching and cutting of structural framing members shall be done only with prior approval from and as directed by the Architect. Replace members cut without prior approval.

3.04 Blocking

A. Install blocking as correct height and location for all wall-mounted items shown on the Drawings, including all accessories, cabinets, electrical, mechanical and plumbing equipment.

3.05 Decking

A. Replace existing damaged roof decking with in-kind or greater strength material, match existing deck thickness.

END OF SECTION

DIVISION 07 – THERMAL / MOISTURE PROTECTION

SECTION 07 13 26 SELF-ADHERING SHEET WATERPROOFING

PART 1 - GENERAL

1.01 SUMMARY

A. The work of this section includes, but is not limited to, the following:

1. Rubberized asphalt sheet membrane waterproofing.

B. Related Sections: All of the Contract Documents, including General and Supplementary Conditions and Division 1 General Requirements, apply to the work of this section. Other specification sections which directly relate to the work of this section include, but are not limited to, the following:

1. SECTION 03 30 00 – CAST-IN-PLACE CONCRETE

1.02 REFERENCES

A. The following standards and publications are applicable to the extent referenced in the text.

B. American Society for Testing and Materials (ASTM)
C 836 Standard Specification for High Solids, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course
D 412 Standard Test Methods for Rubber Properties in Tension
D 570 Standard Test Method for Water Absorption of Plastics
D 882 Standard Test Methods for Tensile Properties of Thin Plastic Sheeting
D 903 Standard Test Method for Peel or Stripping Strength of Adhesive Bonds
D 1876 Standard Test Method for Peel Release of Adhesives (T-Peel)
D 1970 Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection
D 3767 Standard Practice for Rubber - Measurements of Dimensions
D 5385 Standard Test Method for Hydrostatic Pressure Resistance of Waterproofing Membranes
E 96 Standard Test Methods for Water Vapor Transmission of Materials
E 154 Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover

1.03 SUBMITTALS

DIVISION 07 – THERMAL / MOISTURE PROTECTION

SECTION 07 13 26 SELF-ADHERING SHEET WATERPROOFING

A. Product Data: Submit manufacturer's product data, installation instructions, use limitations and recommendations.

1.04 QUALITY ASSURANCE

A. Manufacturer: Sheet membrane waterproofing shall be manufactured and marketed by a firm with a minimum of 20 years experience in the production and sales of self-adhesive sheet membrane waterproofing. Manufacturers proposed for use but not named in these specifications shall submit evidence of ability to meet all requirements specified, and include a list of projects of similar design and complexity completed within the past 5 years.

B. Installer: A firm which has at least 3 years experience in work of the type required by this section.

C. Materials: For each type of material required for the work of this section, provide primary materials which are the products of one manufacturer.

D. Pre-Installation Conference: A pre-installation conference shall be held prior to commencement of field operations to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work. Agenda for meeting shall include review of special details and flashing.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver materials and products in labeled packages. Store and handle in strict compliance with manufacturer's instructions, recommendations and material safety data sheets. Protect from damage from sunlight, weather, excessive temperatures and construction operations. Remove damaged material from the site and dispose of in accordance with applicable regulations.

1. Do not double-stack pallets of membrane on the job site. Provide cover on top and all sides, allowing for adequate ventilation.
2. Protect mastic and adhesive from moisture and potential sources of ignition.

B. Sequence deliveries to avoid delays, but minimize on-site storage.

1.06 PROJECT CONDITIONS

DIVISION 07 – THERMAL / MOISTURE PROTECTION

SECTION 07 13 26 SELF-ADHERING SHEET WATERPROOFING

A. Perform work only when existing and forecasted weather conditions are within the limits established by the manufacturer of the materials and products used.

B. Proceed with installation only when substrate construction and preparation work is complete and in condition to receive sheet membrane waterproofing.

1.07 WARRANTY

A. Sheet Membrane Waterproofing: Provide written 5 year material warranty issued by the membrane manufacturer upon completion of the work.

PART 2 - PRODUCTS

2.01 MANUFACTURERS AND PRODUCTS

A. Acceptable Products and Manufacturers: Grace Bituthene® 3000/Low Temperature Membrane manufactured by W. R. Grace & Co.–Conn., Grace Construction Products, Cambridge, MA., or Architect approved equal.

2.02 MATERIALS

A. Sheet Membrane Waterproofing: Bituthene® 3000/Low Temperature Membrane by Grace Construction Products; a self-adhesive, cold-applied composite sheet consisting of a thickness of 1.4 mm (0.056 in.) of rubberized asphalt and 0.1 mm (0.004 in.) of cross-laminated, high density polyethylene film. Provide rubberized asphalt membrane covered with a release sheet, which is removed during installation. No special adhesive or heat shall be required to form laps.

B. Sheet Membrane Waterproofing

PHYSICAL PROPERTIES FOR BITUTHENE 3000/LOW TEMPERATURE MEMBRANE:

Property	Test Method	Typical Value
Color		Dark gray-black
Thickness	ASTM D 3767 Method A	1.5 mm (0.060 in.) nominal
Flexibility, 180° bend over 25 mm (1 in.) mandrel at -43°C (-45°F)	ASTM D 1970	Unaffected

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Tensile Strength, Membrane Die C	ASTM D 412 Modified[1]	2240 kPa (325 lbs/in.^{2}) minimum
Tensile Strength, Film	ASTM D 882 Modified[1]	34.5 MPa (5,000 lbs/in.^{2}) minimum
Elongation, Ultimate Failure of Rubberized Asphalt	ASTM D 412 Modified[1]	300% minimum
Crack Cycling at -32°C (-25°F), 100 Cycles	ASTM C 836	Unaffected
Lap Adhesion at Minimum Application Temperature	ASTM D 1876 Modified[2]	700 N/m (4 lbs/in.) – Bituthene 3000 880 N/m (5 lbs/in.) – Low Temp
Peel Strength	ASTM D 903 Modified[3]	1576 N/m (9 lbs/in.)
Puncture Resistance, Membrane	ASTM E 154	222 N (50 lbs) minimum
Resistance to Hydrostatic Head	ASTM D 5385	60 m (200 ft) of water
Permeance	ASTM E 96, Section 12 – Water Method	2.9 ng/m^{2}sPa (0.05 perms) maximum
Water Absorption	ASTM D 570	0.1% maximum

Footnotes:
1. *The test is run at a rate of 50 mm (2 in.) per minute.*
2. *The test is conducted 15 minutes after the lap is formed and run at a rate of 50 mm (2 in.) per minute at -4°C (25°F).*
3. *The 180° peel strength is run at a rate of 300 mm (12 in.) per minute.*

PART 3 - EXECUTION

3.01 EXAMINATION

A. The installer shall examine conditions of substrates and other conditions under which this work is to be performed and notify the contractor, in writing, of circumstances detrimental to the proper completion of the work. Do not proceed with work until unsatisfactory conditions are corrected.

3.02 PREPARATION OF SUBSTRATES

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A. Refer to manufacturer's literature for requirements for preparation of substrates. Surfaces shall be structurally sound and free of voids, spalled areas, loose aggregate and sharp protrusions. Remove contaminants such as grease, oil and wax from exposed surfaces. Remove dust, dirt, loose stone and debris. Use repair materials and methods which are acceptable to manufacturer of sheet membrane waterproofing.

B. Cast-In-Place Concrete Substrates:

1. Do not proceed with installation until concrete has properly cured and dried (minimum 7 days for normal structural concrete and minimum 14 days for lightweight structural concrete). If time is critical Bituthene® Primer B2 may be used to allow priming and installation of membrane sooner than 7 days. Priming may begin in this case as soon as the concrete will maintain structural integrity.
2. Fill form tie rod holes with concrete and finish flush with surrounding surface.
3. Repair bugholes over 13 mm (0.5 in.) in length and 6 mm (0.25 in.) deep and finish flush with surrounding surface.
4. Remove scaling to sound, unaffected concrete and repair exposed area.
5. Grind irregular construction joints to suitable flush surface.

C. Related Materials: Treat joints and install flashing as recommended by waterproofing manufacturer.

3.03 INSTALLATION

A. Refer to manufacturer's literature for recommendations on installation, including but not limited to, the following:

1. Apply primer at rate recommended by manufacturer. Recoat areas not waterproofed if contaminated by dust. Mask and protect adjoining exposed finish surfaces to protect those surfaces from excessive application of primer.
2. Delay application of membrane until primer is completely dry. Dry time will vary with weather conditions.
3. Seal daily terminations with troweled bead of mastic.

3.04 CLEANING AND PROTECTION

A. Remove any masking materials after installation. Clean any stains on materials which would be exposed in the completed work.

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B. Protect completed membrane waterproofing from subsequent construction activities as recommended by manufacturer.

END OF SECTION

SECTION 07 19 00 WATER REPELLENTS AND SEALANTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Water repellents of the following types from Okon and Seal-Krete:
   1. Penetrating water repellents.
   2. Film-building water repellents.

B. Water repellents for the following types of surfaces:
   1. Vertical and horizontal.
   2. Concrete and masonry.

1.2 RELATED SECTIONS

A. Section 03 30 00 - Cast-in-Place Concrete.

B. Section 03 41 10 - Plant-Precast Structural Concrete*.

C. Section 03 47 13 - Tilt-Up Concrete.

D. Section 04 20 00 - Unit Masonry.

E. Section 09 26 00 - Veneer Plastering.

F. Section 09 30 00 - Tiling.

1.3 REFERENCES

A. ASTM International, Inc. (ASTM):
   1. ASTM D 2887 - Standard Test Method for Boiling Range Distribution of Petroleum Fractions by Gas Chromatography.
   2. ASTM D 1653 - Standard Test Methods for Water Vapor Transmission of Organic Coating Films.
   3. ASTM D 3359 - Standard Test Methods for Measuring Adhesion by Tape Test.
   4. ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials.
   5. ASTM E 514 - Standard Test Method for Water Penetration and Leakage Through Masonry,

B. South Coast Air Quality Management District (SCAQMD).

C. Federal Specification (FS) SS-W-110C - Water-Repellent, Colorless, Silicone Resin Base.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 30 00 - Administrative Requirements.

B. Product Data: For each coating system indicated, including:
   1. Material List: An inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.
   2. Preparation instructions and recommendations.
   3. Manufacturer's Information: Manufacturer's technical data bulletin and MSDS, including label analysis and instructions for handling, storing, and applying each coating material.

C. Third-party report confirming that recommended system has been tested in accordance with ASTM E 514 on similar CMU substrate and reduced water absorption by a minimum of 90 percent in comparison to untreated specimen.

D. Certification by water repellent manufacturer that's products supplied comply with local regulations controlling VOC emissions.

E. Selection Samples: For colored finishes, submit color sample - Samples of each color applied to substrate used on project must be submitted to architect for approval. Architects may use paint color swatches to direct color choices but must be shown samples of each color applied to substrates to illustrate influence of substrate color and variation in transparency between colors. A second coat of stain may be applied and will significantly increase the color saturation of the stain. The architect shall pre-approve in writing a second application of stain before it is applied.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Capable of providing field service representation during installation and who will approve application method.

B. Installer Qualifications: Installer experienced in performing this type of work and who has specialized in work similar to the type required for this project.

C. Field Sample:
   1. Install at Project site or pre-selected area of building an area for field sample, as directed by Architect.
   2. Provide mockup of at least 100 square feet (9.3 sq. m) to include surface preparation, sealant joint, and juncture details and allow for evaluation of concrete stain top coated with specified water repellent.
   3. Conduct a minimum of three RILEM tests before and after the water repellent has been applied. Allow sealer to cure three days before completing the post-application test. At least one RILEM test should be performed on a mortar joint within the test area. The average water loss should never exceed 1 ml in 3 minutes or be less than 90 percent improvement when compared to test conducted prior to application of

the stain.

4. Apply material in strict accordance with manufacturer's written application instructions.
5. Obtain Architect's written approval of field sample before start of material application, including approval of aesthetics, color, texture, and appearance.
6. Manufacturer's representative will review surface preparation, application, and workmanship.
7. Field sample will be the standard for judging workmanship on remainder of Project.
8. Field sample shall be maintained during construction for workmanship comparison.
9. Field sample shall not be altered, moved, or destroyed until Work is completed and approved by Architect.
10. Intermix enough product at one time to cover areas between architectural breaks. See manufacturer's technical data bulletin for application instructions.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label:

B. Storage: Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

C. Store materials in an area that is within the acceptable temperature range, per manufacturer's instructions. Protect from freezing.

D. Handling: Maintain a clean, dry storage area, to prevent contamination or damage to the coatings.

E. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 35 deg F (2 deg C) and not above 100 deg F (43 C).

F. Maintain storage containers in a clean condition, free of foreign materials and residue.

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.

B. Do not apply coatings in snow, rain, fog, or mist; or when relative humidity

exceeds 85 percent; or at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

1. Application may continue during inclement weather if surfaces and areas to be coated are enclosed and heated within temperature limits specified by manufacturer during application and drying periods.

C. Weather and Substrate Conditions: Do not proceed with application of water repellent under any of the following conditions, except with written instructions from the manufacturer:

1. Ambient air and surface temperature is less than 50 degrees F.
2. Concrete surfaces and mortar have cured less than 28 days.
3. Rain or temperatures below 50 degrees F are predicted within 24 hours.
4. Do not apply coatings when rain is expected less than 12-24 hours after installation
5. Application is earlier than 24 hours after surface has been wet.
6. Substrate is frozen or surface temperature is less than 50 degrees F.
7. Windy conditions exist that may cause water repellent to be blown onto surface not intended to be coated.

1.8 WARRANTY

A. Perform work and submit manufacturer's required job registration and verification forms in accordance with Water Repellent Warranty Guidelines provided by Rust-Oleum. Provide manufacturer's 5-year Water Repellent Warranty.

1.9 EXTRA MATERIALS

A. Furnish extra paint materials from the same production run as the materials applied and in the quantities described below. Package with protective covering for storage and identify with labels describing contents. Deliver extra materials to Owner.

B. Quantity: Furnish Owner with an additional three percent, but not less than 1 gal (3.8 l) or 1 case, as appropriate, of each material and color applied.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Rust-Oleum®, which is located at: 11 Hawthorn Pkwy.; Vernon Hills, IL 60061; Toll Free Tel: 800-323-3584; Tel: 847-367-7700; Fax: 847-816-2330; Email:request info (productsupport@rustoleum.com); Web:https://www.rustoleum.com

Acceptable Manufacturer: Spartan Chemical
https://www.spartanchemical.com/

B. Requests for substitutions will be considered in accordance with provisions of Section 01 30 00 - Administrative Requirements Submittals and 01600 Products

2.2 FILM-FORMING CLEAR WATER REPELLENT FOR SMOOTH CONCRETE BLOCK (NOT LIGHTWEIGHT, EXPOSED AGGREGATE, OR SAND-BLASTED CAST CONCRETE)

A. Penetrating Barrier - OKON W-2 Water Repellent Sealer is a water-based, acrylic, micro-emulsion containing 10 percent solids minimum by weight with the following minimum performance properties:
1. VOC compliant in SCAQMD: 70 g/L.
2. ASTM E 514 Standard Test Method for Water Penetration and Leakage through Masonry tested on like substrate: > 90 percent reduction in water penetration compared to unsealed surface. Two coats may be required to achieve this level of performance on porous block.
3. Specific Gravity: 1.01.
4. Breathable: Yes - ASTM D 1653.
5. Viscosity: < 100 CPS.
6. Paintable: Yes - ASTM D 3359.
7. Flash Point: N/A.
8. Weight Solids: 10 percent.

2.3 MASONRY SEALER FOR HORIZONTAL SURFACES FOR CONCRETE FLOORS FOR RESISTANCE TO STAINING, LOW GLOSS FINISH

A. Concrete and Masonry Sealer - OKON Seal & Finish Clear Concrete / Masonry Sealer is a water-based, acrylic, micro-emulsion coating containing 15 percent solids minimum by weight with the following minimum performance properties:
1. VOC compliant in SCAQMD: 62 g/L.
2. Specific Gravity: 1.01.
3. Breathable: Yes - ASTM D 1653.
4. Viscosity: < 100 CPS.
5. Paintable: Yes - ASTM D 3359.
6. Flash Point: N/A.
7. Weight Solids: 15 percent.

2.4 ACRYLIC-BASED FLOOR FINISH FOR HORIZONTAL SURFACES

A. Dura Gloss Laminate is an acrylic-based floor finish.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean substrate of substances that might interfere with penetration or performance of water repellents. Remove all dust, dirt, paint, bitumen, efflorescence, oil, pollution deposits, and curing, forming, and parting compounds, other contaminants prior to application. Use abrasive brush blast or high pressure water as necessary to achieve the required surface condition.

B. Allow power washed surfaces to dry three days prior to coating. Surface shall be dry to touch and show no visible signs of moisture prior to application of water repellent.

C. Protect adjoining work, including sealant bond surfaces, from spillage or over spray of water repellent. Cover adjoining and nearby surfaces of aluminum and glass if there is the possibility of water repellent being deposited on surfaces.

D. Coordination with Sealants: Do not apply water repellent until sealants for joints adjacent to surfaces receiving water repellent treatment have been installed and cured.

E. Water repellent work may precede sealant application only if sealant adhesion and compatibility have been tested and verified using substrate, water repellent, and sealant materials identical to those used in the work.

3.3 APPLICATION

A. 50/50 mix of OKON W-2 Water Repellent Sealer and OKON Seal & Finish Clear Concrete / Masonry Sealer. Apply two coats per manufacturer specs.

1. Apply a heavy saturation spray coating of water repellent on surfaces indicated for treatment using pressure spray equipment. Comply with manufacturer's written instructions for using airless spraying procedure, unless otherwise directed.

2. Follow application method and rate established by Test Area. Apply a second saturation spray coating, if required, repeating first application. Comply with manufacturers written instructions for limitations on drying time between coats. Consult manufacturer's technical representative if written instructions are not applicable to project conditions.

B. Apply (3) coats of Spartan “Dura Gloss” floor finish per manufacturer specs.

3.4 FIELD QUALITY CONTROL

A. Manufacturers Field Service: Provide service of a factory authorized technical service representative to inspect and approve the substrate before application and to instruct the applicator on the product and application method to be used.

3.5 CLEANING

A. Protective Covering: Remove protective coverings from adjacent surfaces and other protective areas.

B. Immediately clean water repellent from adjoining surfaces and surfaces soiled or damaged by water repellent application as work progresses. Repair damage caused by water repellent application. Comply with manufacturers written cleaning instructions.

END OF SECTION

PART 1 - SUMMARY

A. Work Included:

1. Furnish and install all thermal building insulation and vapor retarders as shown on the Drawings or specified herein, or as required to complete the Work. Work included, but it not necessarily limited to:

   a. Fiberglass batt and board insulation
   b. Rigid foam building and foundation insulation
   c. Spray-applied cellulose insulation
   d. Foamed-in-place insulation
   e. Polyethylene vapor retarder

B. Related Work:

1. Construction waste management requirements are specified in Division 01.
2. Roof insulation is specified in Section 075423.
3. Penetration Firestopping is specified in Section 078413.
4. Mechanical and pipe insulations are specified in Division 15.

C. Related Documents: Drawings, General and Supplementary Conditions, and applicable provisions of Division 01 Sections apply to this Section.

1.2 REFERENCES

A. Reference Standards: Comply with the requirements of the reference standards noted herein, expect where more stringent requirements are described herein or otherwise required by the Contract Documents. A complete listing of applicable reference standards, including full name of publishing agency and date or edition number, is contained in Section 01425.

1.3 SYSTEM DESCRIPTION

A. Design Requirements: Unless otherwise indicated, minimum thermal resistance and U-values shall be not less than the following:

1.	Wall assemblies	U = 0.052	R = 19
2.	Floor assemblies over unheated space	U =0.052	R = 19
3.	Floor assemblies over outdoor air	U =0.052	R = 19
4.	Perimeter and under slabs-on-grade at perimeter	U =0.10	R = 10

1.4 SUBMITTALS

A. Submittal Procedures: Refer to Section 01330.

B. Product Data: Submit manufacturer's printed literature and specifications describing products specified herein, and including thermal or R-values and fire hazard classification for each product.

C. Test Reports: With product data, submit copies of certified test reports showing compliance with specified performance values, including R-value (aged values for plastic insulations), densities, compression strengths, fire performance characteristics, perm ratings, water absorption ratings and similar properties.

D. Samples: Provide field samples of not less than 100 SF of surface area for spray-applied cellulose insulation. Apply at full thickness specified.

1.5 QUALITY ASSURANCE

A. Applicator Qualifications: Spray-applied cellulose insulation applicator shall be licensed or approved by the product manufacturer.

B. Coordination: Coordinate the work of the Section with other Sections whose work relates to spray-applied cellulose insulation in any way. Specific areas of coordination include, but are not limited to, verification of compatibility of finishes at substrates.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Packing and Shipping:

1. Deliver insulation materials in manufacturer's original bundled packaging, with protective wrappings intact, and identifying labels intact and legible.
2. Label each roll, package, or bundle of insulation with R-value and applicable fire resistance ratings.

B. Storage and Protection:

1. Store insulation materials above ground and under cover, protected from the elements. Comply with manufacturer's recommendations for handling storage and protection during installation.
2. Weigh or otherwise secure insulation products to protect from wind in a manner to prevent damage to the material.
3. Protect plastic insulation from prolonged exposure to sunlight, and against ignition at all times.

1.7 PROJECT CONDITIONS

A. Environmental Requirements: Comply with manufacturer's recommendations concerning ambient temperature and relative humidity at time of application of spray-applied cellulose insulation.

1.8 SEQUENCING AND SCHEDULING

A. Coordination: Coordinate scheduling and installation of building insulation with drywall, plumbing, electrical, and other trades whose work is dependent upon or related to insulation in any way.

B. Sequencing:

1. Install hangers or attachments for ductwork, piping, conduit, suspended ceilings, and partitions prior to application of spray-applied cellulose insulation.
2. Apply spray-applied cellulose insulation prior to insulation of ducts, piping, and other equipment which will be suspended below insulated surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:

1. Fiberglass Batt and Board Insulation:

   a. Certainteed
   b. Manville Corporation
   c. Owens-Corning Fiberglass

2. Rigid Foam Insulation:

   a. Amoco Foam Products Company
   b. Dow Chemical Company
   c. UC Industries, Inc.

3. Spray-Applied Cellulose Insulation: International Cellulose Corporation.
4. Foamed-in-Place Insulation: Insta-Foam Products, Inc.

B. Product Options and Substitutions: Refer to Section 01600.

2.2 MATERIALS

A. Unfaced Fiberglass Batt Insulation:

1. Type: Non-combustible, flame-resistant foil-faced fibergalass battts complying with ASTM C665, Type I, friction-fit type.
2. Minimum Density: 0.05 lbs/cf
3. Minimum Thermal Resistance: As required to achieve the design requirements noted in Part 1 above.
4. Fire Hazard: Flame spread 25 or less, smoke developed 50 or less, as determined by ASTM E84.

B. Foil-Faced Fiberglass Batt Insulation:

1. Type: Non-combustible, flame-resistant foil-faced fiberglass batts complying with ASTM C665, Type III, Class A; facing formed with flanges for inset or face stapling.
2. Minimum Density: 0.05 lbs/cf
3. Minimum Thermal Resistance: As required to achieve the design requirements noted in Part 1 above.
4. Foil Facing Permeability: 0.10 maximum
5. Fire Hazard: Flame spread 25 or less, smoke developed 50 or less, as determined by ASTM E84.

C. Rigid Foam Insulation:

1. Type: Extruded polystyrene boards complying with ASTM C578, Type IV.
2. Compressive Strength: 25 psi minimum.
3. Water Vapor Permeance: 1.1 perms maximum at 1” thickness.
4. Water Absorption: 0.1 percent by volume maximum.
5. Minimum Thermal Resistance: 7.0 per inch at 75°F.
6. Edge Detail: Square edge
7. Size: 2’-0” wide x 8’-0” long x thickness required to achieve the design requirements noted in Part 1 above.

D. Spray-Applied Cellulose Insulation: International Cellulose Corp. “K-13”, or approved substitute, consisting of asbestos-free cellulose fibers, blended and chemically treated to resist fire, mold, and mildew and binders, and complying with the following:

1. Fire Resistance (ASTM E84):

   a. Flame Spread: 5 or less
   b. Smoke Developed: 5 or less

2. Bond Strength (ASTM E736): 600 psf minimum
3. Compressive Strength (ASTM E761): 400 psf minimum

4. Light Reflectivity:

    a. White: 73%
    b. Arctic White: 81%

5. Primer: As recommended by manufacturer for substrate conditions.
6. Color: Manufacturer's standard [White] [Arctic White]

E. Foamed-In-Place Insulation: Insta-Foam Products, Inc. "Froth-Pak" or approved substitute, self-contained, factory pressurized, two-component, self-expanding rigid urethane foam insulation complying with the following requirements:

1. Density (ASTM D1622): Minimum 1.75 pcf
2. UL Classification (UL723): Class A
3. Flamespread (ASTM E84): Not more than 25
4. Smoke Density (ASTM E84): Not more than 350
5. Fuel Contributed (ASTM E84): 0

2.3 AUXILIARY MATERIALS

A. Adhesive for Bonding Insulation: Type recommended by insulation manufacturer, guaranteed compatible with insulation material, and complying with requirements for fire performance characteristics.

B. Mechanical Anchors: Type and size recommended by insulation manufacturer for type of application and condition of substrate.

C. Mastic Sealer: Type recommended by insulation manufacturer for bonding edge joints between units and filling voids in work.

D. Vapor Retarder: Minimum 4 mil (0.004") clear polyethylene sheet with moisture vapor transmission rate not to exceed 1.0 perms, as determined by ASTM E96; flame spread not to exceed 25, and smoke developed not to exceed 450 as determined by ASTM E84 or UL 723.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine areas and conditions under which the work of the Section will be performed. Do not proceed with the work until unsatisfactory conditions have been corrected. Commencement of work implies acceptance of all areas and conditions.

3.2 PREPARATION

A. Substrate Preparation:

1. Clean substrates of substances harmful to insulations or vapor retarders, including removal of projections that might puncture vapor retarders.
2. Close off openings in cavities receiving poured-in-place insulation to prevent the escape of insulation. Provide bronze or stainless steel screen (inside) where openings must be maintained for drainage or ventilation.
3. Remove excess mortar or other foreign materials from face of masonry walls; fill voids and grind fins or protrusions in concrete walls prior to applying rigid foam insulation.
4. Spray-Applied Cellulose Insulation:

    a. Clean substrate surfaces of oil, grease, non-approved paints or primers, mill scale, rust, dirt, or other foreign substances which would inhibit or impair proper adhesion of spray-applied acoustical insulation.
    b. Install all clips, hangers, support sleeves, and other attachments required to penetrate the spray-applied acoustical insulation.
    c. Provide masking, drop clots, or other suitable covering to protect adjacent areas from overspray.

3.3 INSTALLATION

A. General: Except as modified herein, comply with insulation manufacturer's instructions applicable to products and application indicated. If printed instructions are not available or do not apply to project conditions, consult manufacturer's technical representative for specific recommendations before proceeding with installation of insulation.

B. Fiberglass Batt Insulation:

1. Comply with manufacturer's instructions for particular conditions of installation in each case. If printed instructions are not available or do not apply to project conditions, consult manufacturer's technical representative for specific recommendations before proceeding with work.
2. Install unfaced batts by friction-fitting between studs or furring. Install faced batts by stapling flanges to wood framing or by taping or screwing flanges to metal framing.
3. Extend insulation full thickness as shown over entire area to be insulated. Install batts in longest practical lengths; tightly butt joints between butts. Cut and fit tightly around conduits, switches, outlet projections which interfere with placement.
4. Apply a single layer of insluation of required thickness, unless otherwise shown or required to make up total thickness.
5. Set vapor retarder faced units with vapor retarder to warm side of construction, except as otherwise indicated. Do not obstruct ventilation spaces, except for firestopping.

6. Tape perimeters, joints, and ruptures in vapor retarders using adhesive tape of type recommended by manufacturer.
7. Stuff loose glass fiber insulation into miscellaneous voids and cavity spaces. Compact to approximately 40% of normal maximum volume (to a density of approximately 2.5 pcf).

C. Rigid Board Insulation:

1. Vertical Application – Interior and Exterior Side of Walls: Install rigid boards to masonry or concrete substrate using mechanical fasteners or adhesives recommended by insulation manufacturer. Adhesives used with polystyrene foam boards must be guaranteed in writing to be compatible with extruded polystyrene foam. Install between studs or furring channels, and tightly butt joints to completely fill cavities or cover substrate.
2. Vertical Application – Exterior Side of Basement or Foundation Walls: Install rigid boards to concrete substrate using mechanical fasteners or adhesives recommended by insulation manufacturer. Adhesives used with polystyrene foam boards must be guaranteed in writing to be compatible with extruded polystyrene foam. Where waterproofing or dampproofing is indicated on walls to be insulated, install insulation after application and approval of waterproofing or dampproofing.
3. Horizontal Application Under Slabs-in-Grade: Completely cover area under slabs with rigid roam boards. Tightly butt joints between boards; carefully cut or scribe insulation at footings, grade beams, pier caps, and plumbing or other penetration through slabs.
4. Masonry Cavity Walls: Install rigid boards to substrate using mechanical fasteners or adhesives recommended by insulation manufacturer. Adhesives used with polystyrene foam boards must be guaranteed in writing to be compatible with extruded polystyrene foam. Tightly butt joints to completely fill cavities or cover substrate.
5. Seal joints between closed-cell (non-breathing) insulation units by applying mastic or sealant to edges or each unity to form a tight seal as units are shoved into places. Fill voids in completed installation with mastic or sealant.

D. Spray-Applied Cellulose Insulation:

1. Prime surface as recommended by the manufacturer for substrate surface material and condition at time of application.
2. Spray-apply cellulose insulation using fiber machines and nozzles approved by the product manufacturer. Mix with 2:1 adhesive ration as recommended by manufacturer for application at the specified thickness.
3. Provide a monolithic coating of uniform thickness as indicated or required to achieve thermal resistance values of not less than R15, but not less than 4” thick over the entire area to be covered.
4. Provide continuous natural or mechanical ventilation as required to cure insulation after application.

3.4 CLEANING

A. Clean-up: Remove all packaging, excess materials, and debris, and remove overspray from adjacent surfaces.

B. Foamed-In-Place Insulation:

1. Install foamed-in-place insulation in accordance with manufacturer's instructions.
2. In addition to overhead door jambs, install foamed-in-place insulation at joints, tees, corners, pipe penetrations, electrical openings, and other spaces or voids in framing where installation of batt insulation is impractical or impossible.
3. After foam has expanded and cured, remove excess with sharp knife.

C. Polyethylene Vapor Retarder: Install polyethylene vapor retarder over entire surface of exterior walls. Place vapor retarder on inner (warm) side of framing, and staple or tape into place using water resistant tape. Lap joints 2" minimum, and tape continuously to create an unbroken vapor retarder.

D. Construction Cleaning: Remove all excess materials, packaging materials, debris, and tools; leave the site and work area in clean condition. Leave protective coverings in place until final cleaning.

E. Construction Waste Management (LEED Credit 2.1 and / or 2.2): Manage construction waste in accordance with the requirements of Section 01524 – Construction Waste Management. Submit documentation as required by that Section.

3.5 PROTECTION

A. General: Protect installed installation and vapor retarders from harmful weather exposure and from physical abuse. Install finish materials or concealing work without delay (after required inspections), or, where that is not possible, by temporary covering or enclosure.

END OF SECTION

SECTION 07 26 16 INTEGRALLY BONDED UNDERSLAB VAPOR RETARDER

PART 1 - GENERAL

1.01 SUMMARY

A. The Work of this Section includes, but is not limited to, underslab vapor retarder / barrier membrane that forms an integral bond to poured concrete for use below slabs on grade.

B. Related sections include, but are not limited to, the following:

1. Section 031000 – Concrete Formwork
2. Section 033000 – Cast-In-Place Concrete

1.02 SUBMITTALS

A. Submit manufacturer's product data, installation instructions and membrane samples for approval.

1.03 REFERENCE STANDARDS

A. The following standards and publications are applicable to the extent referenced in the text.

B. American Society for Testing and Materials (ASTM):

D 412 Standard Test Methods for Rubber Properties in Tension.

D 903 Standard Test Method for Peel or Stripping Strength of Adhesive Bonds.

D 3767 Standard Practice for Rubber - Measurements of Dimensions

E 96 Standard Test Methods for Water Vapor Transmission of Materials.

E 154 Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.

E 1643 Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.

E1745 Plastic Vapor Retarders used in contact with soil or granular fill under concrete slabs.

C. American Concrete Institute (ACI)

ACI 302.1R-96 Addendum Vapor Retarder Location: For slabs with vapor-sensitive floor coverings, locate retarder in direct contact with the slab (not beneath a layer of granular fill).

1.04 QUALITY ASSURANCE

A. Materials: For each type of material required for the work of this section, provide primary materials that are the products of one manufacturer.

B. Schedule Coordination: Schedule work such that membrane will not be left exposed to weather for longer than that recommended by the manufacturer.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in labeled packages. Store and handle in strict compliance with manufacturer's instructions. Protect from damage from weather, excessive temperature and construction operations. Remove and dispose of damaged material in accordance with applicable regulations.

PART 2 — PRODUCTS

2.01 MATERIALS

A. Integrally Bonded Vapor Protection: Florprufe® 120 Membrane by GCP Advanced Technologies Construction Products, a 0.5mm (0.021 in) nominal thickness composite sheet membrane comprising 0.4 mm (0.016 in.) of polyolefin film, and layers of specially formulated synthetic adhesive layers. The membrane shall form an integral and permanent bond to poured concrete to prevent vapor migration at the interface of the membrane and structural concrete. Provide membrane with the following physical properties:

PHYSICAL PROPERTIES FOR FLORPRUFE® 120 MEMBRANE:

Florprufe 120 is a Class A vapor barrier and exceeds the requirements as defined by ASTM E 1745

Property	Typical Value	Test Method
Thickness (nominal)	0.5mm (0.021 in)	ASTM D3767 Method A
Water Vapor Permeance	0.03 perms	ASTM E96 Method B *
Tensile Strength	65 lb./in	ASTM E154 *
Elongation	300%	ASTM D412
Puncture Resistance	3300 grams	ASTM D1709 *
Peel Adhesion to Concrete	>4 lb./in	ASTM D903

* ASTM E 1745 Requirements.

PART 3 — EXECUTION

3.01 EXECUTION

A. The installer shall examine conditions of substrates and other conditions under which this work is to be performed and notify the Contractor, in writing, of circumstances detrimental to the proper completion of the work. Do not proceed with work until unsatisfactory conditions are corrected.

3.02 INSTALLATION

A. Earth and stone substrates shall be well compacted to produce an even, solid substrate. Remove loose aggregate or sharp protrusions. Concrete substrates shall be smooth or broom finished and monolithic. Remove standing water prior to membrane applications.

B. Installation shall be in accordance with manufacturer's instructions and ASTM E 1643–98, including but not limited to,
the following:

1. Apply membrane with the HDPE film facing the prepared substrate. Remove the release liner during application.
2. Apply succeeding sheets by overlapping the previous sheet 50-mm (2 in.) along the marked lap line. End Laps should be staggered to avoid a build up of layers.

   Mechanical Fastening Method - To prevent the membrane from moving and gaps opening, the laps should be fastened together at 1.0m (39 in) maximum centers. Fix through the center of the lap area using 12mm (0.5 in) long washer-head self-tapping galvanized screws or similar allowing the head of the screw to bed into the adhesive compound to self-seal. Ensure the membrane lays flat and no openings occur. Additional fastening may be required at corners, details etc.

   OR

   Taped Lap Method - For additional security use Preprufe® Tape to secure and seal the overlaps. Overband the lap with the 100mm (4in) wide Preprufe® Tape using the lap line for alignment. Remove plastic release liner to ensure bond to concrete.

3. Mix and apply GCP Advanced Technologies liquid detailing compound to seal around penetrations such as drainage pipes, etc.

3.04 CONCRETE PLACEMENT

A. Place concrete within 30 days. Inspect membrane and repair any damage with patches of Preprufe Tape. Ensure all liner is removed from membrane and tape before concrete placement.

END OF SECTION

SECTION 07 54 23 TPO THERMOPLASTIC SINGLE-PLY ROOFING – MECHANICALLY FASTENED

PART 1 - GENERAL

The project, Vital Records and Statistics located in Santa Fe, NM, includes the provision of a complete Firestone Building Products UltraPly™ Platinum™ TPO Membrane Mechanically Fastened 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. Vapor barrier (optional).
   5. Insulation.
   6. Cover boards.
   7. Elastomeric membrane roofing.
   8. Metal roof edging and copings.
   9. Flashings.
   10. Walkway pads.
   11. Safety strips
   12. 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 www.firestone.bpco.com 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. Any modification of the Contract Sum will be made in accordance with the stipulations of the Contract Documents stated elsewhere.

1.02 RELATED REQUIREMENTS

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.

SECTION 07 54 23 TPO THERMOPLASTIC SINGLE-PLY ROOFING – MECHANICALLY FASTENED

C. Section 07 71 00 - Roof Specialties: Manufactured copings, fascias, gravel stops, and other flashing-related items.

D. Section 07 72 00 - Roof Accessories: Roof hatches, vents, and manufactured curbs.

E. Section 22 10 06 - Plumbing Specialties: 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 C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus; 2010.
2. ASTM C209 - Standard Test Methods for Cellulosic Fiber Insulating Board; 2012.
3. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2010.
4. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2013.
5. ASTM C1549 - Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer; 2009.
6. ASTM D638 - Standard Test Method for Tensile Properties of Plastics; 2010.
7. ASTM D1004 - Standard Test Method for Tear Resistance (Graves Tear) of Plastic Film and Sheeting; 2009.
8. ASTM D1079 - Standard Terminology Relating to Roofing and Waterproofing; 2013.
9. ASTM D1621 - Standard Test Method for Compressive Properties Of Rigid Cellular Plastics; 2010.
10. ASTM D1622 - Standard Test Method for Apparent Density of Rigid Cellular Plastics; 2008.
11. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2012.
12. ASTM D6878/D6878M - Standard Specification for Thermoplastic Polyolefin Based Sheet Roofing; 2011a.
13. CAN-ULC-S770 - Standard Test Method Determination of L-Term Thermal Resistance Of Closed-Cell Thermal Insulating Foams; 2009.

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14. FM DS 1-28 - Wind Design; Factory Mutual System; 2007.
15. FM DS 1-29 - Roof Deck Securement and Above-Deck Roof Components; Factory Mutual System; 2006.
16. PS 1 - Structural Plywood; 2009.
17. PS 20 - American Softwood Lumber Standard; 2010.
18. SPRI ES-1 - Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems; 2003. (ANSI/SPRI ES-1)

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.
2. For tapered insulation, provide project-specific layout and dimensions for each board.

C. Pre-Installation Notice: Copy to show that manufacturer's required Pre Installation Notice (PIN) has been accepted and approved by the manufacturer.

D. Sample Warranty: Submit prior to starting work.

E. Samples: Submit samples of each product to be used.

1.05 QUALITY ASSURANCE

A. Applicator Qualifications: Roofing installer shall have the following:

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1. Current Firestone Licensed Contractor status.
2. At least five years experience in installing specified system.
3. Capability to provide payment and performance bond to building owner.

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 Platinum Red Shield Limited Warranty covering membrane, roof insulation, and membrane accessories.

Warranty Duration	Membrane Thickness, required minimums
30 year	Only .080 Ultraply Platinum TPO

1. Limit of Liability: No dollar limitation.
2. Scope of Coverage: Repair leaks in the roofing system caused by:
   a. Ordinary wear and tear of the elements.
   b. Manufacturing defect in Firestone brand materials.
   c. Defective workmanship used to install these materials.
   d. Damage due to winds up to 55 mph.
3. Not Covered:
   a. Damage due to winds in excess of 55 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., Nashville, TN. www.firestonebpco.com.
   1. 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:
      a. Specializing in manufacturing the roofing system to be provided.
      b. Minimum ten years of experience manufacturing the roofing system to be provided.
      c. Able to provide a no dollar limit, single source roof system warranty that is backed by corporate assets in excess of one billion dollars.
      d. ISO 9002 certified.
      e. Able to provide polyisocyanurate insulation that is produced in own facilities.
B. Manufacturer of Insulation and Cover Boards: Same manufacturer as roof membrane.
C. Manufacturer of Metal Roof Edging: Manufacturer as approved by roof membrane manufacturer.
   1. Metal roof edging products by other manufacturers are not acceptable.
   2. Field- or shop-fabricated metal roof edgings are not acceptable.
D. 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) single-ply membrane.
   2. Thickness: As specified elsewhere
   3. Membrane Attachment: Mechanically fastened.
   4. Slope: Deck is sloped but not enough; provide additional slope of 1/4 inch per foot (1:48) by means of tapered insulation.
   5. Comply with applicable local building code requirements.
   6. Provide assembly having Underwriters Laboratories, Inc. (UL) Class A Fire Hazard Classification.

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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 1-90 wind uplift rating.

B. Vapor Barrier : Firestone V-Force Vapor Barrier
   1. Membrane: High density polyethylene sheet with SBS modified bitumen adhesive.
   2. Attachment: Self adhering.

C. Insulation:
   1. Total System R Value: 20 min.
   2. Maximum Board Thickness: 2 inches (50 mm); use as many layers as necessary; stagger and offset joints in adjacent layers.
   3. Base Layer: Polyisocyanurate foam board, non-composite.
      a. Attachment: Mechanical fastening.
   4. Top Layer: Polyisocyanurate foam board, non-composite.
      a. Attachment: Mechanical fastening.

D. Cover Board: High Density Polyisocyanurate Cover Board:
   1. Thickness: 0.5 inch (12.7mm).
   2. R-Value: 2.5 based on ASTM tests C158 and C177.
      a. Attachment: Mechanical fastening.
   3. 80 psi density

E. Crickets and Saddles: Tapered insulation of same type as specified for top layer; slope as indicated.

2.03 TPO MEMBRANE MATERIALS

A. Roofing Membrane: Flexible, heat weldable sheet composed of thermoplastic polyolefin polymer and ethylene propylene rubber; complying with ASTM D6878, with polyester weft inserted reinforcement and the following additional characteristics:
   1. Thickness: 0.080 inch (2.03 mm) plus/minus 10 percent, with coating thickness over reinforcement of 0.030 inch (0.76 mm) plus/minus 10 percent.
   2. Puncture Resistance: 415 lbf (1868 N), minimum, when tested in accordance FTM 101C Method 2031.
   3. Solar Reflectance: 0.79 minimum, when tested in accordance with ASTM C1549.
   4. Color: White.
   5. Acceptable Product: Platinum TPO by Firestone.

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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: Same material as membrane, 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 D638 after heat aging.
   3. Elongation at Break: 650 percent, minimum, when tested in accordance with ASTM D638 after heat aging.
   4. Tearing Strength: 12 lbf (53 N), minimum, when tested in accordance with ASTM D1004 after heat aging.
   5. Color: White.
   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.

L. Roof Walkway Pads: Non-reinforced TPO walkway pads, 0.130 inch (3 mm) by 30 inches (760 mm) by 40 feet (12.19 m) long with patterned traffic bearing surface; UltraPly TPO Walkway Pads by Firestone.

SECTION 07 54 23 TPO THERMOPLASTIC SINGLE-PLY ROOFING – MECHANICALLY FASTENED

M. Yellow Safety Strip: To designate areas of caution on the roof or around rooftop objects. 5.5 inches wide (140 mm) by 100 feet long (30 m) strip and nominal 30 mil (0.76 mm) thick yellow TPO membrane laminated to a white, cured, seam tape. Compatible with TPO and EPDM; QuickSeam Yellow Safety Strip by Firestone.

2.05 VAPOR BARRIER

A. Vapor Barrier Membrane: Comprised of SBS modified bitumen adhesive, factory-laminated to a tri-laminate woven, high-density polyethylene top surface. Release liner protecting adhesive.
   1. Intended for use as a direct to deck air/vapor barrier in roofing systems and may be used as a temporary roof membrane for up to ninety (90) days.
   2. Thickness: 0.0325" (0.826 mm) minimum, when tested in accordance with ASTM D 5147.
   3. Max Load at Break at 73 °F (23 °C): 64 lbf/in, MD (11 kN/m) 88 lbf/in, XMD (15 kN/m) when tested in accordance with ASTM D 5147.
   4. Low Temperature Flexibility: -30 °F (-34 °C) when tested in accordance with ASTM D 5147.
   5. Moisture Vapor Permeance, 0.02 Perms (0.92 Ng/Pa•s•m2) maximum, when tested in accordance with ASTM E 96.
   6. Air Permeability: 0.00114 ft3/min•ft2 (0.007 L/sec•m2) maximum, when tested in accordance with ASTM E 2178.

B. Acceptable Product: V-Force Vapor Barrier Membrane by Firestone.

2.06 ROOF INSULATION AND COVER BOARDS

A. Polyisocyanurate Board Insulation: Closed cell polyisocyanurate foam with core laminated to a specially coated inorganic fiber glass facer, , complying with ASTM C 1289 Type II Class 2, with the following additional characteristics:
   1. Thickness: As indicated elsewhere.
   2. Size: 48 inches (1220 mm) by 96 inches (2440 mm), nominal.
      a. Exception: Insulation to be attached using adhesive or asphalt may be no larger than 48 inches (1220 mm) by 48 inches (1220 mm), nominal.
   3. R-Value (LTTR): 1.0 inch (25 mm) Thickness: 5.7 R, minimum.
   4. Compressive Strength: 20 psi (138 kPa) when tested in accordance with ASTM C 1289.
   5. Ozone Depletion Potential: Zero; made without CFC or HCFC blowing agents.
   6. Recycled Content: 19 percent post-consumer and 15 percent post-industrial, average.
   7. Acceptable Product: Resista polyiso board insulation by Firestone, mold resistant material per ASTM D3273.

SECTION 07 54 23 TPO THERMOPLASTIC SINGLE-PLY ROOFING – MECHANICALLY FASTENED

B. High Density Polyisocyanurate Cover Board: Non-combustible, water resistant high density, closed cell polyisocyanurate core with coated glass mat facers, complying with ASTM D 1623, and with the following additional characteristics:
   1. Size: 48 inches (1220 mm) by 96 inches (2440 mm), nominal.
      a. Exception: Board to be attached using adhesive or asphalt may be no larger than 48 inches (1220 mm) by 48 inches (1220 mm), nominal.
   2. Thickness: 0.5 inch (12.7mm).
   3. R-Value: 2.5 based on ASTM tests C158 and C177.
   4. Surface Water Absorption: <3%, maximum, when tested in accordance with ASTM C 209.
   5. Compressive Strength: 80psi, when tested in accordance with ASTM 1621.
   6. Density: 5pcf, when tested in accordance with ASTM 1622.
   7. Factory Mutual approved for use with FM 1-60 and 1-90 rated roofing assemblies.
   8. Mold Growth Resistance: Passed, when tested in accordance with ASTM D 3273.
   9. Acceptable Product: ISOGARD HD Cover Board by Firestone.

C. Insulation 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.

2.08 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.
   1. Width: 3-1/2 inches (90 mm), nominal minimum, or as wide as the nailing flange of the roof accessory to be attached to it.
   2. Thickness: Same as thickness of roof insulation.

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.

SECTION 07 54 23 TPO THERMOPLASTIC SINGLE-PLY ROOFING – MECHANICALLY FASTENED

C. Do not start work until Pre-Installation Notice has been submitted to manufacturer as notification that this project requires a manufacturer's 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 Safety Data Sheets (SDS) 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.

SECTION 07 54 23 TPO THERMOPLASTIC SINGLE-PLY ROOFING – MECHANICALLY FASTENED

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, loose 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 seepage of foreign materials into building.

3.04 VAPOR BARRIER INSTALLATION

A. All deck/deck cover substrates (except metal decks) must be primed prior to application. Use only primer supplied by membrane manufacturer.

B. Expanded Polystyrene, Extruded Polystyrene, Common Polyisocyanurate, Fiberglass, Wood Fiber, Perlite and existing single-ply roofs are not acceptable substrates for SBS bitumen adhesive.

C. Application can be made at ambient temperatures as low as 25 °F (-4 °C) as long as membrane has been stored in a heated area so that it will be between 50 °F (10 °C) and 100 °F (38 °C) at the time of application.

D. Install with minimum 3" (76.2 mm) side laps and 6" (152.4 mm) end laps.

E. Roll in with a 75 lb (34 kg) roller to fully mate each roll to substrate, including all lap areas.

3.05 INSULATION AND COVER BOARD INSTALLATION

A. Install insulation in configuration and with attachment method(s) specified in PART 2, under Roofing System.

B. Install insulation in a manner that will not compromise the vapor retarder integrity.

C. 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.

D. Lay roof insulation in courses parallel to roof edges.

E. 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).

SECTION 07 54 23 TPO THERMOPLASTIC SINGLE-PLY ROOFING – MECHANICALLY FASTENED

F. 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 seam battens, 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.

G. 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.

SECTION 07 54 23 TPO THERMOPLASTIC SINGLE-PLY ROOFING – MECHANICALLY FASTENED

2. Remove protective plastic surface film immediately before installation.
3. Install water block sealant under the membrane anchorage leg.
4. Flash with manufacturer's 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

SECTION 07 54 23 TPO THERMOPLASTIC SINGLE-PLY ROOFING – MECHANICALLY FASTENED

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.

H. Pipes, Round Supports, and Similar Items: Flash with specified pre-molded pipe flashings wherever practical; otherwise use specified self-curing elastomeric flashing.

I. 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.

J. 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.

3.08 FINISHING AND WALKWAY INSTALLATION

A. Install walkways at access points to the roof, around rooftop equipment that may require maintenance, and where indicated on the drawings.

B. Walkway Pads: Adhere to the roofing membrane, spacing each pad at minimum of 1.0 inch (25 mm) and maximum of 3.0 inches (75 mm) from each other to allow for drainage.

1. If installation of walkway pads over field fabricated splices or within 6 inches (150 mm) of a splice edge cannot be avoided, adhere another layer of flashing over the splice and extending beyond the walkway pad a minimum of 6 inches (150 mm) on either side.
2. Prime the membrane, remove the release paper on the pad, press in place, and walk on pad to ensure proper adhesion.

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.

SECTION 07 54 23 TPO THERMOPLASTIC SINGLE-PLY ROOFING – MECHANICALLY FASTENED

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 60 00 FLASHING AND SHEET METAL

PART 1 – GENERAL

1.01 Scope

A. This section includes flashings and other sheet metal items required to protect the building from moisture.

1.02 Standards

A. All work under this section shall conform to applicable standards of the Sheet Metal and Air Conditioning Contractor's Association, Inc., as shown in their Architectural Sheet Metal Manual.

1.03 Submittals

A. Submit shop drawings and 12" x 12" material samples of flashing if applicable, equipment curbs, brick flashing if applicable, roof and wall expansion joints, all other flashings and sheet metal details and all flashing indicated in the Drawings. Receive Architect's approval of submittals before proceeding with fabrication.

PART 2 - PRODUCTS

2.01 Sheet Metal

A. All sheet metal which is not exposed, such as unexposed roof flashings, shall be standard galvanized metal. All other sheet metal shall be factory finished with the finish selected by the Architect at the time of materials approval submittal and as noted on the Drawings. If any rooftop flashings are visible from surrounding property, they shall be field primed and painted. Color to be selected by Architect.

2.02 Flashings

A. Roof counter-flashings and all flashings at penetrations shall be 24-gauge sheet metal unless otherwise indicated.

2.03 Gauges

A. All other sheet metal shall be fabricated in gauges recommended in the Architectural Sheet Metal Manual unless shown otherwise on the Drawings.

2.04 Fasteners

A. Shall be of the same material as the sheets used.

PART 3 - EXECUTION

3.01 Fabrication

A. Sheet metal items not covered specifically elsewhere in this section shall be as indicated on the Drawings, and as required to provide a water-tight installation. Formed sheet metal shall accurately reproduce the detail and design shown, and profiles, bends and intersections shall be sharp, even and true. Joints shall be locked, lapped, screwed, riveted or soldered as applicable and per SMACNA standards. Flashings, and other exposed sheet metal to be painted as noted in Section 9900 PAINTING.

3.02 Projections and Extensions Through the Roof

A. All roof penetrations shall be located where indicated on the Drawings and shall be installed by roofing subcontractor after coordinating work with all other applicable trades. If any roof equipment or penetrations are needed which are not specifically shown on the Drawings, or will be higher than the finished parapet height as shown on the Drawings, contact the Architect for approval prior to beginning the Work.

END OF SECTION

SECTION 07 90 00 SEALANTS

PART 1 - GENERAL

1.01 SCOPE

A. Furnish all labor, materials and equipment necessary for a complete installation of all sealants as required by the Drawings. Sealant shall be provided to produce water-tight joints at dissimilar materials and where movement of adjacent surfaces is probable, and to produce neat, air-tight joints between dissimilar materials.

1.02 CONDITION

A. The Contractor is responsible for examining the job conditions and installing sealant at locations warranting or requiring the application of sealant, and all locations and conditions where it is advisable to use sealant. Do not proceed under adverse weather conditions as recommended by the material manufacturer. Any damage to new or existing construction resulting from unsealed joints or the improper installation of sealant shall be repaired at the Contractor's expense.

PART 2 - MATERIALS

2.01 EXTERIOR SEALANT

A. Shall be a one-part, high performance, gun-grade polyurethane, weatherproofing sealant conforming to ASTM C920-86, Type S, and to TT-S-00230C, Type II, Class A, Vulkem 116 as manufactured by Mameco International, Inc., or Architect-approved equal. Color to match finish of adjoining materials.

2.02 ACOUSTICAL SEALANT

A. Shall be non-drying, non-hardening, permanently flexible, synthetic rubber based, "Acoustical Sealant" as manufactured by "Tremco", "Pecora Corp", or Architect-approved equal.

2.03 INTERIOR SEALANT

A. Shall be acrylic latex caulk, Sonolac by Sonneborn or Architect-approved equal.

PART 3 - EXECUTION

3.01 PREPARATION

A. Clean surfaces to receive sealant or caulking. Prime and seal the surfaces as recommended by the manufacturer.

3.02 APPLICATION

A. Employ only proven installation techniques which will ensure that the sealant will be deposited in uniform, continuous ribbons, without gaps, and bonded equally on both sides. Install sealant as recommended by the manufacturer.

3.03 ACOUSTICAL SEALANT

A. Seal all perimeter joints, cutouts pipes and plumbing, ducts and electrical boxes and backs of electrical boxes on all interior walls. Install two beads of sealant at each wall; one under each layer of gypsum board. Install sealant as recommended by the manufacturer.

3.04 CURING

A. Cure and protect sealants as recommended by the manufacturer.

3.05 CLEAN-UP

A. After caulking and sealant curing, surfaces shall be cleaned of sealant, oil or discoloration.

END OF SECTION

SECTION 08 10 00 METAL DOORS AND FRAMES

PART 1 - GENERAL

1.01 Scope

A. Furnish all labor, materials and equipment necessary for a complete installation of the hollow metal doors and door frames with applicable ratings as shown on Drawings and as specified herein, including but not limited to hollow metal door, window and skylight frames, anchors, clips and hollow metal doors.

1.02 Shop Drawings

A. Submit three (3) copies of Shop Drawings for the fabrication and erection of hollow metal work, anchorage and accessory items with schedule.

1.03 Standards

A. All materials and installations shall comply with recommendations of the Steel Door Institute.

PART 2 - PRODUCTS

2.01 Manufacturers

A. Ceco Door Products
B. Curries
C. Southwestern Hollow Metal
D. Architect approved equal.

2.02 Doors

A. 16-gauge, cold-rolled steel, flush, with invisible seams filled and ground smooth, with 1/8” bevel in 2” on hinge and lock edges. Glazed openings shall be as indicated on Drawings.
   - **Doors shall be fully insulated with either mineral wool or polystyrene insulation.**
   - **The doors shall be factory prepped for all hardware. Doors shall be bonderized and receive one coat of baked-on primer. Doors shall be U.L. rated as required by Drawings and shall be so labeled.**
   - **Each door to receive door kick hardware at both sides of bottom of door.**
   - **Each door to receive door closer and panic hardware.**

2.03 Frames

A. Form from 16-gauge cold-rolled steel in profiles as shown on Drawings. Heads and jambs shall be accurately mitered, welded and ground smooth in accordance with Steel Door Institute's SDI-105 recommendations. Reinforce for butts and accessories. All frames shall be bonderized and shop primed with baked-on primer. See related section 08 80 00 Glazing.

2.04 Anchors

A. Provided 6 jamb anchors and two base anchors per door frame of type as recommended by the Manufacturer and as noted on Drawings for new CMU, metal frame or existing masonry walls.

PART 3 - EXECUTION

3.01 Installation

A. Set frames plumb and true in accordance with manufacturer's instructions. Paint as noted in Section 09 90 00 PAINTING.

3.02 Coordination

A. Coordinate with other trades to see that anchors are set accurately and frames installed in the correct sequence of work.

3.03 Adjust and Clean

A. Readjust operating hardware items prior to final inspection, replacing defective work, including warped or bowed doors and frames. Sand smooth any rusted or damaged areas of prime coat and touch up immediately after erection of hollow metal items.

END OF SECTION

SECTION 08 36 00 - INSULATED STEEL DOORS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Insulated Sectional Overhead Doors.

B. Electric Operators and Controls.

C. Operating Hardware, tracks, and support.

1.2 RELATED SECTIONS

A. Section 03300 - Cast-In-Place Concrete: Prepared opening in concrete. Execution requirements for placement of anchors in concrete wall construction.

B. Section 04810 - Unit Masonry Assemblies: Prepared opening in masonry. Execution requirements for placement of anchors in masonry wall construction.

C. Section 05500 - Metal Fabrications: Steel frame and supports.

D. Section 06114 - Rough wood framing and blocking for door opening.

E. Section 07900 - Joint Sealers: Perimeter sealant and backup materials.

F. Section 08710 - Door Hardware: Cylinder locks.

G. Section 09900 - Paints and Coatings: Field painting.

H. Section 16130 - Raceway and Boxes: Empty conduit from control station to door operator.

I. Section 16150 - Wiring Connections: Electrical service to door operator.

1.3 REFERENCES

A. ANSI/DASMA 102 - American National Standard Specifications for Sectional Overhead Type Doors.

1.4 DESIGN / PERFORMANCE REQUIREMENTS

A. Wind Loads: Design and size components to withstand loads caused by pressure and suction of wind acting normal to plane of wall as calculated in accordance with applicable code.

B. Wiring Connections: Requirements for electrical characteristics.
   1. 115 volts, single phase, 60 Hz.
   2. 230 volts, single phase, 60 Hz.
   3. 230 volts, three phase, 60 Hz.
   4. 460 volts, three phase, 60 Hz.

C. Single-Source Responsibility: Provide doors, tracks, motors, and accessories from one manufacturer for each type of door. Provide secondary components from source acceptable to manufacturer of primary components.

1.5 SUBMITTALS

A. Submit under provisions of Section 01 30 00.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

C. Shop Drawings: Indicate plans and elevations including opening dimensions and required tolerances, connection details, anchorage spacing, hardware locations, and installation details.

D. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

E. Operation and Maintenance Data.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum five years documented experience.

B. Installer Qualifications: Authorized representative of the manufacturer with minimum five years documented experience.

C. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories, Inc. acceptable to authority having jurisdiction as suitable for purpose specified.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened labeled packaging until ready for installation.

B. Protect materials from exposure to moisture until ready for installation.

C. Store materials in a dry, ventilated weathertight location.

1.8 PROJECT CONDITIONS

A. Pre-Installation Conference: Convene a pre-installation conference just prior to commencement of field operations, to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer:
Overhead Door Corp.
2501 S. State Hwy. 121, Suite 200, Lewisville, TX 75067.
(800) 275-3290 / (469) 549-7100
www.overheaddoor.com sales@overheaddoor.com

Or Approved Equal – by Architect

2.2 INSULATED SECTIONAL OVERHEAD DOORS

A. Insulated Steel Sectional Overhead Doors
Door Corporation. Units shall have the following characteristics:
1. Door Assembly: Insulated steel door assembly with rabbeted meeting rails to form weathertight joints and provide full-width interlocking structural rigidity.
   a. Panel Thickness: 2 inches (51 mm).
   b. Exterior Surface: Ribbed.
   c. Exterior Steel: Nominal 24 gauge, hot-dip galvanized.
   d. Back Cover:

1) 26 gauge steel.
2) Poly-Backed.
3) High Impact Polystyrene Backcover.

e. Center and End Stiles: 16 gauge steel.

f. Springs:
1) 10,000 cycles.
2) 25,000 cycles.
3) 50,000 cycles.
4) 75,000 cycles.
5) 100,000 cycles.

g. Insulation: Polystyrene.

h. Thermal Values:
1) Polystyrene - R-value of 7.35; U-value of 0.136.

i. Partial Glazing of Steel Panels:
1) Insulated double strength glass, 24 inch by 7 inch (610 mm by 178 mm) window.

j. Full Glazed Aluminum Sash Panels:
1) Acrylic glazing.
2) 1/8 inch (3 mm) double strength glass.
3) Insulated double strength glass.

2. Finish and Color: Two coat baked-on polyester with white exterior and white interior color.
3. Windload Design: Provide to meet the Design/Performance requirements specified.
4. Hardware: Galvanized steel hinges and fixtures. Ball bearing rollers with hardened steel races.
5. Lock:
a. Interior mounted slide lock.
b. Interior mounted slide lock with interlock switch for automatic operator.
c. Keyed lock.
d. Keyed lock with interlock switch for automatic operator.
e. Locking mechanism designed to maintain security for exterior while permitting break out when impacted from the inside.
6. Weatherstripping:
a. Flexible bulb-type strip at bottom section.
b. Flexible Jamb seals.
c. Flexible Header seal.
7. Track: Provide track as recommended by manufacturer to suit loading required and clearances available.
8. Manual Operation: Pull rope.
9. Manual Operation: Chain hoist.
10. Electric Motor Operation: Provide UL listed electric operator, size and type as recommended by manufacturer to move door in either direction

at not less than 2/3 foot nor more than 1 foot per second. Operator shall meet UL325/2010 requirements for continuous monitoring of safety devices.

a. Entrapment Protection: Required for momentary contact, includes radio control operation.
   1) Pneumatic sensing edge up to 18 feet (5.5 m) wide. Constant contact only complying with UL 325/2010.
   2) Electric sensing edge monitored to meet UL 325/2010.
   3) Photoelectric sensors monitored to meet UL 325/2010.

b. Operator Controls:
   1) Push-button operated control stations with open, close, and stop buttons.
   2) Key operated control stations with open, close, and stop buttons.
   3) Push-button and key operated control stations with open, close, and stop buttons.
   4) Flush mounting.
   5) Surface mounting.
   6) Interior location.
   7) Exterior location.
   8) Both interior and exterior location.

c. Special Operation:
   1) Pull switch.
   2) Vehicle detector operation.
   3) Radio control operation.
   4) Card reader control.
   5) Photocell operation.
   6) Door timer operation.
   7) Commercial light package.
   8) Explosion and dust ignition proof control wiring.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until openings have been properly prepared.

B. Verify wall openings are ready to receive work and opening dimensions and tolerances are within specified limits.

C. Verify electric power is available and of correct characteristics.

D. If 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.

3.3 INSTALLATION

A. Install overhead doors and track in accordance with approved shop drawings and the manufacturer's printed instructions.

B. Coordinate installation with adjacent work to ensure proper clearances and allow for maintenance.

C. Anchor assembly to wall construction and building framing without distortion or stress.

D. Securely brace door tracks suspended from structure. Secure tracks to structural members only.

E. Fit and align door assembly including hardware.

F. Coordinate installation of electrical service. Complete power and control wiring from disconnect to unit components.

3.4 CLEANING AND ADJUSTING

A. Adjust door assembly to smooth operation and in full contact with weatherstripping.

B. Clean doors, frames and glass.

C. Remove temporary labels and visible markings.

3.5 PROTECTION

A. Do not permit construction traffic through overhead door openings after adjustment and cleaning.

B. Protect installed products until completion of project.

C. Touch-up, damaged coatings and finishes and repair minor damage before Substantial Completion.

END OF SECTION

SECTION 08 50 00 CLAD WOOD WINDOWS

PART 1 - GENERAL

1.01 Scope

A. Provide all labor, materials and equipment to properly install all Wood Windows, Clad Wood Windows, and Entrances. This section includes perimeter trims, stools, accessories, shims and anchors and perimeter sealing of units. See hardware schedule in Drawings and Specifications for Hardware designation.

1.02 Work in Other Sections

A. Installation, wood and steel doors, frames, finish hardware, glazing, finishing and painting.

1.03 Warranty and Recommendations

A. Comply with manufacturer's recommendations for use and handling. Provide manufacturer's warranty for all windows and entrances. Refer to the General Conditions of the Contract for warranty provisions. Submit, for Owner's acceptance, manufacturer's warranty for windows and entrances. The limited two (2) Year Warranty shall begin in no event later than six months from date of shipment by manufacturer. The start date shall be the Date of Substantial Completion.

1.04 Submittals

A. Prepare, review, approve, and submit specified submittals in accordance with "Conditions of the Contract" and Division 1 Submittals Sections.

1.05 Standards

A. Comply with the following codes and standards including current editions, revisions and supplements.

B. ASTM E283, Test for Rate of Air Leakage through Exterior Windows, Curtain Walls and Doors. Air infiltration rate shall not exceed 0.06 cfm/square foot at a static air pressure differential of 6.24 psi.

C. ASTM E330, Test for Structural Performance of Exterior Windows, Curtain Walls and Doors Under the Influence of Wind Loads. : A static air design load of 20 psf shall be applied in the positive and negative direction. There shall be no deflection in excess of L/175 of the span of any framing member. At a structural test load equal to 1.5 times the specified design load, no glass breakage or permanent set in the framing members in excess of 0.2% of their

clear spans shall occur. Windows and glazing designed for 90 mph wind load.

D. ASTM E 331, Test for Water Resistance. There shall be no leakage at a minimum static air pressure differential of 8 psf as defined in AAMA 501.

E. AAMA Specification 1503, Test for thermal transmittance (U-value) shall not be more than 0.44 (low-e) or 0.61 (clear).

F. AAMA Specification 1503, Test for Condensation Resistance (CRF). The condensation resistance factor shall not be less than 62 for the frame and 68 (low-e) for the glass, 60 for the frame and 58 for clear glass.

G. ASTM E 1425 and AAMA Specification 1801, Test for Sound Transmission Class (STC). The STC Rating shall not be less than 37 for Class to Center windows.

1.06 Quality Assurance

A. Installer shall have the necessary experience to perform work in this section who has specialized in the installation of similar work for at least two years and who is acceptable to product manufacturer.

B. The manufacturer shall be capable of providing field service representation during construction, approving installer, and application method.

D. Provide glazing and materials and accessories from a single source. Provide building enclosure system products from a single source manufacturer.

1.07 Pre-installation Meeting

A. Conduct pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instruction, and manufacturer's warranty requirements.

1.08 Delivery, Storage, and Handling

A. Comply with manufacturer's ordering instructions and lead time requirements. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact. Store materials protected from exposure to harmful weather conditions. Handle material and components to avoid damage. Protect material against damage from elements, construction activities and other hazards before, during and after installation.

PART 2 - PRODUCTS

2.01 Materials / Components

A. Clad Wood Windows

B. Each framing member shall provide structural strength to meet specified performance requirements.

2.02 Accessories

A. Where exposed, fasteners shall be stainless steel. Weather-stripping shall be provided by the Aluminum door manufacturer.

B. Thermal Break shall be designed in accordance with AAMA TIR-A8 and tested in accordance with AAMA 505.

2.03 Related Materials

A. For sealants, refer to Joint Treatment Section. For glass, refer to glass and glazing sections.

2.04 Fabrication

A. Fabricate components per manufacturer's installation instruction and with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal. Accurately fit and secure joints and corners. Make joints flush, hairline and weatherproof. Prepare components to receive anchor devices. Fabricate anchors. Arrange fasteners and attachments to conceal from view.

2.05 Shop finishing

A. Color as selected by Architect from manufacturer's standard color chart.

2.06 Manufacturer

A. "**Pella WIndows**"
B. "**Sierra Pacific Windows**"
C. "**Jeld Wen Windows**"
D. Or architect approved equal.

PART 3 - EXECUTION

3.01 Examination

A. Site verify substrate conditions (which have been previously installed under other sections) to confirm that conditions are acceptable for product installation in accordance with manufacturer's instructions. Verify openings are sized to receive Windows, Doors, and Entrances and sill plate is level in accordance with manufacturer's acceptance tolerances.

B. Verify actual measurements / openings by field measurements before fabrication. Show recorded measurements on shop drawings. Coordinate field measurements, fabrication schedule with construction progress to avoid construction delays.

3.02 Installation

A. Installers shall assemble Windows, Doors, and Entrances according to manufacturer's requirements and according to standard trade practices. See SECTION 06200. Install plumb, level, and true to line, without warp or rack of frames with manufacturer's prescribed tolerances and installation instructions. Provide support and anchor in place.

B. Provide separation of aluminum materials from sources of corrosion or electrolytic action contact points.

C. Install sill members and other members in a bed of sealant or with joint filler or gaskets, to provide weathertight construction. Coordinate installation with wall flashings and other components of construction.

3.03 Related Products Installation Requirements

A. Refer to Division 7 Sealants for installation requirements. Refer to Division 8 Glass and Glazing Section.

3.04 Handling

A. Handle with clean gloves and do not drag doors across one another or across other surfaces.

3.05 Field Quality Control

A. Conduct post installation site checks for air and water infiltration with manufacturer's representative present. If deficient, correct as part of the contract amount.

B. Testing shall be performed by a qualified independent testing agency. Refer to Division 1 for testing and testing requirements. Testing shall meet standards as per AAMA 503, including reference to ASTM E 783 for Air Infiltration Test and ASTM E 1105 Water Infiltration testing requirements. No uncontrolled water leakage is permitted when tested at a static test pressure of two-thirds the specified water penetration pressure but not less than 6.24 psf. Testing shall also meet air infiltration standards in accordance with ASTM E 783. Allowable air infiltration shall not exceed 1.5 times the amount indicated in the performance requirements or 0.09 cfm/s.f., whichever is greater.

3.06 Protection

A. Doors shall be delivered to site in separate factory cartons. Protect against damage, deterioration and soiling during transit, storage and handling.

END OF SECTION

SECTION 08 71 00 DOOR HARDWARE

PART 1 - GENERAL

1.01 SCOPE

A. Furnish all labor, materials and equipment necessary for a complete installation of all finish hardware and door accessories as intended by the Drawings and Schedules and as specified herein. This includes but is not limited to locksets, latchsets, hinges, thresholds, and miscellaneous hardware items and accessories required for smooth, secure operation and locking.

1.02 COORDINATION

A. All hardware to be compatible with reinforcing and hardware preparation of doors. Verify compatibility.

1.03 SUBMITTALS

A. Within fifteen working days of the Signing the Contract, a complete schedule of every Finish Hardware item furnished under this Section is to be submitted to the Architect for approval. Such schedule MUST contain finish samples, technical literature, with all pertinent information. Schedules are intended for coordination of the work. Submit sample of cabinet pulls and hinges for Architect approval. Drawing details MUST be submitted for hardware based on the products and manufacturers listed in the hardware schedule. Proposed substitutions must not change design intent.

1.04 KEYING

A. All locks of this Section are to be Master Keyed with and match existing building hardware. Provide three keys per lock, properly labeled. Keying system is to be to the complete satisfaction of the Owner and shall be approved by the Owner before any hardware is installed.

1.05 QUALITY ASSURANCE

A. Obtain each kind of hardware from one manufacturer with the exception of mag locks. In order to meet project requirements, Mag locks may be purchased from Securitron and Sargent. The supplier shall be recognized as builders' hardware supplier. The hardware supplier MUST be furnishing hardware in the project’s vicinity for no less than two years. The hardware supplier MUST have in their employment an experienced hardware consultant who is and will be available for consultation to the Owner, Architect, and Consultant.

B. Provide hardware for fire rated openings in compliance with NFPA Standard No. 80. Provide only hardware that has been tested and listed by U.L. for types and sizes of doors required and complies with requirements of door and door frame labels.

1.06 DELIVERY, STORAGE AND HANDLING

A. Packaging of hardware, on a set-by-set basis is the responsibility of the supplier. As material is received by hardware suppliers, sort and repackage in containers marked with hardware set numbers. Inventory hardware jointly with the hardware supplier and the installer. Provide secured area for hardware delivery to the project site. Control handling and installation of the hardware sets.

1.07 JOB CONDITIONS

A. Coordinate hardware work with other work. Tag each item or package with basic information related to hardware schedule and installation requirements. Check shop drawings to confirm that hardware components will make an excellent fit. Coordinate all applicable door strike hardware with floor finishes so there will be a smooth transition. Make floor strikes flush with floor finishes.

1.08 REFERENCES

A. Fire/Life Safety

1. NFPA - National Fire Protection Association

a. NFPA 70 – National Electric Code
b. NFPA 80 - Standard for Fire Doors and Fire Windows
c. NFPA 101 - Life Safety Code
d. NFPA 105 - Smoke and Draft Control Door Assemblies

B. UL - Underwriters Laboratories

1. UL 10B - Fire Test of Door Assemblies
2. UL 10C - Positive Pressure Test of Fire Door Assemblies
3. UL 1784 - Air Leakage Tests of Door Assemblies
4. UL 305 - Panic Hardware

C. Accessibility

1. ADA - Americans with Disabilities Act.
2. ANSI A117.1 - Accessible and Usable Buildings and Facilities.

D. DHI - Door and Hardware Institute

1. Sequence and Format for the Hardware Schedule
2. Recommended Locations for Builders Hardware
3. Key Systems and Nomenclature

E. ANSI - American National Standards Institute

1. ANSI/BHMA A156.1 - A156.29, and ANSI A156.31 - Standards for Hardware and Specialties

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Schlage
B. Sargent
C. Von Duprin
D. Trimco
E. Bommer
F. LCN
G. Glynn-Johnson
H. Locknetics
I. NGP
J. Falcon
K. Markar

2.02 STEEL DOORS

A. All aluminum doors shall receive 1224 screws or larger with riv-nut type connection (minimum 8 per operator) in conjunction with the installation of all applicable hardware.

2.03 DOOR HARDWARE

A. Provide a hardware schedule

2.04 THRESHOLDS

A. Provide threshold anchors as approved by Architect at all doors to receive thresholds.

2.05 DOOR CLOSERS

A. Provide door closers as approved by Architect

2.06 DOOR KICK PLATES

A. Provide Door Kick Plates. Architect approved brushed or satin finished stainless steel (ss) or nickel chrome finish.

PART 3 - EXECUTION

3.01 GENERAL

A. Install hardware items according to the manufacturer's recommendations and to the satisfaction of the Architect. Do not install surface mounted items until finishes are complete. Set units level, plumb and true to line.

3.02 ADJUSTMENTS

A. Adjust and clean operating items before final inspection. Instruct Owner personnel as to proper maintenance. Operation shall be approved by the Architect.

3.03 MOUNTING HEIGHTS

A. Mount hardware units at heights recommended by code requirements.

3.04 INSPECTION

A. Doors shall be demonstrated to swing and close and hardware to operate to the satisfaction of the Architect.

PART 4 - SCHEDULE

4.01 See drawings for schedule information.

SECTION 09 24 00 PORTLAND CEMENT PLASTER

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Supply and Installation of a three-coat stucco assembly over continuous insulation with an acrylic based elastomeric finish.

1.2 RELATED SECTIONS

A. Section 03 30 00 - Cast-in-Place Concrete
B. Section 04 20 00 - Unit Masonry
C. Section 06 16 00 - Sheathing
D. Section 07 25 00 - Weather Barriers
E. Section 07 62 00 - Sheet Metal Flashing and Trim
F. Section 07 90 00 - Joint Protection
G. Section 08 50 00 - Windows
H. Section 09 21 16 - Gypsum Board Assemblies

1.3 REFERENCES

A. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar
B. ASTM C578 - Specification for Preformed, Cellular Polystyrene Thermal Insulation
C. ASTM C847 - Standard Specification for Metal Lath
D. ASTM C897 - Standard Specification for Aggregate for Job-Mixed Portland Cement-Based Plaster
E. ASTM C926 - Standard Specification for Application of Portland Cement-Based Plaster
F. ASTM C933 - Standard Specification for Welded Wire Lath
G. ASTM C1032 - Standard Specification for Woven Wire Plaster Base
H. ASTM C1063 - Standard Specification for Installation of Lathing and Furring for Portland Cement Based Plaster
I. ASTM C1177 - Specification for Glass Mat Gypsum for Use as Sheathing
J. ASTM C1278 - Specification for Fiber-Reinforced Gypsum Panel
K. ASTM C1396 - Standard Specification for Gypsum Board
L. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials
M. ASTM E119 - Method for Fire Tests of Building Construction and Materials
N. ASTM E330 - Test Method for Structural Performance of Windows, Curtain Walls, and Doors by Uniform Static air Pressure Difference
O. ASTM G153 - Standard Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials
P. ICC Acceptance Criteria 219 - Acceptance Criteria for Exterior Insulation And Finish Systems

1.4 ASSEMBLY DESCRIPTION

A. A code complying water resistive barrier, Continuous Insulation, metal lath, Scratch & Brown Concentrate (¾ in (19 mm)) embedment of a fiberglass mesh for crack suppression and an acrylic or elastomeric based finish coat.

1.5 SUBMITTALS

A. General: Submit Samples, Evaluation Reports and manufacturers product datasheets in accordance

with Division 1 General Requirements Submittal Section.

B. Samples: Submit samples for approval. Samples shall be of materials specified and of suitable size as required to accurately represent each color and texture used on project. Prepare each sample using same tools and techniques for actual project application. Maintain and make available, at job site, approved samples.

C. Manufacturer's Warranty: Submit sample copies of Manufacturer's Warranty indicating Single Source Responsibility for Stucco Base coats, reinforcing mesh and finish coat as specified.

1.6 QUALITY ASSURANCE

A. Qualifications:

1. Manufacturer: Shall have marketed stucco assemblies in United States for at least five years and shall have completed projects of same general scope and complexity.
2. Applicator: Shall be experienced and competent in installation of stucco materials, and shall provide evidence of a minimum of 5 years experience in work similar to that required by this section.

B. Functional Criteria:

1. General: Stucco application shall be to vertical substrates or to substrates sloped for positive drainage according to ASTM C926. Substrates sloped for drainage shall have additional protection from weather exposure that might be harmful to coating performance.
2. Performance Requirements of Coatings applied to Expanded polystyrene features: Must comply with ASTM E 2568 or ICC Acceptance Criteria AC 219 for EIFS.

C. Substrate Conditions:

1. Substrate materials and construction shall conform to the building code having jurisdiction.
2. Substrates shall be sound, dry and free of dust, dirt, laitance, efflorescence and other harmful contaminants.
3. Substrate Dimensional Tolerances: Flat with ¼ in (6.4 mm) within any 4 ft (1.22 m) radius.
4. Maximum deflection of substrate system under positive or negative design loads shall not exceed L/360 of span.

D. Expansion and Control Joints: Continuous expansion and control joints shall be installed at locations in accordance with ASTM C1063 and ASTM C926.

1. Substrate movement, and expansion and contraction of El Rey Fiber-47 300 Stucco and adjacent materials shall be taken into account in design of expansion joints, with proper consideration given to sealant properties, installation conditions, temperature range, coefficients of expansion of materials, joint width to depth ratios, and other material factors. Minimum width of expansion joints shall be as specified by the designer or shown on the project drawings.
2. In accordance with ASTM C1063, expansion or control joints shall be installed in walls not more than 144 ft² (13.4 m²) in area, and not more than 100 ft² (9.3 m²) in area for all non-vertical applications. The distance between joints shall not exceed 18 ft (5.5 m) in either direction or a length-to-width ratio of 2-½ to 1.
3. For direct appliaction to concrete or masonry, stucco joints are requried only at control/expansion joints in the underlaying concrete or masonry

1.7 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver products in original packaging with manufacturer's identification.

B. Storage: Store products in a dry location, out of direct sunlight, off the ground, and protected from moisture.

SECTION 09 24 00 PORTLAND CEMENT PLASTER

1.8 SITE / ENVIRONMENTAL CONDITIONS

A. Substrate Temperature: Do not apply products to substrates whose temperature are below 40°F (4.4°C) or contain frost or ice.

B. Inclement Weather: Do not apply products during inclement weather, unless appropriate protection is employed.

C. Sunlight Exposure: Avoid, when possible, installation of the products in direct sunlight. Application of finishes in direct sunlight in hot weather may adversely affect aesthetics.

D. Do not apply stucco base coats or finishes if ambient temperature falls below 40ºF (4ºC) within 24 hours of application. Protect stucco from uneven and excessive evaporation during dry weather and strong blasts of dry air.

E. Prior to installation, the wall shall be inspected for surface contamination, or other conditions that may adversely affect the performance of the stucco assembly, and shall be free of residual moisture.

1.9 COORDINATION AND SCHEDULING:

A. Coordination: Coordinate Stucco Assembly installation with other construction operations.

1.10 WARRANTY

A. Warranty: Upon request, at completion of installation, provide written warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturer basis of design: Parex USA, Inc., 4125 E. La Palma Ave., Suite 250, Anaheim, CA 92807. Brands include: Parex, Lahabra, El Rey Stucco and TEIFS are all brands of Parex USA and are approved for use under this specification. Please contact Andy Townes CSI, CCPR Architectural Sales Manager Rocky Mountain Region at 505.338.4433 direct or email andy.townes@parexusa.com.

1. STO Corp – Power Wall CI with fiberglass mesh and Lotusan Finish

2. Dryvit – CCPR #4 over CI with fiberglass mesh and Weatherlastic finish

B. Components: Obtain components manufactered by Parex USA for the 300 HE Stucco Assembly from authorized distributors. No substitutions or additions of other materials are permitted.

2.2 MATERIALS

A. Stucco Base Coat Assembly Materials:

a. Amourwall 300/Fiber-47 Scratch & Brown Stucco Base Concentrate: A factory blended portland cement, fibers, hydrated lime and proprietary ingredients, cement scratch and brown coat mixed in the field with sand, conforming to ASTM C926

B. Acrylic Additive: Adacryl, and acrylic polymer additive for use in Portland cement based stucco basecoats. To be field mixed at a ratio of one (1) gallon per sack of basecoat concentrate.

C. Crack Suppression, Crack Shield Fiber Glass Mesh:

1. Stucco Level Coat™: Copolymer based, factory blend of cement and proprietary ingredients requiring addition of water.

2. 355 Standard Mesh: Weight 4.5 oz/yd^2 (153 g/m^2) reinforcing mesh.

C. Tinted Primer: 100% acrylic based coating to prepare surfaces for acrylic finishes.

D. Acrylic based elastomeric finish:

1. Primer: 100% acrylic primer that is tinted to the same color as the finish coat.

2. Perma-Flex E'lastic: Factory blended, 100 % acrylic polymer based elastomeric textured finish, integrally colored.

a. Finish texture and color as selected by Project Designer

2.3 RELATED MATERIALS AND ACCESSORIES

A. General: Stucco Assembly and its related materials shall conform to ASTM C926, this specification and Product Data Sheets.

B. Substrate Materials:

1. Gypsum Sheathing: Minimum ½ in (13 mm) thick, core-treated, weather-resistant, exterior gypsum sheathing complying with ASTM C79 or ASTM C1177.
2. Cement Board Sheathing, Minimum ½ in thick, conforming to ASTM C1186.
3. Fiberboard: Minimum ½ in (13 mm) thick fiberboard complying with ANSI/AHA A194.1 as a regular density sheathing.
4. Plywood: Minimum $^{5}/_{16}$ in (8 mm) thick exterior grade or Exposure I plywood for studs spaced 16 in (406 mm) o.c. and ⅜ in (9.5 mm) thick exterior type plywood minimum for studs spaced 24 in (610 mm) o.c. Plywood shall comply be exterior grade or Exposure 1 and comply with DOC PS-1
5. Oriented Strand Board (OSB): $^{7}/_{16}$ - ½ in Wall-16 or Wall-24, approved by the APA, TECO, or PSI/PTL. Stamped as Exposure 1 or Exterior Sheathing with a PS2 or PRP-108 rating. The system is qualified for application to OSB (oriented strand board) sheathing only in areas shown in the Parex USA “Acceptable Substrates and Areas of Use” Technical Bulletin.
6. Concrete Masonry Construction: Painted (coated) and non-painted (uncoated). Shall be in conformance with the building code.

C. Water-Resistive Barriers:

1. Weather Seal: A Fluid Applied Weather and Air Barrier by Parex USA
2. Dupont Tyvek®, Stuccowrap® or DrainWrap™ or other sheet good Water resistive barrer, incorporating in itself a means of drainage, and maintaining a current ICC Evaluation Report Optional Drainage covered by Flat Insulation board.

D. Continuous Insulation: (Choose from the following)

1. Expanded (EPS), or Extruded (XPS), having a minimum density of 1.5 lb/ft³ (21 kg/m³), thickness of 1 in (25.4 mm) to 2 in (50.8 mm).
2. Over sheathing and Masonry: Expanded (EPS), or Extruded (XPS), having a nominal density of 1 lb/ft³ (14 kg/m³).

E. Lath and Accessories: Conform to ASTM C847, ASTM C933, ASTM C1032, ASTM C1063 and Appendix

1. Accessories: Manufacturer’s standard steel products with minimum G60 galvanizing
2. Metal Plaster Bases: Field to be a minimum 3.4 lb/yd^2 (1.8 kg/m^2) expanded metal diamond lath.
3. Weep Screeds: 7/8” grounds, foundation weep screed with minimum 3-½ inch vertical attachment flange.
4. Control joints, plaster stops, corner aid etc… to be galvanized and a minimum of 7/8” grounds.
5. Crack Suppression Reinforcing Mesh
   a. Parex USA Standard Mesh: Weight 4.5 oz/yd^2 (153 g/m^2) #355 reinforcing mesh.

F. Seals, Sealants and Bond Breakers: Sealants shall conform to ASTM C 920, Grade NS, Class 25, Use NT. Backer rod shall be closed-cell polyethylene foam.

PART 3 - EXECUTION

SECTION 09 24 00 PORTLAND CEMENT PLASTER

3.1 EXAMINATION

A. Verify project site conditions under provisions of Section 01 00 00.

B. Compliance: Comply with manufacturer's instructions for installation of stucco assembly products.

C. Substrate Examination: Examine prior to stucco base installation as follows:

1. Substrate shall be of a type approved by stucco manufacturer. Plywood and OSB substrates shall be gapped ⅛ in (3.2 mm) at all edges.
2. Substrate shall be examined for soundness, and other harmful conditions.
3. Substrate shall be free of dust, dirt, laitance, efflorescence, and other harmful contaminants.
4. Substrate construction in accordance with substrate material manufacturer's specifications and applicable building codes.

D. Advise Contractor of discrepancies preventing installation of the Stucco Assembly . Do not proceed with the Stucco Assembly work until unsatisfactory conditions are corrected.

3.2 PREPARATION

A. Water Resistive Barrier:

1. The water-resistive barrier is placed over all substrates except concrete or unpainted masonry. Painted (coated) CMU is to use a bond breaker such as asphalt paper and lath if the paint or coating cannot be removed.
2. Installed according to manufacturers instructions.

B. Continuous Insulation:

1. The boards described in Section 2.3 E.1.are placed horizontally, and are temporarily held in place with galvanized staples or roofing nails, on wood framing, and with self-tapping screws, on metal framing. Vertical butt joints must be staggered a minimum of one stud space from adjacent courses, and must occur directly over studs.
2. Insulation Boards installed over a solid sheathing should be fastened to allow temporary placement until the lath is installed.
3. The lath is applied tightly over the insulation board and fastened through the insulation board to the studs with a minimum stud penetration of ¾”, care must be taken to avoid overdriving fasteners.

C. Ensure that metal flashing has been installed per Specification Section 07 60 00 - Flashing and Sheet Metal.

3.3 MIXING

A. Mix proprietary products in accordance with manufacturer's instructions, including the applicable Stucco Assembly Product Data Sheets.

3.4 APPLICATION

A. General: Stucco application shall conform to its related materials shall conform to ASTM C926, this specification and manufacturers Product Data Sheets.

B. Stucco Base:

1. Scratch Coat:
   a. Apply scratch coat to a minimum thickness of ⅜ in (10 mm), using sufficient trowel pressure to key stucco into lath or to create bond to substrates as applicable.
   b. Prior to initial set, scratch horizontally to provide key for bond of brown coat.
   c. Moist cure scratch coat with clean potable water for at least 48 hours in accordance with ASTM C926 and the building codes following initial application (unless brown coat is applied

as soon as the scratch coat has achieved sufficient rigidity to support the brown coat).

2. Brown Coat:
   a. Apply brown coat to a minimum thickness of ⅜ in (10 mm), using sufficient trowel pressure to key stucco into scratch coat.
   b. Rod surface to true plane and float to densify.
   c. Trowel to smooth and uniform surface to receive acrylic polymer finish coat
   d. Moist cure brown coat with clean potable water for at least 48 hours, in accordance with ASTM C926 and the building codes.

C. Leveling and Reinforcing Mesh
   1. After Moist Curing, allow Stucco Base to air dry a minimum of 24 hours before applying the leveling and fiberglass mesh coat.
   2. Using a stainless steel trowel, apply the Level Coat over the stucco Base at a thickness of $^{1}/_{16}$ – $^{3}/_{32}$ in. (1.6 – 2.4 mm).
   3. Fully embed the reinforcing mesh into the wet level coat or wet brown coat, including diagonal strips at corners of openings and trowel smooth. If standard mesh is used, seams are overlapped 2½ in (63 mm), and if the intermediate mesh is used, seams are butted and covered by strips of detail mesh 356.

      -OR-

   3. While brown coat is wet, embed fiberglass mesh and trowel smooth.
   4. The acrylic primers and finishes can be applied as soon as the level coat has cured, typically within 24 hours.

D. Expanded Polystyrene Features over over level coat: (Foam shapes, pop-outs)
   1. Install back-wrap mesh at EPS terminations.
   2. Apply adhesive to backs of insulation boards with a notched trowel. Allow to dry a minimum of 12 hours.
   3. Apply Base coat to the entire foam shape and pull the backwrap mesh around the foam shapes and fully embed it into the base coat.
   4. Immediately embed the reinforcing mesh in the wet Base coat.

E. Primer and Finish:
   1. Ambient and surface temperature must be 40°F (4°C) or higher during application and drying time. Supplemental heat and protection from precipitation must be provided as needed.
   2. Apply tinted primer over all surfaces to receive acrylic based finish coats.
   3. Apply exterior wall finish in number of coats thickness recommended by manufacturer to achieve texture indicated, using sufficient trowel pressure or spray velocity to bond finish to base coat.
   4. Protect Finish Coats from inclemate weather until completely dry.

G. Curing:
   1. Keep stucco moist for at least 48 hours (longer in dry weather) by lightly fogging walls. Start light fogging after initial set of 1–2 hours.
   2. Air dry acrylic based and elastomeric finish coats only, do not wet cure.

3.5 CLEAN-UP

A. Removal: Remove and legally dispose of stucco component debris material from job site.

3.6 PROTECTION

A. Provide protection of installed materials from water infiltration into or behind them.

B. Provide protection of installed stucco from dust, dirt, precipitation, and freezing during installation.

C. Provide protection of installed finish from dust, dirt, precipitation, freezing, and continuous high humidity until fully dry.

D. Clean exposed surfaces using materials and methods recommended by the manufacturer of the material or product being cleaned. Remove and replace work that cannot be cleaned to the satisfaction of the Designer/Owner.

END OF SECTION

SECTION 09 25 00 GYPSUM BOARD SYSTEMS

PART 1 – GENERAL

1.01 Scope

A. Furnish all labor, materials and equipment necessary for a complete installation and finishing of gypsum wallboard as shown on the Drawings. See SECTION 07900 for acoustical sealant.

1.02 Submittals

A. A complete list of materials for gypsum board work, including but not necessarily limited to: Studs, gypsum board accessories, finishing, sealing and manufacturer's written installation requirements with copies of testing laboratory approval for each rated system.

1.03 Substrates and Coordination

A. Framing, furring and other substrates shall be true, plumb or level, without bulges or depressions, and shall be firmly anchored. Correct all deficiencies. Initiation of work in an area shall indicate Contractor's acceptance of substrates.

1.04 Approval

A. No framing shall be covered with drywall until blocking is installed and the framing and insulation is approved by the Architect.

1.05 Standards

A. The materials and Work of this section shall comply with standards set forth in the "Manual of Gypsum Drywall Construction" 4th Edition, 1992, as published by the Gypsum Drywall Contractors International, including the ANSI A108.11, Installation of Cementitious Backerboards.

1.06 Fire Rated Wall Assemblies

A. One (1) Hour Partitions: UBC Table No. 43-B, 15-1.1. No. 25 gage channel-shaped studs 24 inches O.C. with one full-length layer of 5/8-inch Type X gypsum wallboard applied vertically attached with 1-inch long No. 6 drywall screws to each stud. Screws are 8 inches O.C. around perimeter and 12 inches O.C. on the intermediate stud. Wallboard may be applied horizontally when attached to 3-5/8 inch studs and the horizontal joints are staggered with those on the opposite side. Screws for the horizontal application shall be 8 inches O.C. at vertical edges and 12 inches O.C. at intermediate studs.

B. One (1) Hour Rated Shaft Wall System: Cavity shaft Wall Gypsum Drywall—5/8” gypsum sheetrock panels with Fire Code core on one side—1” sheetrock set between USG steel C-H studs at 24” O.C. Panels must be applied to side opposite liner panels and screw attached with finished joints.

C. Two (2) hour Partition: U.L. Design U419, SA100 / USG Corporation. Use 2 layers 5/8” sheetrock, Imperial Firecode C core on each side of steel studs as indicated on Drawings at 24” o.c. with staggered joints. Base and face layers must be screw attached with joints finished and perimeter caulked.

1.07 Tolerance

A. Maximum deviation from a true plane shall be 1/8 inch as measured from a line of twelve (12) foot straightedge placed at any location on the surface.

1.08 Maximum Allowable Stud Height

A. Stud height shall be limited by deflection, 1/240 of span. Studs shall be installed at spacings specified herein after.

1.09 Job Conditions

A. In cold weather during gypsum panel application and joint finishing, maintain temperature in building within range of 55 degrees F to 70 degrees F. Provide adequate ventilation to carry off excess moisture. Provide 30 footcandles minimum where taping and bedding work is in progress.

1.10 Product Deliveries, Storage and Handling

A. Where necessary to store gypsum board outside, stack off the ground, properly supported on a level platform and fully protected from weather. Stack gypsum board neatly and flat and dry. If stored on its side, it must be stored horizontally. It is a safety hazard if it should fall when stacked vertically. Take care to avoid undue sagging or damage to edges, ends and surfaces. Store adhesives in dry areas, protected from freezing.

PART 2 - MATERIALS

2.01 Gypsum Board

A. Shall be standard size sheets, 5/8” thick firecode gypsum panels with tapered edges, as noted on drawings, and shall comply with ASTM C36 for Type X gypsum board.

2.02 Shaftwall Gypsum Board

A. 1” Sheetrock Brand Gypsum Panels, Firecode C Core as indicated on Drawings.

2.03 Water Resistant Gypsum Board

A. Shall be standard size sheets, 5/8” thick firecode Type X water resistant gypsum panels with tapered edges, ASTM C630. Use everywhere plumbing penetrates wall.

2.04 Cementitious Backer Board

A. 5/8-inch thick cement panels with square cut edges. Durock Cement Board manufactured by United States Gypsum Co., Wonder Board by Glascrete, Inc. or acceptable substitution. Use for ceramic tile substrate in shower. Use manufacturer recommended tape and cementitious joint compound.

2.05 Tile Backer Board

A. ASTM, C1178, Glass fiber reinforced gypsum board with water resistant additive, 5/8 inch thick, 4’ x 8’ or 12’ with tapered edges. Use 5/8” Den-Shield Firestop Type X Backer Board if used as part of a fire rated partition system. To be used at “wet: walls where ceramic tile is to be installed.

2.06 Exterior Gypsum Sheathing

A. Shall be standard size, weather and fire resistant “Dens-Glass Gold” board as manufactured by Georgia Pacific Corporation, Atlanta, GA 30303, consisting of a gypsum core clad in water-repellent fiberglass on face and paper back surfaces, 5/8” thick fire rated, with V-shaped T&G long edges.

2.07 Ceiling Framing

A. Suspend wire hangers from overhead roof framing at 5’ centers each way. Hang 1-1/2” runner channels and space 4’ o.c. Wire tie furring channels perpendicular to runners, spacing channels at 16 in. centers. Plumb suspend runners prior to wallboard attachment. Secure system to adjacent partition. Sheets shall be attached to 7/8" light gage metal hat channels supported by 1’1/2” cold rolled channel hanger wire as detailed on Drawings.

B. Design No. P 510 (U. L. Fire Resistance Directory) must be used for one (1) hour fire rated ceiling assemblies.

2.08 Studs, Runners, furring channels

SECTION 09 25 00 GYPSUM BOARD SYSTEMS

A. Studs, runners, furring channels shall meet or exceed ASTM C645 (electro-galvanized) and / or ASTM A525 (hot-dipped galvanized).

B. Use one of the following manufacturers's or one approved by the architect:
   01. United States Gypsum, Chicago, IL 60606

   02. Angles Metal Systems, Los Angeles, CA 90040

   03. Southwest Metals Inc., Carrollton, TX 75006

   04. Incor, Inc. Baltimore, MD 21219

   05. Dietrich Industries, Inc., Pittsburgh, PA 15219.

C. Interior partitions (where Indicated) shall be: 18, 20 and 25 gage galvanized (1-5/8 inch, w-1/2 inch, 3-5/8 inch, 4 inch, 6 inch, 8 inch) metal studs shall be installed at 16 inches on centers maximum.

D. Studs at doors and window jambs shall be 20 gage ST20 doubled studs back to back each side of jamb, stud width compatible with partition studs. Studs shall extend full height from floor to structure above.

E. Top and bottom runner tracks shall be 20 gage, width compatible with studs. Top runner track shall be standard legged.

F. Shaft-Wall studs shall be USG CH20; 2-1/2 inch studs spaced at 24 inches on centers maximum or as noted otherwise.

2.09 Metal Stud Fasteners

A. ASTM C646, corrosion-resistant self-tapping bugle head spiral-thread type screws, minimum 1 inch long except 1-5/8 inches for double layer walls, lengths to penetrate supporting metal at least 3/8 inch. Furnish specialty hardened type for supports heavier than 25 gage.

2.10 Corner Bead (Metal Corner Trim)

A. M&L Edge Trim 1-1/4" x 1-1/4 " galvanized steel with perforated flanges.

2.11 Joint Tape and Joint Compound

A. Shall comply with ASTM C475.

2.12 Adhesive

A. Durabond by US Gypsum or Architect-approved equal.

2.13 Drywall Texture

A. Submit sample for prior approval by Architect. Provide a very fine light stipple finish. Apply evenly.

PART 3 - EXECUTION

3.01 Metal Stud Installation

A. Components shall be erected in strict compliance with manufacturer's current published construction standards. Install top runner tracks by anchoring with powder driven fasteners or other suitable fasteners. Locate fasteners two inches from end and then spaced at 16 inches O. C. maximum. Securely anchor bottom runner tracks similarly. Locate two (2) inches from each and then spaced at 16 inches O.C. maximum.

B. Partition studs (except shaft-wall studs) - Space studs at 16 inches O.C. maximum unless noted otherwise. Provide double 20 gage (ST 20) studs back to back at all openings and doorjambs. Anchor each stud to runner tracks with four (4) screws, one (1) each flange top and bottom. Form heads and sills of openings with track sections screwed or bolted to jamb studs unless otherwise shown.

C. Shaft-Wall Studs and Coreboard - Space shaft-wall studs at 24 inches maximum. Install gypsum coreboard after first stud has been anchored, then install next stud. Anchor stud to top and bottom runner tracks then install next gypsum coreboard. Continue until shaft is enclosed. Frame openings cut within liner panel with J-Runner around perimeter. Installation of shaft-wall studs and coreboard shall be accomplished simultaneously.

3.02 Gypsum Board

A. Perform gypsum board installation and finishing in accordance with gypsum board manufacturer's recommendations and referenced standards. Conform to applicable fire-rating requirements, Building Code approvals, and specified requirements.

B. At recessed boxes, appliances, equipment, etc., larger than 4 inches by 4 inches in fire-rated partitions, back-up or furr out to maintain integrity of fire-rated partitions.

C. Install wood blocking specified in Section 06100 to metal studs for installation of all wall mounted or secured items and accessories indicated on the Drawings or as required.

D. Accurately cut and fit gypsum board at openings. At door openings, cut board to continue across area above door head. Do not cut board to both jambs and fill in area over door with separate pieces. Make dimension from joint overhead of an opening to jamb of openings six inches minimum. Stagger joints on opposite sides of partition.

3.03 Gypsum Board Joints

A. Use boards of maximum length to minimize end joints. Stagger end joints. Abut boards without forcing. Neatly fit ends and edges. Do not place butt ends against tapered edges. Apply boards at right angles to framing. Stagger joints on opposite face of a two-faced wall. Fasten with type and spacing of fasteners recommended by manufacturer and required by UBC for fire ratings required by Drawings.

3.04 Corner Bead (Metal Corner Trim)

A. Install metal edge trim at all outside corners. 90º corner bead.

3.05 Casing Bead (Metal Edge Trim)

A. Install metal corner trim at all exposed edges.

3.06 Water Resistant Gypsum Board

A. Apply on all walls behind any plumbing fixtures to extend at least 18” on each side. Apply at all windowsills and jambs.

3.07 Cementitious BackerBoard and Tile Backer Board

A. Install in conformance with manufacturer’s recommendations and referenced standards. Tape joints using manufacturer’s recommended joint tape and cementitious joint compound. Joint compound containing gypsum will not be accepted.

B. Board Joints: Use boards of maximum length to minimize end joints. Stagger end joints centered on studs or runners. Abut boards without forcing. Neatly fit ends and edges, leaving 1/8” spacing. Apply boards at right angles to framing. Fasten with type and spacing of fasteners recommended by manufacturer.

C. Joint Finishing: Fill joints flush with cementitious acrylic mortar and remove excess material. Leave clean depression to receive tape. Permit to harden before applying tape.

D. Taping: Apply 2” mesh tape over joints and corners. Embed with joint compound.

3.08 Joint Finishing

A. Fill joints flush and remove excess compound. Leave clear depression to receive tape. Permit compound to harden before applying tape.

3.09 Taping

A. Apply compound in thin, uniform layer to all joints and corners to be reinforced. Apply reinforcing tape immediately. Center tape over joint and seal tape into compound. Apply embedding coat immediately. Dry embedding coat prior to application of fill coat.

3.10 Fasteners

A. Install fasteners so head of fastener is just below gypsum board surface without breaking surface paper or stripping framing member around fastener. Drive screws at least 3/8 inch from ends of edges of board. Space screws according to requirements for fire rated assemblies as specified.

3.11 Filling

A. Apply joint compound over embedding coat. Fill taper flush with surface. Cover tape and feather out at least 4” on either side of tape. Allow to dry prior to application of finish coat.

3.12 Finishing

A. Spread joint compound evenly over and beyond fill coat on all joints. Apply finish coat to taped angles to cover tape and taping compound. Sand final application of compound to provide surface ready for paint.

3.13 Depressions, Beads and Trim

A. Apply, feather and dry three successive coats of compound. Sand finish.

3.14 Multi-Layer Walls

A. Apply second and/or third layers with adhesive and Type G screws with joints staggered.

3.15 Texture

A. Submit sample for prior approval by Architect. Provide a very fine light stipple (orange peel) finish. Apply evenly.

3.16 Completion

A. Upon completion of application, contractor shall make sure that all holes for projecting pipes, electric outlet boxes and heating grilles are properly cut, snugly fit, rigidly anchored, meet fire-resistive requirements, and are ready to receive the required installation by others. Reseat any popped nails and improperly applied joint taping or accessory items and leave ready to finish. Clean up all surplus materials or debris and remove from the premises. Completely clean and remove all discoloration from adjacent finish materials.

END OF SECTION

SECTION 09 67 23 RESINOUS FLOORING

(AIRCRAFT HANGAR / INDUSTRIAL PLANT COATING SYSTEM)

PART 1 GENERAL

1.01 WORK INCLUDED

A. Furnish necessary material, labor, and equipment required to prepare designated areas and install an Aircraft Hangar/Industrial Plant Coating System.

1.02 RELATED WORK

A. Drawings and general provisions of contract including General and Special Conditions and Division I, excepting special Submittal and Quality Assurance provisions in this section.

1.03 QUALITY ASSURANCE

A. Manufacturer's Qualifications
Obtain Aircraft Hangar/Industrial Plant Coating System materials from a single manufacturer with a minimum of 3 years verifiable experience providing materials of the type specified in this section.

B. Contractor's Qualifications
Installation must be performed by a manufacturer approved contractor with skilled mechanics having not less than three (3) years satisfactory experience in the installation of the type of system as specified in this section, and must be approved in writing by the manufacturer of the Aircraft Hangar/Industrial Plant Coating System.

C. Floor System Thickness Verification
At the owner's discretion and under his supervision the contractor shall take 1" random cores per 1,000 sq. ft. (**3ea minimum**) through the system into the substrate to verify proper system thickness. Cored areas less than specified thickness shall be removed and replaced or increased in thickness by the installing contractor, in a manner that does not affect the performance or integrity of the system. Cored areas which comply with the recommended system thickness shall be built-up to match the surrounding surface elevation prior to applying the seal coat(s). Cores taken and patched will be noticeable; therefore, cores should be taken from areas where aesthetics are less critical. Cost associate with repair of cored areas that comply with specification thickness are the responsibility of the owner.

1.04 WARRANTY

A. The contractor and the manufacturer shall furnish a standard guarantee of the Aircraft Hangar/Industrial Plant Coating System for a period of one year after installation. The labor and material guarantee shall include loss of bond and wear-through to the concrete substrate from normal use.

B. Not included in the warranty are damage due to structural design deficiencies including but not limited to slab cracking from lateral, vertical or rotational movement, and gouging or other damage due to fork lifts, other equipment, delamination caused by vapor transmission, Acts of God, or other

elements beyond the scope of protection of this system nor causes not related to the system materials.

C. In case of a warranty claim, the owner will notify the manufacturer and contractor in writing within 30 days of the first appearance of problems covered under this warranty. The owner will provide free and unencumbered access to the area during normal working hours for warranty rework. Property protection is also the owner's responsibility. Remedy is limited to direct repair of the Aircraft Hangar/Industrial Plant Coating System.

1.05 SUBMITTAL

A. System Data
Submit manufacturer's specifications on cured system and individual components of the Aircraft Hangar/Industrial Plant Coating System, including physical properties and performance properties and tests described in part 2.01 B and submit Material Safety Data Sheets. Each individual component of the system will be evaluated on the basis of these standards. For any tests not listed in the manufacturer's standard nationally published data, the manufacturer must supply the missing data accompanied by the independent testing laboratory's test results which prove compliance in accordance with the referenced standard(s). Furnish **1 pdf set** of this information. Manufacturer's standard color chart shall also be submitted and must afford the owner color selection from the standard colors and computerized custom color matching shall be available upon request. Furnish **1 pdf set of this information.**

COLOR: Match existing floor or standard color "Steel Gray (54)"

B. The contractor shall submit a 6" x 6" cured system sample which the contractor has made for verification purposes and finish texture approval.

C. Contractor Experience
The contractor shall furnish a list of projects using either specified material or equivalent that they have installed during the last 3 years. Information shall include: project name, square footage, owner contact name with owner's address and phone number. Also, the contractor shall furnish resumes detailing the experience of key project personnel including supervisors and mechanics.

D. It is the intention of this Section to provide the products as named. Substitutions will be considered only when received by the Architect, Engineer or Design Professional through a bidding Prime Contractor at least ten days prior to the date set for receipt of bids. Upon receipt of any such submission, the Architect, Engineer or Design Professional will determine whether or not the proposed product is an equal. In the event the Architect, Engineer or Design Professional determines that a proposed system is an approved equal, he will issue an addendum and notify all bidders at least 48 hours prior to receipt of bids. No substitutions will be considered after contract bid date.

E. The contractor shall submit a copy of the manufacturer's packing slip, tagged for this specific job, along with calculations, signed by an officer of the primary material supplier demonstrating that the quantity of material furnished for the project will achieve the specified coverage and mil thickness.

SECTION 09 67 23 RESINOUS FLOORING
(AIRCRAFT HANGAR / INDUSTRIAL PLANT COATING SYSTEM)

1.06 MATERIAL DELIVERY, HANDLING AND STORAGE

A. Primary system materials shall be delivered in the manufacturer's undamaged, unopened containers. Each container shall be clearly marked with the following:

- Product name(s) and/or Number(s)
- Manufacturer's name
- Component designation (A, B, etc.)
- Product Mix Ratio
- Health and Safety Information
- CHEMTREC Emergency Response Information

B. Provide equipment and personnel to handle the materials by methods which prevent damage.

C. The contractor shall promptly inspect direct jobsite material deliveries to assure that quantities are correct, comply with requirements and are not damaged.

D. The contractor shall be responsible for materials furnished by him, and he shall replace, at his own expense, such materials that are found to be defective in manufacture or that have become damaged in transit, handling or storage.

E. Store material(s) in accordance with manufacturer’s instructions, with seals and labels intact and legible. Maintain temperatures within the required range. Do not use materials which exceed the manufacturer’s maximum recommended shelf life.

1.07 JOB CONDITIONS

A. The contractor shall visit the jobsite prior to the installation of the Aircraft Hangar/Industrial Plant Coating System to evaluate substrate condition, including substrate moisture transmission, quantity and severity of cracking, and the extent of repairs needed. Substrate imperfections should be repaired only after mechanical preparation of the substrate. Surface preparation reveals most imperfections requiring repair. Concrete substrates shall be tested to verify that the moisture vapor transmission of the substrate does not exceed the Aircraft Hangar/Industrial Plant Coating System manufacturers' recommendations. Cost associated with repair, leveling and remediation of the substrate are the responsibility of the provider of the substrate.

B. The contractor should exercise care during surface preparation and system installation to protect surrounding substrates and surfaces, as well as in-place equipment. The contractor shall prepare the substrate to remove laitance and open the surface. This shall be achieved by light brush grit blasting. Surface profile achieved shall be similar to medium grit sandpaper and free from bond-inhibiting contaminants. Costs incurred that are associated with damage from negligence or inadequate protection shall be the sole responsibility of the contractor.

C. Subfloor tolerances are specified in Concrete Slab Section (in accordance with ACI 302). Each drain in the installation area must be working and raised or lowered to the actual finished elevation of the Aircraft Hangar/Industrial Plant Coating System.

D. System must be protected by the General Contractor or, as a separate bid item, by the installing contractor until it is inspected and turned over to the owner.

E. The minimum slab temperature must be conditioned to 60 degrees F before commencing installation, during installation, and for at least 72 hours after installation is complete. The substrate temperature must be at least 5 degrees F above the dew point during installation.

F. Maintain lighting at a minimum uniform level of 50 or more foot candles in areas where the Aircraft Hangar/Industrial Plant Coating System is being installed. It is the recommendation of the manufacturer that the permanent lighting be in place and working during the installation.

G. Leaks from pipes and other sources must be corrected prior to the installation of the Aircraft Hangar/Industrial Plant Coating System.

PART 2 - PRODUCTS

2.01 MATERIALS

A. System Overview
The General Polymers Aircraft Hangar/Industrial Plant Coating System as manufactured by Sherwin-Williams consists of 3579 Standard Primer / Sealer as the primer, and 3746 Self-Leveling Epoxy as the base coat and 4638 HS Polyurethane Enamel as the topcoat.

A. Typical Physical Properties

Color	Standard Colors Computerized custom color matching available upon request
Abrasion Resistance ASTM D 4060,CS-17 Wheel, 1,000 cycles	30-50 mgs lost
Resistance to Elevated Temperatures MIL-D-3134J	No slip or flow at required temperature of 158°F
Adhesion ASTM 503R	300 psi concrete failure
Flammability	Self-extinguishing over concrete
Gloss 60° Gloss Meter @ 73°F, 50% RH	90
Impact Resistance MIL-D-3134J	Direct, inch pound greater than 160 passes Reverse, inch pound greater than 160 passes
ASTM C = Mortar system ASTM D = Resin only	

SECTION 09 67 23 RESINOUS FLOORING
(AIRCRAFT HANGAR / INDUSTRIAL PLANT COATING SYSTEM)

PART 3 - EXECUTION

3.01 URFACE PREPARATION

A. For thorough instructions regarding preparation of concrete substrates consult "Instruction for Concrete Surface Preparation" (Form G-1).

3.02 INSTALLATION

A. General
Apply each component of the Aircraft Hangar/Industrial Plant Coating System in compliance with manufacturer's written installation instructions and strictly adhere to mixing and installation methods, recoat windows, cure times and environmental restrictions. The Aircraft Hangar/Industrial Plant Coating System is to be installed directly over non-moving control joints and cracks which have been treated with EPO-FLEX epoxy, and the Aircraft Hangar/Industrial Plant Coating System will terminate at the edge of isolation and expansion joints as designated by the Architect, Engineer or Design Professional. Integral cove base shall be installed where specified in the drawings.

C. Cracks
After preparation, evaluation of quantity and severity of cracks in concrete will determine the needed repairs. Original bid assumes repair and treatment of **100 linear feet of cracks and control joints**. Additional treatment is considered excessive and must be bid on a per linear foot basis. For information pertaining to the treatment of cracks in concrete substrates, consult Manufacturer’s publication, Concrete 102.

D. Control Joints
Original bid assumes repair and treatment of **100 linear feet of cracks and control joints**. Additional treatment is considered excessive and must be bid on a per linear foot basis. For information pertaining to the treatment of control joints in concrete substrates, consult Manufacturer’s publication, Concrete 103.

E. Isolation/Expansion and Other Joints Subject to Movement
All expansion joints must be honored through the flooring system. For information pertaining to the above, consult Manufacturer’s publication, Concrete 105.

F. System Primer
3579 Standard Primer / Sealer

G. 3746 Self-Leveling Epoxy

H. Topcoat
4638 HS Polyurethane Enamel

SECTION 09 67 23 RESINOUS FLOORING
(AIRCRAFT HANGAR / INDUSTRIAL PLANT COATING SYSTEM)

3.03 CURING, CLEANING AND PROTECTION

A. Cure the Aircraft Hangar/Industrial Plant Coating System materials in compliance with manufacturer's directions, taking care to prevent contamination during stages of the installation and prior to completion of the curing process.

B. Protect the Aircraft Hangar/Industrial Plant Coating System from damage and wear during other phases of the construction operation, using temporary coverings as recommended by the manufacturer, if required. Remove temporary covering just prior to final inspection.

C. Clean the Aircraft Hangar/Industrial Plant Coating System just prior to final inspection, using materials and procedures suitable to the system manufacturer.

D. Some cleaners will affect the color, gloss or texture of your polymer floor surfaces. To determine how your cleaner will perform, first test each cleaner, in a small area, utilizing your cleaning technique. This precaution will demonstrate the effect of your cleaner and technique. If no deleterious effects are observed, continue with the procedure. If deleterious effects do occur, modify the cleaning material and/or procedure. For recommendations regarding types of cleaners, contact the Aircraft Hangar/Industrial Plant Coating System manufacturer.

END OF SECTION

SECTION 09 91 13 EXTERIOR PAINTING

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 surface preparation and the application of paint systems on the following exterior substrates:

1. Concrete.
2. Steel.
3. Galvanized metal.
4. Aluminum trim indicated to receive field painted finish.
5. Finish exterior carpentry.
6. Heavy timber construction.

B. Related Sections include the following:

1. Division 5 Sections for shop priming of metal substrates with primers specified in this Section.
2. Division 8 Sections for factory priming doors with primers specified in this Section.
3. Section 099123 - "Interior Painting" for surface preparation and the application of paint systems on interior substrates.
4. Division 9 painting Sections for special-use coatings.

1.3 SUBMITTALS

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

1. For paints, including printed statement of VOC content.

B. Samples for Initial Selection: For each type of topcoat product indicated.

C. Samples for Verification: For each type of paint system and each color and gloss of topcoat indicated.

1. Submit Samples on rigid backing, 8 inches square.
2. Step coats on Samples to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

SECTION 09 91 13 EXTERIOR PAINTING

D. Product List: For each product indicated, include the following:
   1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.

1.4 QUALITY ASSURANCE

A. Master Painters Institute (MPI) Standards:

   1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."
   2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and paint systems indicated.

B. Mockups: Apply benchmark samples of each paint system indicated and each color and finish selected to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

   1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.

      a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft.
      b. Other Items: Architect will designate items or areas required.

   2. Final approval of color selections will be based on benchmark samples.

      a. If preliminary color selections are not approved, apply additional benchmark samples of additional colors selected by Architect at no added cost to Owner.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

   1. Maintain containers in clean condition, free of foreign materials and residue.
   2. Remove rags and waste from storage areas daily.

1.6 PROJECT CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply paints in rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

SECTION 09 91 13 EXTERIOR PAINTING

1.7 EXTRA MATERIALS

A. Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.

1. Quantity: Furnish an additional 5 percent, but not less than 1 gal. of each material and color applied.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Benjamin Moore & Co.
2. Sherwin-Williams Company (The).
3. Architect Approved Equal.

2.2 PAINT, GENERAL

A. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

B. Colors: As selected by Architect from standard, custom and premium colors.

2.3 PRIMERS/SEALERS

A. Alkali-Resistant Primer: MPI #3.

1. VOC Content: E Range of E2.
2. Product Names:

a. Devshield 4130 by ICI.
b. Loxon by SW

B. Bonding Primer (Water Based): MPI #17.

1. VOC Content: E Range of E2.
2. Product Names:

    a. Fresh Start by BM.
    b. Prep-N-Prime by ICI.
    c. PrepRite Bonding Primer B51W50 by SW

2.4 METAL PRIMERS

A. Alkyd Anticorrosive Metal Primer: MPI #79.

1. VOC Content: E Range of E2.
2. Product Names:

    a. IronClad or Industrial by BM
    b. Devguard by ICI.
    c. Kem Kromik by SW.

B. Waterborne Galvanized-Metal Primer: MPI #134.

1. VOC Content: E Range of E2.
2. Product Names:

    a. Acrylic Metal Primer M04 by BM.
    b. Devflex WB DTM Primer Finish by ICI.
    c. DTM Acrylic Primer by SW.

C. Quick-Drying Primer for Aluminum: MPI #95.

1. VOC Content: E Range of E2.
2. Product Names:

    a. Rapid Dry Metal Primerl by BM
    b. Devguard by ICI.
    c. Fast Dry 2.8 VOC by PPG.

2.5 EXTERIOR LATEX PAINTS

A. Exterior Latex (Flat): MPI #10 (Gloss Level 1).

1. VOC Content: E Range of E2.
2. Product Names:

    a. MoorLife by B.M.
    b. Dulux Professional by ICI.

c. A100 or Weather-Crylic Coating by SW

B. Exterior Latex (Semigloss): MPI #11 (Gloss Level 5).

1. VOC Content: E Range of E2.
2. Product Names:

a. Dulux Professional Ext. Acrylic Semi-gloss by ICI.
b. A-100 Semi-gloss by SW

2.6 EXTERIOR ALKYD PAINTS

A. Exterior Alkyd Enamel (Semigloss): MPI #94 (Gloss Level 5).

1. VOC Content: E Range of E2.
2. Product Names:

a. Classic 99 by SW

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Concrete: 12 percent.
2. Prepare concrete to be painted. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.

a. Determine alkalinity and moisture content of surfaces by performing appropriate tests. If surfaces are sufficiently alkaline to cause the finish paint to blister and burn, correct this condition before application. Do not paint surfaces where moisture content exceeds that permitted in manufacturer's written instructions.
b. Poured concrete must be allowed to cure for 60 days.

C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

D. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.

1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.

B. Remove plates, machined surfaces, and similar items already in place that are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
2. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

C. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints.

1. Remove incompatible primers and re-prime substrate with compatible primers as required to produce paint systems indicated.

D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

E. Concrete Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

F. Steel Substrates: Remove rust and loose mill scale. Clean using methods recommended in writing by paint manufacturer.

G. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

H. Aluminum Substrates: Remove surface oxidation.

SECTION 09 91 13 EXTERIOR PAINTING

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions.

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 FIELD QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure at any time and as often as Owner deems necessary during the period when paints are being applied:

1. Owner will engage the services of a qualified testing agency to sample paint materials being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.
2. Testing agency will perform tests for compliance of paint materials with product requirements.
3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove non-complying-paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

SECTION 09 91 13 EXTERIOR PAINTING

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 EXTERIOR PAINTING SCHEDULE

A. Concrete Substrates, Non-traffic Surfaces:

1. Latex Over Alkali-Resistant Primer System: MPI EXT 3.1K.

a. Prime Coat: Alkali-resistant primer.
b. Intermediate Coat: Exterior latex matching topcoat.
c. Topcoat: Exterior latex flat.

B. Stain at Exterior Wood:

1. Semi-solid oil stain

a. Provide minimum 3 coats of Benjamin Moore White #01 color in Cabot Full-Bodied Base #0107 Deep Base.

C. Steel Substrates:

1. Quick-Drying Enamel System: MPI EXT 5.1A.

a. Prime Coat: Quick-drying alkyd metal primer.
b. Intermediate Coat: Quick-drying enamel matching topcoat.
c. Topcoat: Quick-drying enamel semi-gloss.

D. Galvanized-Metal Substrates:

1. Latex Over Water-Based Primer System: MPI EXT 5.3H.

a. Prime Coat: Waterborne galvanized-metal primer.
b. Intermediate Coat: Exterior latex matching topcoat.
c. Topcoat: Exterior latex semi-gloss.

E. CMU Walls

1. Epoxy paint system

SECTION 09 91 13 EXTERIOR PAINTING

a. Heavy Duty Block filler water base
b. Waterbased Catalyzed Epoxy
c. Waterbased Catalyzed Epoxy

F. Aluminum Reveal and other Aluminum Trim in Stucco Walls:

1. Latex System: MPI EXT 5.4H.

a. Prime Coat: Quick-drying primer for aluminum.
b. Intermediate Coat: Exterior latex matching topcoat.
c. Topcoat: Exterior latex flat to match adjacent stucco paint.

END OF SECTION

SECTION 09 91 23 INTERIOR PAINTING

PART 1 GENERAL

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.

2. SUMMARY

   a. Section includes surface preparation and the application of paint systems on the following interior substrates:

      1) Concrete.
      2) Steel.
      3) Galvanized metal.
      4) Aluminum (not anodized or otherwise coated).
      5) Wood.
      6) Gypsum board.

   b. Related Requirements:

      1) Section 051200 "Structural Steel Framing" for shop priming of metal substrates with primers specified in this section.
      2) Section 099113 "Exterior Painting" for surface preparation and the application of paint systems on exterior substrates.
      3) Section 099600 "High-Performance Coatings" for tile-like coatings.

3. ACTION SUBMITTALS

   a. Product Data: For each type of product. Include preparation requirements and application instructions.

      1) Indicate VOC content.

   b. Samples for Initial Selection: For each type of topcoat product.

   c. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.

      1) Submit Samples on rigid backing, 8 inches square.
      2) Label each coat of each Sample.
      3) Label each Sample for location and application area.

   d. Product List: For each product indicated, include the following:

1) Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
2) Indicate VOC content.

4. CLOSEOUT SUBMITTALS

1) Coating Maintenance Manual: Provide coating maintenance manual including area summary with finish schedule, area detail designating location where each product / color / finish was used, product data pages, material safety data sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.

5. MAINTENANCE MATERIAL SUBMITTALS

a. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1) Paint: 1 gallon of each material and color applied.

6. QUALITY ASSURANCE

a. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1) Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.

a) Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft.
b) Other Items: Architect will designate items or areas required.

2) Final approval of color selections will be based on mockups.

a) If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.

3) Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4) Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

7. DELIVERY, STORAGE, AND HANDLING

a. Delivery and Handling: Deliver products to Project site in an undamaged condition in manufacturer's original sealed containers, complete with labels and instructions for handling, storing, unpacking, protecting, and installing. Packaging shall bear the manufacturer’s label with the following information:

1) Product name and type (description).
2) Batch date.
3) Color number.
4) VOC content.
5) Environmental handling requirements.
6) Surface preparation requirements.
7) Application instructions.

b. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

1) Maintain containers in clean condition, free of foreign materials and residue.
2) Remove rags and waste from storage areas daily.

8. FIELD CONDITIONS

a. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

b. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

c. Lead Paint: It is not expected that lead paint will be encountered in the Work.

1) If suspected lead paint is encountered, do not disturb; immediately notify Architect and Owner.

PART 2 PRODUCTS

1. MANUFACTURERS

a. Basis-of-Design Product: Subject to compliance with requirements, provide Sherwin-Williams Company; products indicated or comparable product from one of the following:

1) Benjamin Moore Corporation.
2) Dunn Edwards Corporation.
3) PPG Architectural Finishes, Inc.
4) Tnemec Company, Inc.
5) Architect Approved Equal.

b. Comparable Products: Comparable products of approved manufacturers will be considered in accordance with Section 016000 "Product Requirements," and the following:

1) Products are approved by manufacturer in writing for application specified.

2) Products meet performance and physical characteristics of basis of design product including published ratio of solids by volume, plus or minus two percent.

c. Source Limitations: Obtain paint materials from single source from single listed manufacturer.

1) Manufacturer's designations listed on a separate color schedule are for color reference only and do not indicate prior approval.

2. PAINT, GENERAL

a. Material Compatibility:

1) Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

2) For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

b. VOC Content: For field applications that are inside the weatherproofing system, paints and coatings shall provide materials that comply with VOC limits of authorities having jurisdiction and for interior paints and coatings applied at Project site, the following VOC limits exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

1) Flat Paints and Coatings: 50 g/L.

2) Nonflat Paints and Coatings: 150 g/L.

3) Dry-Fog Coatings: 150 g/L.

4) Primers, Sealers, and Undercoaters: 200 g/L.

5) Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.

6) Zinc-Rich Industrial maintenance Primers: 340 g/L.

7) Pretreatment Wash Primers: 420 g/L.

8) Floor Coatings: 100 g/L.

c. Colors: As indicated in a color schedule.

3. SOURCE QUALITY CONTROL

a. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:

1) Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.

2) Testing agency will perform tests for compliance with product requirements.

3) Owner may direct Contractor to stop applying coatings if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials

from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 EXECUTION

1. EXAMINATION

a. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers. Where acceptability of substrate conditions is in question, apply samples and perform in-situ testing to verify compatibility, adhesion, and film integrity of new paint application.

1) Report, in writing, conditions that may affect application, appearance, or performance of paint.

b. Substrate Conditions:

1) Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

a) Concrete: 12 percent.
b) Masonry (Clay and CMU): 12 percent.
c) Wood: 15 percent.
d) Gypsum Board: 12 percent.
e) Plaster: 12 percent.

2) Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
3) Plaster Substrates: Verify that plaster is fully cured.
4) Spray-Textured Ceiling Substrates: Verify that surfaces are dry.

c. Proceed with coating application only after unsatisfactory conditions have been corrected; application of coating indicates acceptance of surfaces and conditions.

2. PREPARATION

a. Comply with manufacturer's written instructions and recommendations in "Data Pages" applicable to substrates indicated.

b. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1) After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

c. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1) Remove incompatible primers and re-prime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

d. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

1) Concrete Floors: Remove oil, dust, grease, dirt, and other foreign materials. Comply with SSPC-SP-13/NACE 6 or ICRI 03732.

e. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceed that permitted in manufacturer's written instructions.

f. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer.

g. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

h. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

i. Aluminum Substrates: Remove loose surface oxidation.

j. Wood Substrates:

1) Scrape and clean knots, and apply coat of knot sealer before applying primer.
2) Sand surfaces that will be exposed to view, and dust off.
3) Prime edges, ends, faces, undersides, and backsides of wood.
4) After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

k. Cotton or Canvas Insulation Covering Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

3. APPLICATION

a. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."

1) Use applicators and techniques suited for paint and substrate indicated.
2) Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
3) Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.

4) Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

5) Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

b. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

c. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

d. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

e. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

1) Paint the following work where exposed in equipment rooms:

a) Equipment, including panelboards.
b) Uninsulated metal piping.
c) Uninsulated plastic piping.
d) Pipe hangers and supports.
e) Metal conduit.
f) Plastic conduit.
g) Tanks that do not have factory-applied final finishes.
h) Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.

2) Paint the following work where exposed in occupied spaces:

a) Equipment, including panelboards.
b) Uninsulated metal piping.
c) Uninsulated plastic piping.
d) Pipe hangers and supports.
e) Metal conduit.
f) Plastic conduit.
g) Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
h) Other items as directed by Architect.

3) Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

4. FIELD QUALITY CONTROL

a. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.

1) Contractor shall touch up and restore painted surfaces damaged by testing.

2) If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

5. CLEANING AND PROTECTION

a. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

b. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

c. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

d. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

6. INTERIOR PAINTING SCHEDULE

a. Concrete Substrates, Pedestrian Traffic Surfaces:

1) Epoxy System: Clear or Pigmented Thin Film Moderate Duty (Painting Contractor)

a) Prime Coat: Epoxy, matching topcoat.

b) Topcoat: Epoxy, Gloss:

1) S-W Armorseal 8100 Water Based Epoxy Floor Coating, B70 Series, at 2.0 to 4.0 mils dry, per coat.

b. Metal Substrates (Aluminum, Steel, Galvanized Steel):

1) Waterbased Acrylic System: Standard system for doors & frames.

a) Prime Coat: Primer, rust-inhibitive, water based:

1) S-W Pro Industrial Pro-Cryl Universal Primer, B66-310 Series, at 5.0 to 10 mils wet, 2.0 to 4.0 mils dry.

b) Intermediate Coat: Water-based Acrylic, interior, matching topcoat.

c) Topcoat: Water-based Acrylic, semi-gloss, interior:

1) S-W Pro Industrial Acrylic Semi-Gloss Coating, B66-650 Series, at 2.5 to 4.0 mils dry, per coat.

2) Waterbased/Alkyd Urethane System: hand rails.

a) Prime Coat: Primer, rust-inhibitive, water based:

1) S-W Pro Industrial Pro-Cryl Universal Primer, B66-310 Series, at 5.0 to 10 mils wet, 2.0 to 4.0 mils dry.

b) Intermediate Coat: Water-based acrylic-alkyd, interior, matching topcoat.

c) Topcoat: Water-based alkyd-urethane, semi-gloss, interior:

1) S-W Pro Industrial Waterbased Alkyd Urethane Semi-Gloss, B53-1150 Series, at 4.0 mils wet, 1.4 mils dry, per coat.

c. Wood Substrates: Including exposed wood items not indicated to receive shop-applied finish.

1) Waterbased/Acrylic System:

a) Prime Coat: Primer sealer, latex, interior:

1) S-W Premium Wall & Wood Primer, B28W8111, at 4.0 mils wet, 1.8 mils dry.

b) Intermediate Coat: Water-based Acrylic, interior, matching topcoat.

c) Topcoat: Water-based Acrylic, semi-gloss, interior:

1) S-W Pro Industrial Acrylic Semi-Gloss Coating, B66-650 Series, at 2.5 to 4.0 mils dry, per coat.

d. Wood Substrates: Stain and Waterbased Urethane finish.

1) Transparent System: Low VOC Finish

a) Stain Coat: interior: Manufactures Recommended Stain.

b) Intermediate Coat: WB Polyurethane, matching topcoat.

c) Topcoat: Clear, interior, satin, Gloss Level 3:
S-W Wood Classics WB Polyurethane, A68 Satin.

e. Gypsum Board Substrates:

1) Latex System: Select Sheen Eggshell standard

a) Prime Coat: Primer, latex, interior:

1) S-W ProMar 700 Primer/Finish, at 4.0 mils wet, 1.0 mils dry.

b) Intermediate Coat: Latex, interior, matching topcoat.

c) Topcoat: Latex, interior, **eggshell**:

1) S-W ProMar 400 Zero VOC Latex Eg-Shel, B20-4600 Series, at 4.0 mils wet, 1.7 mils) dry, per coat.

2) Water-Based Light Industrial Coating System: bathrooms, kitchens.

a) Prime Coat: Primer sealer, latex, interior:

1) S-W ProMar 200 Zero VOC Latex Primer, B28W2600, at 4.0 wet, 1.0 mils dry.

b) Intermediate Coat: Light industrial coating, interior, water based, matching topcoat.

c) Topcoat: Light industrial coating, interior, water based, **semi-gloss**:

1) S-W Pro Industrial Pre-Catalyzed Waterbased Epoxy, K46-151 Series, at 4.0 mils wet, 1.5 mils dry, per coat.

END OF SECTION

SECTION 09 97 23 CONCRETE AND MASONRY COATINGS

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes:

1. Sealing all concrete floors.

1.02 SUBMITTALS

A. Submit product data sheets including product specifications.

B. Submit 1'x1' sample for review by Architect prior to performing work.

PART 2 - PRODUCTS

2.01 MANUFACTURERS AND PRODUCTS

A. Acceptable Manufacturer: Rust-Oleum Corporation, 11 Hawthorn Parkway, Vernon Hills, Illinois 60061; or Architect approved equal.

2.02 MATERIALS

A. Concrete Sealer: Okon Seal & Finish Concrete and Masonry Sealer, clear.

PART 3 - EXECUTION

3.01 PREPARATION OF SUBSTRATES

A. Refer to manufacturer's literature for requirements for preparation of substrates.

1. Concrete surfaces must be clean, dry and sound prior to application of the product. Remove all waxes and oils using a commercial degreaser. Scuff sand soundly adhered previous coatings to remove gloss. Vacuum and damp-mop bare concrete surface. Check for the presence of wax on the surface by sprinkling with water. If the surface turns dark as the water is absorbed, it is free of wax or sealer and can be coated. If not, a test area should be applied to ensure adhesion or the surface should be mechanically abraded. Concrete surfaces must be completely dry prior to application. Check for dryness by taping a 2 foot square piece 4 mil plastic sheet on the bare concrete for 24 hours. Be sure to tape all four sides. After 24 hours, check the concrete for signs of moisture. If the concrete is dark,

moisture is present and the concrete should not be coated. If moisture is found, allow additional drying time. New concrete must be cured for 28 days prior to coating. The surface must be thoroughly rinsed if applied over acid stain or if surface was acid etched. Un-rinsed acid salts may damage the coating and cause it to turn white.

3.02 APPLICATION

A. Refer to manufacturer's literature for recommendations on application.

1. Concrete Sealer: Apply no more than two coats as additional coats will increase the opacity of the finish and significantly affect the final color; if the final color is affected, Contractor will completely remove the product and reapply to Architect's satisfaction.

3.03 CLEANING AND PROTECTION

A. Clean any stains on materials which would be exposed in the complete work.

1. Concrete Sealer: Drips and runs that have dried may be removed using a strong solvent within 24 hours after application.

B. Protect completed work from subsequent construction activities.

END OF SECTION

SECTION 10 00 00 METAL LETTERS / SIGNAGE

Part I – General

1.1 Scope

A. Furnish letters and hardware necessary to install cast letters/logos, shown on drawings and herein specified.

1.2 Submittals

A. Manufacturer's illustrated product literature and specifications.

B. Installation instructions

1.3 Quality Assurance

A. Manufacturer to have a minimum of 20 years experience in manufacturing Letters/ Logos.

B. All letters to be manufactured by one manufacturer.

Part II – Products

2.1 Acceptable Manufacturer or Manufacturer's Representative

A. **GEMINI INCORPORATED**
103 Mensing Way Cannon Falls, MN 55009
Phone: 800-538-8377 or 507-263-3957
Fax: 800-421-1256 or 507-263-4887
Email: sales@geminisignproducts.com
Web: www.geminisignproducts.com

B. Or Architect approved equal

2.2 Materials(Metal Alloys)

A. Aluminum–514Alloy.

B. Bronze – NAVYG (lead and mercury free bronze) alloy.

2.3 Finishes (meeting ASTM G4Aspecifications)

A. Aluminum (Alloy#514)

1. Brushed: belt sanded faces to a standard #2-#3 finish, (#4 finish optional),

vertical grain direction (optional horizontal grain, random arc, or orbital sanded optional), bead-blasted returns, low-gloss clear powder coated, baked.

2. Painted: (standard or custom colors), belt sanded faces, liquid sprayed with a 2-part hardened polyurethane, bead-blasted returns, baked.

3. Clear Anodized: belt sanded faces, bead-blasted returns, anodized to meet A31 Aluminum Architectural Class II anodized finish (.4-.7 mil), no clear coat.

4. Gold Anodized: belt sanded faces, bead-blasted returns, anodized to meet A43 Aluminum Architectural Class I anodized finish (.7- 1 mil), no clear coat.

5. Medium Bronze Anodized: belt sanded faces, bead-blasted returns, anodized to meet A44 Aluminum Architectural Class I anodized finish (.7-1 mil), no clear coat.

6. Dark Bronze Anodized: belt sanded faces, bead-blasted returns, anodized to meet A44 Aluminum Architectural Class I anodized finish (.7-1 mil), no clear coat.

7. Black Anodized: belt sanded faces, bead-blasted returns, anodized to meet A44 Aluminum Architectural Class I anodized finish (.7-1mil), no clear coat.

8. Buffed (near-polish #6–#7 finish): buffed faces, bead blasted returns, sprayed with 2 -part hardened clear polyurethane, baked.

9. Rust Powder coated: belt sanded faces, bead blasted returns, powder coated with Rust color paint, baked.

B. Bronze (NAVYG Alloy–lead & mercury free)

1. Brushed: belt sanded faces, #2–#3 finish (#4 optional), vertical grain direction standard (horizontal optional), bead- blasted returns, sprayed with 2-part hardened acrylic polyurethane low-gloss clear coat, baked.

2 . Polished US9 Finish: polished face — # 8 Finish, bead - blasted returns, 2 – part hardened acrylic polyurethane gloss clear-coat, baked.

3. Oxidized US10BFinish: belt sanded face, bead-blasted returns, oxidized as Light, Medium or Dark Bronze, sprayed with 2-part hardened low-gloss acrylic polyurethane, baked.

4. Traditional or Turquoise Patina: belt sanded face, chemically treated to create patina look (finish varies from letter to letter, not uniform), clear coated, baked.

2.4 General Construction

A. Cast Aluminum/ Bronze Letters & Logos - in one of multiple company foundries.

B. Cast Letters are cut and cast from standard pattern styles or custom production per customer's vector illustrative art files.

C. Cast Letters are hand finished per order, per customer specifications. Face grain direction is standard at vertical–horizontal grain direction is optional.

2.5 Mounting Hardware & Options

A. Blind stud standard, available aligned for Brick, Block, Rail. Optional Double Rail, Top or Bottom Rail, Top or Bottom Stud.

B. Letters under 15", drilled & tapped for 10-24 studs. Thin strokes, 6-32 or 4-40 studs.

C. Letters 15"+, drilled & tapped for 1/4-20 studs (Aluminum studs with Aluminum letters, Stainless Steel studs with Bronze letters).

D. Metal spacer sleeves available upon request.

Part III – Execution

3.1 Installation

A. A qualified installer shall install cast letters. Additional structural support may be required for larger/heavier Letters/Logos.

3.2 Warranty

A. Letters should be guaranteed for the life of the business against defects. 3.3 Maintenance

B. Cleaning of Letters/Logos as needed, per manufacturer's recommendations.

END OF SECTION

SECTION 10 42 00 JOB CONSTRUCTION SIGN

PART 1 - GENERAL

1.01 Scope
A. Furnish and install job construction sign, 4’ x 6’. Design to be by Architect. Text to be approved by Architect / Owner.

1.02 Submittals
A. Furnish three (3) copies of sign shop drawings showing letter and graphics placement, support fasteners and placement of supports.

PART 2 - PRODUCTS

2.01 Sign / Paint
A. 3/4” A-B exterior grade plywood.
B. Exterior grade enamel. Colors to be decided by Architect.

2.03 Post Supports
A. 3 1/2” x 3 1/2” x 10’ Long Wood Posts - Painted.

2.04 Fasteners
A. 3” x 3/8” ø lag bolts.

PART 3 - EXECUTION

3.01 Surface Preparation
A. Sand A-grade side of plywood to achieve smooth, paint ready finish. Apply enamel paint to industry accepted standards. Letters and graphics shall align with edges of sign.

3.02 Location
A. Install sign parallel to the main road at a location designated by Architect.

3.03 Installation
A. Mount sign on posts with lag bolts at 16” o.c. Place posts at a depth of 3’-4” minimum. Sign shall be plumb and true to line.

END OF SECTION

SECTION 10 52 20 FIRE EXTINGUISHERS & CABINETS

PART 1 - GENERAL

1.01 Scope

A. Furnish all labor and materials necessary for a complete installation of fire extinguishers & cabinets as shown on plans.

PART 2 - PRODUCTS

2.01 Fire Extinguisher

A. Multi-purpose dry chemical fire extinguisher; 5 pound, 2A-10B:C UL rated and FM approved, and shall have ABC fire rating.

2.02 Fire Extinguisher Cabinet

A. Larson's 2409 Series, fully recessed at 6" stud walls, and semi-recessed at 3 5/8" stud walls and fully recessed at CMU walls. Provide fire rated cabinets at rated walls. Stainless steel brushed finish.

B. Or Architect Approved Equal

2.03 Wall mounted brackets; Larson's Standard bracket or equivalent.

PART 3 - EXECUTION

3.01 Installation

A. Install in locations indicated on Drawings and in accordance with NFPA 10, Standard for the Installation of Portable Fire Extinguishers.

END OF SECTION

SECTION 22 00 10 MECHANICAL GENERAL PROVISIONS

PART 1 - GENERAL

1.01 Related Documents

A. The General Conditions, Special Conditions and Contract Documents are part of these specifications. Consult them further instructions and be governed by the requirements thereunder.

1.02 Description

A. Work Included

01. Furnish all labor and materials and perform all operations necessary for the installation of complete and operating mechanical systems subject to the conditions of the contract. The work also includes the completion of such mechanical and electrical details not mentioned or shown which are necessary for the successful operation of all systems; this includes the furnishing of all materials for filling systems to make them operable, including water, refrigerant, oil, grease, antifreeze and brine. Prove satisfactory operation of all equipment and controls to the MECHANICAL ENGINEER on request.

B. Work Not Included

01. Certain labor and materials may be furnished and/or installed under other divisions of these specifications. Coordinate with other trades and arrange the work to make the parts fit together. The following items are to be accomplished under other divisions of these specifications, unless noted otherwise.

a. Temporary Heat: See Paragraph 1.7, this Section and Division 1.

b. Roof Curbs: See Paragraph 3.9, this Section.

c. Concrete: See paragraph 3.10, this Section.

d. Electrical Equipment and Wiring: See paragraph 3.11, this section.

e. Temporary Water and Toilet: See Division 1.

C. Equipment Furnished by Owner

01. The Owner will award contracts, which will commence concurrently with this contract. Specifically this work will include:

a. Equipment Installation: Refer to appropriate drawings for equipment furnished by the Owner.

02. Rough-in service pipes to locations as required by architectural and mechanical drawings and equipment shop drawings. Provide service valves on all pipes except waste and vent pipes, plug or cap these. Final connections to equipment will be made by Contractor.

1.03 Provisions

A. Work performed under this division of the specifications shall conform to the requirements of Division 1, and the mechanical drawings and all items hereinafter specified.

01. Prior to any work being performed under this division, examine architectural, structural, food service, civil, electrical, specialty systems, and interior design drawings and specifications. If any discrepancies occur between them and the mechanical drawings and specifications, report discrepancies to the Architect in writing and obtain written instructions for the work.

02. Mechanical drawings are diagrammatic, but shall be followed as closely as actual construction of the building will permit. All changes from drawings necessary to make the mechanical work conform to the building as constructed shall be made without additional cost to the Owner.

03. Coordinate the mechanical work with the General Contractor and be responsible to him for satisfactory progress of the work. Coordinate mechanical work with all other trades on the project without additional cost to the Owner.

04. All work and materials covered by drawings and specifications shall be subject to review at any time by representatives of the Architect and Owner. If the Architect or Owner's agent finds any materials or installation that does not conform to these drawings and specifications, Contractor shall remove the material from the premises and correct the installation to the satisfaction of the agent.

05. In acceptance or rejection of installed mechanical systems, no allowance will be made for lack of skill on the part of the installers.

1.04 Examination Of Premises/Site

A. Visit the premises site before submitting bid as no extras will be allowed for lack of knowledge of existing conditions.

1.05 Codes And Standards

A. Conform to applicable sections of NFPA 13 and 24.

B. Conform to the National Electrical Code, 2017 Edition.

C. Conform to all applicable State and Local Codes.

D. In case of difference between these specifications, codes, laws, industry standards, and/or utility company regulations the most stringent shall govern.

E. Americans with Disabilities Acts (ADA) and American National Standards

Institute (ANSI) 117.

1.06 Permits, Fees And Notices

A. Apply for and pay for all permits, fees, licenses and inspections for this Division of work.

B. Notify proper authorities when work is ready for inspections required by applicable codes, rules and regulations, allowing sufficient time for inspections to be made without hindering progress of the work. Furnish to the Owner copies of inspection certificates of acceptance.

1.07 Temporary Heat

A. Temporary heat will be furnished by the General Contractor. Use of the permanent heating system will not be allowed without written authorization from the MECHANICAL ENGINEER. In case the permanent heating system is used for temporary heat, the General Contractor shall pay all costs until acceptance by the Owner.

1.08 Drawings

A. Mechanical drawings are diagrammatic and are not to be scaled for dimensions. Take all dimensions from Architectural drawings, certified equipment drawings, and from the structure itself before fabricating any work. Verify all space requirements, coordinating with other trades, and install the systems in the space provided without extra charges to the Owner.

B. Conceal all piping in finished areas of the building except where otherwise noted on the drawings.

C. Install all equipment in accordance with manufacturer's recommendations, unless approval is given in writing by the MECHANICAL ENGINEER for deviation.

1.09 Examination Of Bidding Documents

A. Each bidder shall examine the bidding documents carefully, and not later than seven days prior to the date of receipt of bids, shall make written request to the Architect for interpretation or correction of any discrepancies, ambiguity, inconsistency, or error therein which he may discover. Any interpretation or correction will be issued as an addendum by the Architect. Only a written interpretation or correction by addendum shall be binding. No bidder shall rely upon interpretations or corrections given by any other method. If discrepancies, ambiguity, inconsistency, or error are not covered by addendum or written directive, Contractor shall include in his bid, labor materials and methods of construction resulting in higher cost. After award of contract, no allowance or extra compensation will be made on behalf of the Contractor due to his failure to make the written requests as

described above.

B. The person submitting the request will be responsible for its prompt delivery. Failure to so request clarification of any inadequacy, omission, or conflict will not relieve the Contractor of responsibility. The signing of the Contract will be considered as implicitly denoting that the Contractor has a thorough comprehension of full intent and scope of the working drawings and specifications.

1.10 Rough-In

A. Verify final locations for rough-ins with field measurements and with the requirements of the actual equipment.

B. Refer to equipment specifications in other Divisions for additional rough-in requirements.

C. Refer to kitchen equipment drawings and equipment cut sheets provided by the Owner for kitchen equipment.

1.11 Access Doors

A. Furnish access doors of type suitable to Architect and provide to General Contractor to construct into the building. Access doors should be provided in all locations where access is required.

1.12 Coordination Drawings

A. Prepare and submit a set of coordination drawings showing major elements, components, and systems of mechanical equipment and materials in relationship with other building components. Prepare drawings to an accurate scale of ¼”=1”-0” or larger. Indicate the locations of all equipment and materials, including clearances for servicing and maintaining equipment. Indicate movement and positioning of large equipment into the building during construction.

B. Prepare floor plans, reflected ceiling plans, elevations, sections, and details to conclusively coordinate where space is limited, and where sequencing and coordination of installations are of importance to the efficient flow of the Work, including (but not necessarily limited) to the following:

01. Ductwork

02. Plumbing Piping

03. Fire sprinkler piping

04. Electrical conduit mains

C. Provide in coordination with all trades a full size Mock-up of the dorm room heating wall at a location within the building (Coordinate with owner). Contractor shall utilize an owner provided heating unit (unit to be replaced

with new unit for closeout). Owner/Architect to approve installation/appearance prior to release of heater equipment order. Mock up will coordinate piping space in wall, controls connections, installation height relative to window sill, maintenance accessibility, etc. to allow for adjustments in equipment or installation means and methods prior to full scale construction.

1.13 Mechanical Installations

A. Coordinate mechanical equipment and materials installation with other building components.

B. Verify all dimensions by field measurements.

C. Arrange for chases, slots, and openings in other building components to allow for mechanical installations.

D. Coordinate the installation of required supporting devices and sleeves to be set in poured in place concrete and other structural components, as they are constructed.

E. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work. Give particular attention to large equipment requiring positioning prior to closing-in the building.

F. Coordinate the cutting and patching of building components to accommodate the installation of mechanical equipment and materials.

G. Where mounting heights are not detailed or dimensioned, install mechanical services and overhead equipment to provide the maximum headroom possible, and in accordance with minimum required clearances as specified in codes and regulations.

H. The word “concealed” as used in this specification refers to such spaces as pipe and duct chases, pipe and duct trenches, above plastered ceilings, in walls and buried where pipe and/or duct is inaccessible when building is complete. “Exposed” is intended to be within equipment rooms, unfinished areas, above “push up” ceilings, accessible pipe and duct tunnels.

I. The term “furnish” means supply and deliver to Project, unless otherwise defined in greater detail. The term “install” is used to describe operations at Project, from inspecting and unloading, to completion in place, ready for intended use. The term “provide” means furnish and install, complete and ready for intended use, unless otherwise defined in greater detail.

1.14 Submittals

A. Submit under provisions of Division 1.

B. Proposed Product List: Include Products specified in Divisions 22 and 23 specifications.

C. Submit shop drawings and product data grouped to include complete submittals of related systems, Products, and accessories in a single submittal.

D. Mark dimensions and values in units to match those specified.

E. Submit miscellaneous items specified on the drawings, but not covered in the specifications. Make no substitutions without prior approval from the Architect.

1.15 Shop Drawings

A. Submit shop drawings on all equipment, Temperature Controls and Fire Protection. Provide shop drawings to the Architect and Engineer showing locations of all access panels.

B. Shop drawings required for this project include, but are not limited to, the following:

01. Plumbing fixtures

02. Insulation

03. Fans

04. Air Handlers

05. Fire Protection

06. Piping

07. Temperature controls

08. Seismic bracing/Vibration Isolation

C. Present shop drawing submittal data at one time, bound in three-ring binders, indexed in a neat and orderly manner. Partial submittals will not be accepted. Provide five sets of submittal data, unless noted otherwise in Division 1. Do not begin work until one (1) copy is returned.

D. Provide, with shop drawing submittal, 1/4" scale layout drawings of rooms with boilers, chillers, and HVAC equipment. Layouts shall show locations of, and shall be coordinated with electrical equipment, and equipment shall be drawn to scale.

E. Place orders for all equipment in time to prevent any delay in construction schedule or completion of project. If any materials or equipment are not ordered in time, additional charges made by equipment manufacturers to complete their equipment in time to meet construction schedule, together with any special handling charges, shall be borne by the Contractor.

F. Contractor agrees that shop drawing submittals processed by the engineer are not change orders. The purpose of shop drawing submittals by the Contractor is to demonstrate to the engineer that the Contractor

understands the design concept, that he demonstrates his understanding by indicating which equipment and material he intends to furnish and install and by detailing the fabrication and installation methods he intends to use. Contractor further agrees that if deviations, discrepancies, or conflicts between shop drawing submittals and contract documents in the form of design drawings and specifications are discovered either prior to or after shop drawings and specifications shall control and shall be followed.

G. Contractor to provide manufacturers' recommended installation manuals for equipment.

H. Review of shop drawings does not relieve this Contractor from the responsibility of furnishing equipment and materials of proper dimension, size, quantity, quality and all performance characteristics to efficiently perform the requirements and intent of the contract documents. Review does not relieve this Contractor from responsibility for errors on the shop drawings. If the shop drawings deviate from the contract documents, advise the MECHANICAL ENGINEER of the deviations in writing accompanying the shop drawings, including the reasons for the deviations. Coordinate all required changes with the other trades affected. If the changes are occasioned by the Contractor, he/she shall pay any costs involved.

1.16 Project/Site Conditions

A. Install Work in locations shown on Drawings, unless prevented by Project conditions.

B. Prepare drawings showing proposed rearrangement of Work to meet Project conditions, including changes to Work specified in other sections. Obtain permission of Architect before proceeding.

1.17 Project Record Drawings

A. During the process of the work, maintain an accurate record of the installation of the mechanical systems. Upon completion of the mechanical systems installation, transfer all record data to blue-line prints of the original drawings. Drawings shall include all addendum items, charge orders, alternations, reroutings, etc. As a condition of acceptance of the project, deliver to the Architect one copy of the record drawings.

1.18 Warranty

A. All materials and equipment shall be new unless otherwise specified.

B. Guarantee all workmanship, materials and equipment and replace any found defective without cost to the Owner, for one year after final acceptance, as defined in General Conditions.

C. Each warranty for longer than the one year described above (that comes

with equipment used on the job) shall be passed on to the owner with dates of start and end of the warranty.

1.19 Engineering By Contractor

A. The construction of this building requires the contractor to design several systems or subsystems. All such design shall be the completed responsibility of the contractor.

B. Systems or subsystems which require engineering responsibility by the contractor include, but are not limited to:

01. Fire sprinkler.

02. Equipment supports, not fully detailed in the drawings.

03. Pipe hangers and anchors not specified in these documents, or catalogued by the manufacturer.

04. Temperature controls.

05. Water treatment.

06. Refrigeration systems.

PART 2 - PRODUCTS

2.01 Equipment Manufacturer

A. Equipment in the following categories shall be of one manufacturer or available through one manufacturer for each category to facilitate ease of maintenance for the Owner.

01. Motors (open drip-proof squirrel cage)

02. Starters

03. Booster Pumps

04. Single Suction Pumps

05. Double Suction Pumps

06. Temperature Controls

07. Plumbing Fixture Trim

08. Thermometers

09. Pressure Gauges

010. Gate Valves

011. Butterfly Valves

012. Plug Valves

013. Globe Valves

014. Check Valves

015. Balancing Valves

016. Radiator Valves

017. Traps

018. Dielectric Unions

019. Strainers

020. Air Filters

021. Access Doors

2.02 Substitutions (Prior Approvals)

A. Bidder's Choice

01. Materials, equipment or services listed by several identifying names are intended to be bidder's choice, and any of the listed names may be bid without soliciting prior acceptance. Where more than one name is given in the specifications, the first named manufacturer's material, equipment or services is contemplated and any changes and their costs, required to accommodate the other named material or equipment as well as space requirements for the other named materials or equipment, must be assumed by the Contractor in his bid. (See Shop Drawing Requirement).

B. Performance Specification

01. When any product is specified only by requirement to meet an industry standard or regulating body standard (such as U.L., AGA, AWWA, ANSI, etc.) and the item proposed carries approval of that body, no prior acceptance by the MECHANICAL ENGINEER is needed.

02. When any product or service is specified by requirement to meet a performance standard or is specified by a generic specification, (no manufacturers name listed) no prior acceptance by the MECHANICAL ENGINEER is needed except as specifically called for in these specifications.

C. Acceptance

01. Material and equipment specified is used as a basis of standard, and while not specifically mentioned, material gauges, weights, appearance and space requirements must be met by any substitutions.

02. Action for substitutions specified herein will be given only after the receipt of complete data showing performance over entire range, physical dimensions and material construction all SPECIFICALLY

marked for the individual item. Letter of transmittal with at least one (1) copy and one (1) marked up copy of all descriptive data shall be submitted to the MECHANICAL ENGINEER'S Office.

03. Submit shop drawings for all materials and equipment other than the first named in theses specifications showing any changes required in piping, ducting, electrical wiring, space allocation etc. Be responsible to make all changes required to accommodate and to pay for these changes. Coordinate changes required with all other trades. Pay for all changes resulting from re-arranging equipment.

04. See General Conditions for method of notification of acceptance.

2.03 substitutions (Contractor And/Or Owner Initiated)

A. Materials or equipment listed by several manufacturers' names are intended to be bidder's choice, and any of the listed manufacturers may be used in the base bid. Materials or equipment not listed are considered substitutions.

B. Performance Specification: When any item is specified by requirement to meet a performance, industry or regulating body standard or is specified by a generic spec, (no manufacturer's name listed) no prior approval by the Consulting Mechanical Engineer is needed unless specifically called for in these specifications.

C. Contractor to be responsible for any changes and costs to accommodate any equipment except the first named in the specification.

D. Substitutions for Material

01. Equipment and materials not listed as equivalents may be proposed as deductive alternates to specified items by submitting it as a separate line item to the base bid on the Bidder's letterhead.

02. Such alternate proposals shall not be substituted for the base bid and must be accompanied by full descriptive data on the proposed equipment, together with a statement of the cost to be deducted for each item and all deviations from specified items. Highlight all difference from specified equipment. If any such alternates are considered, the Contractor shall submit a list of the proposed alternate substitution items within 14 days of award of contract. Late requests for proposed substitutions shall not be accepted by the Engineer due to scheduling or delivery concerns.

2.04 Bid Alternate(S)

A. Refer to Division 1 and all contract documents for additional information.

B. Alternate(s) for Material and Equipment

01. Equipment and material bid alternate(s) shall be proposed as additive

or deductive alternate(s) to specified items by submitting it as a separate line item from the base bid on the Bidder's letterhead.

02. Such bid alternate proposals shall not be substituted or included in the base bid. Bid alternate proposal(s) must be accompanied by full descriptive data on the proposed equipment, together with a statement of the cost to be added or deducted for each item. The bid alternate shall include all materials, equipment, labor, electrical connections, coordination with all other trades, etc. for a complete and operational system.

03. The Contractor shall submit the bid alternates at the time the base bids are due.

2.05 Safety Provisions

A. Any refrigeration system containing CFC-11, CFC-12, HCFC-123, HCFC-22, or any of the other refrigerants listed in the Clean Air Act as a Class I or Class II Ozone Depleting Compound shall comply with the Clean Air Acts and the Colorado Air Quality Control Commission Regulation #15.

B. As a minimum all systems shall be equipped with refrigerant recovery service valves, relief valves capable of resetting after activation, and for system with more than 50 pounds of charge, and isolateable receiver and/or condenser capable of holding the complete charge.

PART 3 - EXECUTION

3.01 Storage

A. Provide for proper storage of all materials and equipment and assume responsibility for losses due to any cause. All storage shall be within the contact limit lines of the building site. Cover and store all equipment and materials out of elements; any rusted or weather damaged item shall not be used.

3.02 Product Installation

A. Manufacturer’s Instructions

01. Except where more stringent requirements are indicated, comply with the product manufacturer’s instructions and recommendations.

02. Consult with manufacturer’s technical representatives, who are recognized as technical experts, for specific instructions on special project conditions.

03. If a conflict exists, notify the Architect/Engineer in writing and obtain his instruction before proceeding with the work in question.

B. Movement of Equipment

01. Wherever possible, arrange for the movement and positioning of equipment so that enclosing partitions, walls and roofs will not be delayed or need to be removed.

02. Otherwise, advise Contractor of opening requirements to be maintained for the subsequent entry of equipment.

C. Heavy Equipment

01. Coordinate the movement of heavy items with shoring and bracing so that the building structure will not be overloaded during the movement and installation.

02. Where mechanical products to be installed on the existing roof are too heavy to be hand-carried, do not transport across the existing roof deck; position by crane or other device so as to avoid overloading the roof deck.

D. Clearances

01. Install piping and ductwork:

a. Straight and true.

b. Aligned with other work.

c. Close to walls and overhead structure (allowing for insulation).

d. Concealed, where possible, in occupied spaces.

e. Out-of-the-way with maximum passageway and headroom remaining in each space.

02. Except as otherwise indicated, arrange mechanical services and overhead equipment with a minimum of:

a. 7’0” headroom in storage spaces.

b. 8’6” headroom in other spaces.

03. Do not obstruct windows, doors or other openings.

04. Give the right-of way to piping systems required to slope for drainage (over other service lines and ductwork).

05. Offsets, transitions and changes in direction in pipes and ducts shall be made as required to maintain proper head room and pitch of sloping pipes whether or not indicated on the drawings. Furnish and install all traps, air vents, sanitary vents, etc., as required to affect these offsets, transitions and changes in direction.

E. Access

01. Install all work to permit removal (without damage to other parts) of coils, heat exchanger bundles, boiler tubes, fan shafts and wheels,

filters, belt guards, sheaves and drives, and all other parts which might require periodic replacement or maintenance. Arrange pipes, ducts, and equipment to permit ready access to valves, traps, starters, motors, control components and to clear the openings of doors and of access panels. Furnish access panels for all mechanical equipment and valves requiring access in concealed locations for installation by contractor.

3.03 Protection Of Work And Property

A. Where there are existing facilities, be responsible for the protection thereof, whether or not such facility is to be removed or relocated. Moving or removing any facility must be done so as not to cause interruption of the work of Owner's operation.

B. Close all pipe and duct openings with caps or plugs during installation. Cover all fixtures and equipment and protect against injury. At the final completion, clean all work and deliver in an unblemished condition, or refinish and repaint at the discretion of the Architect.

C. Do not allow any fans in the HVAC system to operate before the area served by the fan has been cleaned and vacuumed of all debris and dust which might enter the system.

D. Any equipment, duct or piping systems found to have been damaged or contaminated above “MILL” or “SHOP” conditions shall be replaced or cleaned to the Engineer’s satisfaction.

E. Initial fill of traps

01. Provide initial water seal fill for all waste p-traps, condensate traps, or similar traps.

3.04 Protection Of Potable Water Systems

A. All temporary water connections shall be made with an approved back flow preventer.

B. All hose bibbs shall have, as a minimum, a vacuum breaker to prevent back flow.

C. Direct connections to hydronic systems shall only be made through a reduced pressure back flow preventer.

3.05 Refrigeration Systems

A. All technicians involved in the installation of refrigeration systems shall be certified and trained in accordance with the Colorado Air Quality Commission Regulation #15, and the applicable sections of the Clean Air Act.

B. No refrigerant shall be intentionally vented to the atmosphere. All

refrigerant shall be recovered before opening a closed system for charging, evacuation, service, or installation.

3.06 Demonstration

A. Refer to Division 1 sections of the specifications regarding requirements of Record Drawings and Operation and maintenance Manual submittal and systems demonstration.

01. Demonstrate that each system operates properly.

02. Explain the operation of each system to the Owner's Representative. Explain use of O&M manual in operating and maintaining systems.

B. Date and time of demonstration will be determined by the Owner.

3.07 roof Curbs

A. Roof curbs and roof flashings for all equipment located on the roof shall be furnished under the Architectural Division (except for any sound curbs or roof top units' integral curbs specified herein). Furnish and install all counter flashing of the same material as the flashing.

3.08 Concrete

A. All poured in place concrete shall be furnished under the Architectural Divisions of these Specifications.

B. This Contractor shall coordinate all requirements for concrete surrounding buried duct. Ducts shall be tied down to concrete deadman and completely surrounded with 3" of concrete.

3.09 Electrical Equipment And Wiring For Mechanical Division

A. Unless otherwise indicated, all motors and controls shall be furnished, set in place and wired in accordance with the following schedule. (MD is Mechanical Division - ED is Electrical Division).

ITEM	FURNISHED UNDER	SET IN PLACE OR MOUNTED UNDER	WIRED AND CONNECTED UNDER
1. Equipment Motors and Thermal overloads, resistance heaters (c).	MD	MD	ED
2. Motor Controllers; magnetic starters, reduced voltage starters and overload relays.	MD	ED(a)	ED
3. Disconnect switches, fused or	ED(a)	ED(a)	ED

	unfused, H.P. rated switches, thermal overload switches and fuses, manual operating switches.			
4.	Push-button stations, pilot lights, multi-speed switches, float switches, thermostats, control relays, time clocks, control transformers, control panels, motor valves, damper motors, solenoid valves, EP and PE switches and interlocks.	MD	MD(b)	MD(b)
5.	Contactors, 120V control circuit outlets for control panels and for boiler controls and for fire protection controls and smoke detectors.	ED	ED	ED
6.	Duct Detectors, fire/smoke dampers, elevator vent dampers.	MD	MD	ED(c)

a. If furnished as part of factory wired equipment, wiring and connections only by ED.

b. If float switches, line thermostats, P.E. switches, time switches, etc., carry the FULL LOAD CURRENT to any motor, they shall be furnished by the Mechanical Division, but shall be set in place and connected under the Electrical Division, except that where such items are no integral part of the mechanical equipment, or directly attached to ducts, piping, etc., they shall be set in place under the Mechanical Division and connected by the Electrical Division. If they do not carry the FULL LOAD CURRENT to any motor they shall be furnished, set in place and wired under the Mechanical Division. Control devices carrying full load current furnished by Mechanical and wired by Electrical shall be located at the device being controlled, unless shown on drawings or mutual agreement is made between the contractors with no change in the contract price.

1) Wiring from alarm contacts to alarm system by ED; all control function wiring by MD.

B. The above list does not attempt to include all components. All items necessary for a complete system shall be included in the base contract.

C. Connections to all controls directly attached to ducts, piping and mechanical equipment shall be made with flexible connectors.

3.10 Identification

A. Piping

01. All exposed piping, except piping in finished spaces, shall be identified in conformance with "Scheme for the Identification of Piping Systems", ANSI A13. All markers must be in compliance with respect to (1) proper letter color, (2) proper letter size, (3) correct background color, and (4) proper marker length.

02. Directional flow arrows shall be applied adjacent to each pipe mark.

03. For pipes under 3/4" O.D. color coded (as described above) identification tags shall be securely fastened at all required locations. Tags shall be 1-1/2 inches in diameter.

04. All piping shall be marked at the following locations: (1) next to each valve and fitting, (2) at each branch and riser take-off, (3) at each wall, ceiling or floor penetration, (4) on pipes that lead to and from underground areas, and (5) every 30 feet on horizontal and vertical pipe runs. Identification of all piping systems shall conform to the designations in the mechanical legend on the drawings.

B. Valves

01. All valves shall be identified by color coded (to match piping system identification) tags which indicate both service and number. Tags shall be 1-1/2 inch in diameter and have 1/4 inch high letters to indicate service and 7/16 inch high numbers. Tags shall be securely fastened to all valves. Service designations shall match abbreviations for piping systems given in mechanical legend on the drawings. Valve charts shall be provided and shall include (1) valve identification number, (2) service, (3) location, and (4) purpose. Valve charts shall be mounted in metal frame with glass enclosure. One valve chart shall be secured on a wall in the boiler room. A second valve chart shall be delivered to the Owner's authorized representative. Also a copy of the valve chart shall be included in the Operations and Maintenance Instructions.

C. All fire dampers and their access doors shall be identified by printed stencil secured to the access door or a location approved by the Architect.

D. All pneumatic and electric controls, starters, air handling units, pumps, and all other equipment and controls shall be identified by stencil or permanent labeling.

E. Care shall be taken not to paint over nameplates.

3.11 Flushing, Cleaning & Sterilizing

A. Intent: It is the intent of this specification to require that all work, including the inside of equipment, be left in a clean condition with all dust, grease,

and construction debris removed.

01. Piping and connection equipment to be left free of sediments, core sand, grease, etc.

02. Clean all exposed surfaces of piping, ducts and hangers, etc., sufficiently to receive paint. Vacuum ducts as required for debris removal.

03. Air systems shall not be operated without filters. Replace the filters or clean permanent type filters just prior to substantial completion. All air systems shall be furnished with one additional set of filters for owner replacement.

04. Remove and clean all screens, interceptors, strainers, etc., in piping systems just prior to substantial completion.

05. Clean and wipe dry all plumbing fixtures, exposed valves, faucets, and piping, etc. that are exposed just prior to substantial completion. Clean all equipment and fixtures per manufacturer's specifications to avoid scratching finished surfaces. Leave all plumbing fixtures ready to use.

06. Clean interior and exterior of all air handling equipment of all construction debris. Clean exterior of all exposed ductwork just prior to substantial completion.

07. Thoroughly clean all equipment room floors after completion of equipment, pipe and duct cleaning. A condition of final acceptance will be the cleanliness of all exposed systems, equipment, and equipment rooms.

B. Before final connections are made in the piping systems, blow out all piping with air and then wash out with cleaning compounds. Then flush the system to remove of all foreign materials. Furnish all temporary connections, valves, etc, required for this purpose. Clean the boiler and chiller by the same procedure.

C. After flushing, sterilize the domestic water system in accordance with Section 22 11 16.

3.12 Testing

A. Test all drain and waste lines with standing water test of twelve feet of head, held long enough to visually inspect each joint.

B. Test all air, oil and gas piping under 60 psig air pressure.

C. Test all refrigeration piping under 150 psig pressure using oil pumped, dry nitrogen and tapping of joints if there is any loss of pressure, soap each joint to find leaks. Charge with 10 psig refrigerant and test with halide torch or electronic leak detector. Evacuate using vacuum pump to 500 microns and

purge twice with oil pumped, dry nitrogen.

D. All tests must be done to the satisfaction of the local authorities having jurisdiction, before covering.

E. All hydrostatic tests to be held for a minimum of six hours without loss of pressure. Air tests to be held for a minimum of two hours without loss of pressure.

F. Furnish all instruments required for testing.

3.13 Placing In Operation

A. Clean all ducts, pipes, equipment, controls etc., of plaster and other foreign debris.

B. Before final acceptance, clean or replace all strainers, oil or grease all bearings and clean out all drains. Clean and recoat all permanent filters, replace throwaway type filters with new filters.

C. The systems shall be put into operation.

01. The Contractor shall verify that all controls are set to meet operating conditions specified.

a. Example: Boiler operating and limit controls set where specified.

02. The contractor shall verify that all pieces of equipment are operable and that all sequences of control are being met.

03. The contractor to adjust settings through 1st year as required by MECHANICAL ENGINEER.

3.14 Operation And Maintenance Instructions

A. Books of Operating and Maintenance Instructions shall be personally delivered to the Owner's authorized representative and the Owner instructed as to their use and the equipment involved. (Provide two books for each building). Also, instruct the Owner's personnel on each valve and the valve chart previously specified.

B. The book shall contain, but not be limited to, the following general items:

01. Spare parts lists for each piece of equipment.

02. Operating manuals for each piece of equipment and control.

03. Lubrication charts showing type of lubricant and application methods and frequencies.

04. Filter cleaning or replacement schedule. (On Contractor's letterhead stationary).

05. Preventive maintenance schedule for checking all items such as belt drive, safety controls and oil and refrigerant charges. Cleaning

schedule of all strainers, traps, coils, tubes, tower pans, sprays, etc. (On Contractor's letterhead stationary).

06. Water treatment recommendations for boiler, tower, etc.

07. Normal operating instructions including a sequence of operation for each system. (On Contractor's letterhead stationary).

08. Instructions as to procedure to be followed for any emergency situation, such as alarms or safety items being tripped. (On Contractor's letterhead stationary).

09. Instructions on who to call for service during guarantee period. (On Contractor's letterhead stationary).

010. Record of equipment installed (copy of each shop drawing as set forth under "Shop Drawing" Paragraph).

011. All warranties provided by Manufacturers on their equipment that run longer than the one year guarantee by the Contractor.

C. Books shall be arranged in sequence to match the equipment schedules included in the specifications.

D. Approval will not be given for final payment until the tests, balancing and operating instruction portions have been completed.

3.15 Equipment Start-Up

A. All refrigeration, radiant heating and packaged equipment shall be started by the manufacturer or under the manufacturer's supervision. Start-up data shall be recorded in logs. Copies of start-up logs shall be forwarded to Mechanical Engineer and included in Operation and Maintenance manuals.

END OF SECTION

SECTION 22 00 50 MECHANICAL BASIC MATERIAL AND METHOD

PART 1 - GENERAL

1.01 Related Documents

A. The General Conditions, Special Conditions and Contract Documents are a part of these specifications. Consult them for further instructions and be governed by the requirements thereunder.

1.02 Standards For Materials

A. All materials shall conform to current applicable industry standards. Workmanship and neat appearance shall be as important as the electrical and mechanical operation. Defective or damaged materials shall be replaced or repaired, prior to final acceptance, in a manner acceptable to the Architect or Owner at no additional cost to the Owner.

B. All equipment shall have housings suitable for the location installed.

C. Provide products and materials that are new, clean, free of defects, and free of damage and corrosion, unless specifically directed to reuse any existing materials.

PART 2 - PRODUCTS

2.01 Motors

A. Furnish ball bearing, squirrel cage, open dripproof, normal starting torque motor of the horsepower and current characteristics specified with thermal overload protection and dustproof and leak proof bearing rings and constructed for use at the altitude where the work is to be located. Motors guaranteed to operate continuously at full load with temperature rise in any part not to exceed NEMA Standards. Motors shall be commercially, dynamically balanced and tested at the factory before shipment and selected for quiet operation. Provide motors for V-belt drives with a cast iron and steel base, with slide rail and adjustable screw device and belt guard. Line up motors and drives and place motors and equipment on foundations ready for operation.

B. Motors rated 1 horsepower or greater shall be Department of Energy (DOE) approved “energy efficient”, meeting the requirements of EP Act 92, and shall meet NEMA 12-6C full load efficiencies. Where not commercially available, power factors shall be capacitor corrected by equipment manufacturer to at least 90 percent under rated load conditions.

2.02 Starters

A. Provide starters of current and capacity ratings to serve the motor intended. All three phase starters to have over current protection on all three legs. On three phase starters furnish a Phase Monitor Control Relay, Time Mark

B258B, or A258B, three-phase monitor control relay to open on phase reversal, phase failure or phase under voltage. Phase monitor control relay shall be mounted and wired in the starter enclosure by this contractor. Furnish switches and green running pilot light in starter cover. If pilot lights are specified on control panel, individual starter lights will not be required.

B. Provide integral transformer and 120-volt control circuit on all starters, which are furnished with control circuits.

C. Size thermal overload relays for approximately 115% of full load motor current. Switch and fuse units will not be acceptable unless specifically indicated.

D. All motors 25 horsepower or greater shall be equipped with reduced voltage starters.

2.03 Belt Drives

A. Provide belt drives with cast iron sheaves, either companion driven sheaves (except for two groove) or fixed pitch sheaves. If fixed pitch sheaves are used, the MECHANICAL ENGINEER reserves the right to direct speed changes be made, if in his opinion, these are warranted after final balancing. Fixed pitch sheaves shall be bushed type. Provide two groove adjustable drive sheaves with a key for holding pitch adjustment. Use standard FHP, A, B, C and D Sections. FHP belt drives may be used for motors less than three horsepower. Select belt sections for drives for three horsepower and over from the following chart:

MOTOR SPEEDS			MOTOR SPEEDS		
HP	1750	1160	HP	1750	1160
3	A	A	30	C	C
5	A	A	40	C	C
7.5	B	B	50	B or C	C
10	B	B	60	C	C
15	B	C	100	C	D
25	C	C	125	C	D

B. Provide matched belts sized for 150% of motor schedule horsepower. When A-B sheaves are used, use B Section belts only.

2.04 Access Doors

A. Provide painted, steel access doors with key lock suitable for the surface in

which they are installed and satisfactory to the Architect. Recessed style to accept plaster finish, recessed type to accept acoustical tile, flush panel for drywall or flanged flushed panel for remodeling. If installed in fire rated surface, access door to carry proper rating.

2.05 Altitude Ratings

A. Except as otherwise noted, all equipment capacities, air qualities, etc., are adjusted ratings for the elevation of this project as noted on drawings. Manufacturer's ratings shall be adjusted to provide net ratings shown.

2.06 Flexible Pipe Connections

A. For steel piping, construct with stainless steel inner hose and braided exterior sleeve.

B. For copper piping, construct with bronze inner hose and braided exterior sleeve.

C. Use connectors suitable for minimum 125 psi WSP and 450º and 200 psi WOG and 250ºF.

D. Construct spool pieces to exact size for insertion of flexible connection.

2.07 Fire Stopping Material

A. General:

01. Products to be used shall have been tested in accordance with ASTM E 814-88 and be listed in the UL Fire Resistance Directory.

B. Bare Piping:

01. Model FD 150 or CP-25.

C. Insulated Piping:

01. Model: CP-25 or FS-195, Intumescent.

02. "No-sag" or "self-leveling" as required.

D. Plastic Piping:

01. Model: CP-25 or FS-195 Intumescent.

02. "No-Sag" or "Self-leveling" as required.

E. Accessories:

01. Provide Fasteners, Restricting collars, backing materials, and protective coatings as required to comply with the UL system listing.

F. Manufacturers:

01. 3M or G.E.

2.08 Heat Trace

A. Manufacturers:

01. Raychem Model: XL-Trace for freeze protection applied between pipe and insulation.

02. Raychem Model: Ice stop for freeze protection applied inside storm drain leaders and down spouts.

03. Other acceptable manufacturers:

a. Thermon.

b. Hevi-Duty/Nelson.

B. Features:

01. Self regulating at all points along its length.

02. 90% power reduction from 40°F pipe temperature to 150°F pipe temperature.

03. No overheating if crossed.

04. Provide outer jacket and braided copper shield for use inside roof drain leaders or on piping without a ground path.

C. Accessories:

01. Provide tee, splice, and end seal kits as required by the manufacturer.

02. Provide ambient sensing thermostat in a NEMA 4x enclosure with three (3) contacts rated at 22 amps each.

PART 3 - EXECUTION

3.01 Freeze Protection

A. Proximity of any equipment component or fluid piping to potential damage from freezing sources shall be avoided wherever possible. Drawings are diagrammatic. Make location adjustments, add insulation and/or control devices and/or heat sources as necessary to prevent or minimize freeze damage potential. The Architect/Engineer will neither guarantee nor be responsible for any consequences of freezing.

3.02 Vibration Isolation

A. Equipment

01. Erect all floor mounted equipment on 4" high concrete pads over the complete floor area of the equipment.

02. Where inertia bases are indicated, pour these bases within structural channel frames having mountings attached to the inside perimeter and furnished with supplementary spring units. Furnish bases with an 18 gauge sheet metal bottom welded in place to retain the concrete. Anchor bolts and reinforcing bars are to be set in the field, #5 reinforcing bars top and bottom, 12" o.c. both ways. Provide one #5 bar at corners,

top and bottom, 2' x 2' long. The mounting housing shall have concrete anchors and form enclosures for the spring elements. No damping material shall be used between the inner and outer housing on mountings and mountings shall have a combination lifting and leveling adjustment and 1/4" thick neoprene acoustical friction pads bonded to the steel base.

03. Mount base mounted pumps and compressors (including temperature control compressors) on inertia base with a weight equal to not less than 1-1/2 times the combined weight of the pump and motor. Each inertia base for horizontally split case pumps shall include supports for base elbows at the suction and discharge connections. Where the concrete is "T" shaped, or other than rectangular, mounting shall be self contained concrete inserts with flush openings on the side of the foundation for spring adjustment or removal.

04. Mount supply and return centrifugal fans, cabinet fans and air handling units (where called for on plans) on inertia base with a weight equal to not less than 1-1/2 times the combined weight of the fan and motor. Where centrifugal fan is used, mount fan and motor on common steel base.

05. Support each air or refrigeration compressor, (including temperature control compressor) base mounted pump, factory assembled air handing unit and fan by Mason Industries or equivalent spring type vibration isolators, as follows:

EQUIPMENT	GROUND SUPPORTED SLAB OR BASEMENT MASON			
	Engr. Spec	Min Static Defl. (in.)	Engr. Spec.	Min Static Defl. (in.)
a. Refrigeration Machines				
1) Absorption Machines	AK	0.35	C-K	0.75
2) Centrifugal Chillers or Heat Pumps				
a) Cooler condenser Mounted Hermetic-Compressors	A-K	0.35	C-K	0.75

b) Cooler condenser alongside Hermetic-compressors	A-K	0.35	C-K	0.75
c) Open Type Compressors	A-G-K	0.35	C-G-K	0.75
3) Refrigeration Reciprocating Compressors				
a) 500 RPM to 750 RPM	B	0.75	B	1.5
b) 751 RMP and over	B	0.75	B	0.75
4) Reciprocating Chillers or Heat Pumps				
a) 500 RPM to 750 RPM	C-K	0.75	C-K	1.5
b) 751 RMP and over	C-K	0.75	C-K	0.75
b. Pumps				
1) Close Coupled				
a) Thru 5 HP	A-J-K	0.35	B-J-K	0.75
b) 7½ HP and larger	B-J-K	0.75	B-J-K	0.75
2) Base mounted				
a) Up to 60 HP	B-J-K	0.75	B-J-K	0.75
b) 75 HP and larger	B-J-K	0.75	BJK	1.5
c. Factory Assembled H & V Units				
1) Curb Mounted Rooftop Units	Y	1.0	Y	1.0
2) Suspended Units				
a) Thru 5 HP	D	1.0	D	1.0
b) 7-1/2 HP and larger – 275 RPM TO 400 RPM	D	1.5	D	1.5

c) 7-1/2 HP and larger – 401 RPM and over	D	1.0	D	1.0
3) Floor Mounted Units				
a) Thru 5 HP	A	0.35	B-H	0.75
b) 7-1/2 HP and larger – 275 to 401 RPM	A	0.35	B	1.5.
c) 7-1/2 HP to 40 HP – 401 RPM and over	A	0.35	B	0.75
d) 50 HP and larger – 401 and over	A	0.35	B	0.75
d. Air Compressors				
1) Tank Type	B-J-L	0.75	B-J-L	0.75
2) Horiz, Vert, 1 or 2 Cylinder				
a) 275 RPM to 499 RPM	B-J-L	2.5	B-J-L	2.5
b) 500 RPM to 800 RPM	B-J-L	1.5	B-J-L	1.5
e. Blowers				
1) Utilities Sets				
a) Floor Mounted	A	0.35	B	0.75
b) Roof Mounted	B-J		C	0.75
c) Suspended Unit	--	--	D	2.5
2) Centrifugal Blowers	A-J	.035	B-J	
3) Tubular Centrifugal and Axial Fans				
a) Suspended Units	D		Refer to Guide.	
b) Floor Mounted w/Motor on/in Fan Casing	A	0.35	B-J	

c) Floor Mounted Arrangement 1 or any Separately Mounted Motor	A-J	0.35	B	0.75
f. Cooling Towers and Condensing Units	A	0.35	C	

06. All mountings used outdoors shall be hot dipped galvanized.

07. Equipment with operating weight different than the installed weight, such as chillers and cooling towers and equipment exposed to wind, such as roof fans, cooling towers, etc., shall be mounted on spring mountings as directed in Mason Engineering Spec. B, but a housing shall be provided that includes vertical limit stops to prevent spring extension when weight is removed. Limit stops shall be out of contract during normal operation.

B. Piping

01. Chillers, Condensers, Towers and Compressors

a. Isolate all refrigerant piping from the structure throughout by double deflection spring and neoprene hangers with 1" deflection. Hang piping so that it does not touch any part of the structure. Connect pipes to compressor or condensing unit with convoluted bellows braided metallic flexible pipe connectors.

b. Isolate all condenser water piping, connected to condenser on any packaged chiller with a reciprocating compressor, from the structure throughout the equipment room by double deflection spring and neoprene hangers with 1" deflection. Hang piping so that it does not touch any part of the structure. Connect pipes to condenser and to cooling tower with Teflon flexible equipment connectors.

c. Isolate all chilled water piping, connected to evaporator on packaged chiller with reciprocating compressor, from the structure throughout the equipment room by double deflection spring and neoprene hangers with 1" deflection. Hang piping so that it does not touch any part of the structure. Connect pipes to evaporator with Teflon flexible equipment connectors.

02. Base Mounted Pumps and Air Compressors (including temperature control compressors). Connect piping to air compressors with convoluted bellows, braided metal flexible pipe connectors. Isolate air piping from the structure for the first six hangers by double deflection spring and neoprene hangers with 1" deflection. Hang piping so that it does not touch any part of the structure. Connect piping to base mounted pumps with Teflon flexible equipment connectors.

03. Domestic Hot and Cold Water, Heating Water and Waste Piping

a. Domestic hot and cold water piping one inch diameter and smaller shall be isolated with the Acousto-Plumb System of orange and blue pipe isolators, holders, and guide, as manufactured by LSP/Specialty Products Company, Tel (800) 854-3215.

b. Isolate waste piping and domestic hot and cold water piping larger than one inch in diameter with Trisolator system of pipe isolators as manufactured by Elmdor/Stoneman, Tel. (818) 968-8699.

c. Do not allow the piping, pipe connectors, pipe hangers or valve to directly touch the structure, studs, gypsum board, or other pipes.

d. Copper waste piping must be completely wrapped with Lowry's acoustical pipe wrap. The wrap is manufactured by Harry A. Lowry, Tel. (818) 768-4661.

C. Flexible Connections

01. Where ductwork or piping is connected to fans, air handling units, pumps, or other equipment that may transmit vibration along the piping or ductwork, connect by means of a flexible connection constructed of fire resistant canvas, flex piping, or other approved method. Connections shall be suitable for pressures developed at the point of installation. Flexible material shall be waterproof for weather exposed ductwork, shall show no visible strain during operating conditions, and shall comply with code requirements. Flex connections for range exhaust systems shall be fire rated.

3.03 Pipe Hangers

A. General

01. Provide pipe supports for vertical lines at each floor. Provide pipe hangers to support the systems without sagging, including hangers at each offset or change in direction, at ends of branches over five feet in length and at the following maximum spacing:

Pipe Size	Hanger Spacing	Hanger Rod Diameter(Minimum)
a. 3/4" and smaller	6 ft.	3/8"
b. 1"	8 ft.	3/8"
c. 1-1/4" through 2"	10 ft.	3/8"
d. 2-1/2" through 3"	10 ft.	1/2"
e. 4" through 5"	10 ft.	1/2"

f. 6" through 10"	2 ft	5/8"
g. 12" and larger	12 ft.	7/8"
h. Cast iron no hub	5 ft. and at joints	

B. Individual Hangers

01. Individual hangers for non-insulated copper piping and insulated copper heating piping and insulated domestic hot water and circulating water piping shall be copper plated, adjustable swivel ring hangers similar to Auto Grip 500, Kin-Line felt lined 440-F or Michigan Hanger Company Series 102 with polyvinyl coating, with hanger outside insulation.

02. Individual hangers for insulated cold piping (steel or copper) shall be zinc plated, adjustable swivel ring hangers similar to Auto Grip Figure 800, Kin Line 400 Series, Michigan Series 103. Hangers shall support pipe with hangers over the insulation. The system shall be complete with Auto Grip or Michigan Zinc plated steel shield, Pipe Shields or Kin-Line 460 zinc plated steel shield. Provide insulation insert of high density polyethylene foam, calcium silicate, high density glass fiber or expanded perlite divided in longitudinal half sections and covered with fire resistant vapor barrier jacket. High density inserts are not required in plumbing walls behind plumbing fixtures.

03. Individual hangers for all insulated or non-insulated steel piping (except steam and high temperature hot water) shall be zinc plated, adjustable swivel ring hangers similar to Auto Grip Figure 400, Kin-Line 400 Series, Michigan Series 100. Hangers shall support pipe with hanger outside insulation.

04. Individual hangers for steam and high temperature water piping (250oF and above) shall be adjustable swivel pipe rolls, similar to Grinnel No. 171, 181 or 174 with pipe covering protection saddle, similar to Grinnel No. 185-186 or 360° zinc plated steel shield for insulation thickness specified. Hangers shall support pipe with hanger outside insulation.

C. Trapeze Hangers

01. Parallel runs of piping may be supported on trapeze hangers. Trapeze shall be Unistrut P-1000-3 or Kin Line 211, 371 or 372 equivalent by Elcen or Kindorff. System shall be selected to support five times the weight of thrust applied without failure.

02. All non-insulated steel pipe and insulated steel heating water pipe shall have standard pipe straps at each support.

03. All non-insulated copper pipe, insulated copper domestic hot and re-circulating water piping and insulated copper heating piping shall rest on neoprene sleeves and have standard pipe straps at each support.

04. All cold insulated pipe (steel or copper) shall rest on Fee and Mason Figure 81 or equivalent by unistrut, or Kin-Line, galvanized steel insulation shield or 360o galvanized steel shield. Provide insulation insert of high density polyethylene foam, calcium silicate, high density fiber glass or expanded perlite divided in longitudinal half sections and covered with fire resistant vapor barrier jacket. Provide pipe strap over insulation at each support. High density inserts are not required in plumbing walls behind plumbing fixtures.

05. All steam and high temperature hot water pipe shall have pipe covering protection saddle and shall be supported on Unistrut P-2474-3, pipe rollers or equivalent at each support.

06. See this Section, 3.02, Vibration Isolation for special hangers.

3.04 Control Valve Piping

A. If the control valve size is smaller than the pipe size marked on the drawing, the reduction in size pertains to the valve only. Gate valves, globe valves, and strainers on either side of the automatic valve shall be a minimum of the pipe size marked on the drawings.

3.05 Pump Connections

A. Where the suction or discharge of any pump unit is smaller than the pipe size noted on the drawings, all strainers, valves, flexible connections, expansion joints, etc., shall be a minimum of the pipe size noted on the drawings.

3.06 Access Doors

A. Furnish an access door for each pipe chase for each floor. This includes both toilet plumbing chases and pipe riser chases. Access doors assembly to be minimum size of 16" x 16".

B. Furnish access doors in all non-removable ceilings and in partitions and walls where necessary to maintain access to plumbing cleanouts, shock absorbers, fire dampers, manual dampers, valves and other mechanical devices requiring access. Size these as required for access.

C. Provide all access doors to the General Contractor for installation.

D. Submit shop drawing indicating the locations of all access doors.

3.07 Welding

A. Provide all welding in accordance with the welding procedures of the National Certified Pipe Welding Bureau or other approved procedure conforming to the requirements of the ASME Boiler and Pressure Vessel Code, or the ASA Code for Pressure Piping. Only welders who have been fully qualified under the specified procedure shall be employed.

3.08 Pipe Depths

A. Interior pipe below slabs shall be a minimum of 4 inches below slab and shall

not be in contact with concrete at any point. Minimum exterior cover over water piping, unless otherwise shown or required by code, shall be **5 feet** above the top of the pipe. Area drains shall have maximum cover possible consistent with finished landscape and acceptable flow lines. Gas piping shall have minimum of 3 foot cover with warning tape 12" above pipe. Sanitary waste and storm drain lines shall have 3 foot cover minimum.

3.09 Pipe And Pipe Fittings

A. Full-length pipe in longest lengths possible shall be used. All threads shall be right hand, pipe standard, clean cut, full depth and tapering. Install piping so as to permit complete draining. Provide drains at all low points. All interior soil, waste and condensate lines shall have uniform pitch in the direction of flow of not less than 1/4 inch per foot unless otherwise noted. Ream out all pipe ends, turn on ends and rattle before installing.

3.10 Ducts

A. Construct straight and smooth with neatly finished joints, airtight and free from vibration. Internal ends of slip joints shall be made in the direction of flow. Changes in duct dimensions and shape shall be gradual and uniform. Curved elbows, unless otherwise noted, to have centerline radius of at least 1-1/2 times the duct width. Air turns shall be installed in all abrupt elbows and shall be arranged to permit air to make turns without appreciable turbulence and to remain quiet when the system is in operation. Construction of ducts shall be per the details and recommendations of the latest edition of the ASHRAE handbook and U.M.C. The most stringent requirement governs in conflicts. "Duct mate" joint method may be utilized provided all portions of seam/joint materials are provided by "duct mate" and installed in strict compliance with manufacturer's standards.

3.11 Fire Dampers And Fire/Smoke Dampers

A. Install as required by NFPA pamphlet No. 90A, the International Building Code, International Mechanical Code and as required by local codes. Provide a duct access door to each fire damper and service access when architecture is restrictive. Furnish UL 555S labeled fire and fire/smoke dampers. Refer to architectural drawings for fire resistive ratings of walls, floors, ceilings, etc.

3.12 Flexible Connections

A. Where ductwork or piping is connected to fans, air handling units, pumps, or other equipment that may transmit vibration along the piping or ductwork, connect by means of a flexible connection constructed of fire resistant canvas, flex piping, or other approved method. Connections shall be suitable for pressures developed at the point of installation. Flexible material shall be waterproof for weather exposed ductwork, shall show no visible strain during operating conditions, and shall comply with code requirements. Flex connections for range exhaust systems shall be fire rated.

3.13 Cleaning

A. Intent: It is the intent of this specification to require that all work, including the inside of equipment, be left in a clean condition with all dust, grease, and construction debris removed. Refer also to Division 01 specifications.

B. Piping and connected equipment to be left free of sediments, core sand, grease, etc.

C. Clean all exposed surfaces of piping, ducts and hangers, etc., sufficiently to receive paint. Vacuum ducts as required for debris removal.

D. Air systems shall not be operated without filters. Replace the filters or clean permanent type filters just prior to substantial completion. All air systems with disposable filters shall be furnished with one additional set of boxed filters for owner replacement.

E. Remove and clean all screens, interceptors, strainers, etc., in piping systems just prior to substantial completion.

F. Clean and wipe dry all plumbing fixtures, exposed valves, faucets, and piping, etc. that are exposed just prior to substantial completion. Clean all equipment and fixtures per manufacturer's specifications to avoid scratching finished surfaces. Leave all plumbing fixtures ready to use.

G. Clean interior and exterior of all air handling equipment of all construction debris. Clean exterior of all exposed ductwork just prior to substantial completion.

H. Thoroughly clean all equipment room floors after completion of equipment, pipe and duct cleaning. A condition of final acceptance will be the cleanliness of all exposed systems, equipment, and equipment rooms.

3.14 Expansion Compensation And Seismic Protection

A. Examine piping layout and provide anchors or expansion joints required to adequately protect system.

B. Install flexible pipe connectors on pipes connected to equipment supported by vibration isolation.

C. Accomplish structural work and provide equipment required to control expansion and contraction of piping, loops, pipe offsets, and swing joints, and provide corrugated bellows type expansion joints where required.

D. Provide seismic bracing as required by code for all ducts, piping and equipment.

3.15 Sleeves, Cutting, Patching

A. Major openings in the structure for mechanical work may be shown on the structural drawings; these will be done under the Architectural Division of these Specifications. It is the Contractor's responsibility to set necessary sleeves and boxes for pipe and ducts (not shown on the structural drawings)

before erection of structure. This Contractor is responsible for the correct size and location of all openings including coordination with the other trades. All sleeves shall be large enough to allow for continuous insulation to pass through the sleeve.

B. In mechanical equipment room floors, all pipe sleeves to the Schedule 40 pipe and shall extend 1" above finished floor. In mechanical equipment room floors, all ducts shall have a 4" high concrete curb around duct.

C. Caulk all pipes and ducts leaving equipment rooms between sleeve and duct or pipe, 1" deep on each side of wall, floor, or roof. Caulk bare pipes and ducts with lead wool. Caulk insulated pipes with 1- or 2-part polysulphide caulking compound.

D. In the same manner as described in Paragraph C above, caulk all other pipes and ducts throughout the building which penetrate walls and floors and roofs this includes pipe and ducts to rooftop units.

E. All pipes which may be in view shall be finished with chrome floor, wall and ceiling plates, except in equipment rooms.

3.16 Excavation And Backfill

A. Excavation, trenching, bedding of pipe, placement and cover, backfilling, etc., in conjunction with work under this Division, shall be per requirements of Division 2 and the additional requirements specified herein.

B. Trenches: Slope bottoms uniformly to drain. Trench bottoms to be firm, free from large rocks or boulders, or shall have concrete cradles placed to support piping. Cradles to bear on undisturbed soil.

C. Cast iron: Place on firm trench bottom shaped to accept hubs. Both hubs and pipe shall have uniform firm bearing. Place a minimum of 12 inches of loose rock-free material over pipe.

D. Other piping, conduits, culverts: Place on firm trench bottom and backfill per Division 2, 22, and 23 or embed per manufacturer's recommendations.

E. Expansion: Place pipe fittings and thrust blocks per manufacturer's recommendations and/or project specifications.

F. Excavation: Provide all excavating and backfilling required by the work in this division, all as required by the rules of the State Department of Labor and Equipment. All pipe must be laid on solid earth with bellholes provided for hubs. After pipe is laid in trench, it shall be tested, insulated if specified, and backfilled.

G. Compaction

01. Backfill by hand around the pipe and the first 12" over the top of the pipe. Moisten, backfill, and tamp in 8" layers (maximum) with air motor or gasoline driven tamper to consolidate to 90% of the maximum density obtainable at optimum moisture content. (Puddling will not be allowed).

02. Trenches under road surfacing shall have the upper 6" layer, forming the subgrade for pavement compacted to at least 95% of the maximum density obtainable at optimum moisture content for rigid pavements.

03. Density of backfill shall be determined by the requirements of the A.A.S.H.O. in Pamphlet 57. Standard Method T-99-57.

04. Where requirements of the general conditions are more stringent than the above, the general condition requirements shall be met.

H. Pavement

01. Accomplish cutting of flexible pavement so that the remaining exposed edge of the pavement conforms vertically and horizontally to a straight line. The width of the section of pavement removed shall be of necessary width for the proper laying of pipe, but shall not exceed 36". Waste material resulting from the above operations will be disposed of in suitable waste areas. Repair pavement to satisfaction of the authorities having jurisdiction.

I. Shoring

01. Provide all shoring required to perform the excavation and to protect the project, employees, and public.

J. Surveying

01. Establish all lines, grades and elevations. Stake out the work and furnish all lines, stakes (1" x 2" x 10"), and all hubs or hardwood pegs (1" x 1" x 6") to stake out the lines and structures to line and grade.

K. Maintaining and Protecting Traffic

01. Maintain sufficient barricades, warning signals and lights to protect pedestrian and vehicular traffic. Provide and maintain such detours as may be necessary to keep traffic moving during construction.

L. Surface Drainage and Ground Water

01. Surface drainage shall be diverted away from open excavation and trenching before commencement of work at the location. Surface water on ground water seepage, which enters or accumulates in the trenches, shall be removed by pumping or subdraining, and the subgrade or pipe bed restored to original bearing value and conditions.

M. Any settling of backfilled trenches which may occur during the warranty period shall be repaired without expense to the Owner, including the complete restoration of all damaged property.

3.17 Foundations And Supports

A. Furnish and install as indicated on the plans and/or as may be necessary for the proper installation of all equipment furnished under this Division, all foundations, bases and supports. Contractor shall be responsible for their

correct location and sizes to fit all equipment. Shim and grout between the equipment and its base to align and level. Bolt equipment inertia bases, vibration isolators, and supports to prevent relative movement.

B. Furnish all hangers, anchors, sway bracing, guides, etc., for the various piping and duct systems as required for their proper installation.

3.18 Fire Stopping

A. Install firestopping materials in accordance with their UL and ASTM tested methods.

B. Coordinate required annular space with size of pipe and sleeve.

C. Requirements for specific systems:

01. Cold piping: Includes chilled water, domestic water, storm water and refrigerant: Insulation and vapor barrier shall be continued through wall and firestopping for “insulated piping” shall be provided.

02. Hot piping to 250°F includes domestic hot water, steam to 15 psig and heating hot water: The Contractor has the option of continuing the insulation through the penetration and providing firestopping for “insulated piping”, or stopping the insulation on either side of the penetration and using firestopping for uninsulated piping”.

03. High temperature piping, over 250°F or over 15 psig steam: Contractor shall stop insulation and provide firestopping for “high temperature piping”.

3.19 Heat Trace

A. Heat trace cable shall be installed by a licensed electrician.

B. Apply the heat trace cable on the pipe after pressure testing.

01. Do not spiral wrap on pipe.

02. Make one wrap at valves.

03. Secure to pipe with methods approved by manufacturer.

C. Apply “Electrically Traced” signs on resistance 20 mega ohms.

D. Test with a 1000 VDC megger minimum resistance 20 mega ohms.

E. Heat trace shall be sized as follows, based on -20°F ambient, to maintain 40°F pipe temperature:

PIPE SIZE	1" INSULATION	2" INSULATION
Less than 2"	3 w/ft	3 w/ft
2", 2-1/2", 3"	5 w/ft	3 w/ft

4", 5", 6"	8 w/ft	5 w/ft
8", 10", 12 "	8 w/ft ea. (2 cable circuits)	8 w/ft

END OF SECTION

SECTION 22 13 13 SANITARY WASTE AND VENT PIPING

PART 1 - GENERAL

1.01 Summary

A. Section Includes:

01. Pipe, tube, and fittings.

B. Related Section:

01. Section 22 13 13 "Facility Sanitary Sewers" for sanitary sewerage piping and structures outside the building.

1.02 Action Submittals

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

1.03 Informational Submittals

A. Field quality-control reports.

1.04 Quality Assurance

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

B. Comply with NSF/ANSI 14, "Plastics Piping Systems Components and Related Materials," for plastic piping components. Include marking with "NSF-dwv" for plastic drain, waste, and vent piping and "NSF-sewer" for plastic sewer piping.

PART 2 - PRODUCTS

2.01 Earth Moving

A. Comply with requirements for excavating, trenching, and backfilling specified in Section 31 20 00 "Earth Moving."

2.02 Piping Installation

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.

B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

E. Install piping at indicated slopes.

F. Install piping free of sags and bends.

G. Install fittings for changes in direction and branch connections.

H. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical. Use long-turn, double Y-branch and 1/8-bend fittings if two fixtures are installed back to back or side by side with common drain pipe. Straight tees, elbows, and crosses may be used on vent lines. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.

I. Lay buried building drainage piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.

J. Install soil and waste drainage and vent piping at the following minimum slopes unless otherwise indicated:

   01. Building Sanitary Drain: 2 percent downward in direction of flow for piping NPS 3 and smaller; 1 percent downward in direction of flow for piping NPS 4 and larger.

   02. Horizontal Sanitary Drainage Piping: 2 percent downward in direction of flow.

   03. Vent Piping: 1 percent down toward vertical fixture vent or toward vent stack.

K. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."

L. Install aboveground copper tubing according to CDA's "Copper Tube Handbook."

M. Install aboveground ABS piping according to ASTM D 2661.

N. Install aboveground PVC piping according to ASTM D 2665.

O. Install underground ABS and PVC piping according to ASTM D 2321.

P. Plumbing Specialties:

01. Install backwater valves in sanitary waste gravity-flow piping. Comply with requirements for backwater valves specified in Section 22 13 19 "Sanitary Waste Piping Specialties."

02. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers in sanitary drainage gravity-flow piping. Comply with requirements for cleanouts specified in Section 22 13 19 "Sanitary Waste Piping Specialties."

03. Install drains in sanitary drainage gravity-flow piping. Comply with requirements for drains specified in Section 22 13 19 "Sanitary Waste Piping Specialties."

Q. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

R. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Division 22.

S. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Division 22.

T. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Division 22.

2.03 Joint Construction

A. Join hubless, cast-iron soil piping according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-piping coupling joints.

B. Join copper tube and fittings with soldered joints according to ASTM B 828. Use ASTM B 813, water-flushable, lead-free flux and ASTM B 32, lead-free-alloy solder.

C. Flanged Joints: Align bolt holes. Select appropriate gasket material, size, type, and thickness. Install gasket concentrically positioned. Use suitable lubricants on bolt threads. Torque bolts in cross pattern.

D. Plastic, Nonpressure-Piping, Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:

01. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.

02. ABS Piping: Join according to ASTM D 2235 and ASTM D 2661 Appendixes.

03. PVC Piping: Join according to ASTM D 2855 and ASTM D 2665 Appendixes.

2.04 Specialty Pipe Fitting Installation

A. Transition Couplings:

01. Install transition couplings at joints of piping with small differences in OD's.

02. In Drainage Piping: Shielded, nonpressure transition couplings.

2.05 Valve Installation

A. Backwater Valves: Install backwater valves in piping subject to backflow.

01. Horizontal Piping: Horizontal backwater valves. Use normally closed type unless otherwise indicated.

02. Floor Drains: Drain outlet backwater valves unless drain has integral backwater valve.

03. Install backwater valves in accessible locations.

04. Comply with requirements for backwater valve specified in Section 22 13 19 "Sanitary Waste Piping Specialties."

2.06 Hanger And Support Installation

A. Comply with requirements for seismic-restraint devices specified in Section 22 05 48 "Vibration and Seismic Controls for Plumbing Piping and Equipment."

B. Comply with requirements for pipe hanger and support devices and installation specified in Division 22.

01. Install carbon-steel pipe hangers for horizontal piping in noncorrosive environments.

02. Install stainless-steel pipe hangers for horizontal piping in corrosive environments.

03. Install carbon-steel pipe support clamps for vertical piping in noncorrosive environments.

04. Install stainless-steel pipe support clamps for vertical piping in corrosive environments.

05. Vertical Piping: MSS Type 8 or Type 42, clamps.

06. Install individual, straight, horizontal piping runs:

a. 100 Feet (30 m) and Less: MSS Type 1, adjustable, steel clevis hangers.
b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
c. Longer Than 100 Feet if Indicated: MSS Type 49, spring cushion rolls.

07. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.

08. Base of Vertical Piping: MSS Type 52, spring hangers.

C. Support horizontal piping and tubing within 12 inches of each fitting, valve, and coupling.

D. Support vertical piping and tubing at base and at each floor.

E. Rod diameter may be reduced one size for double-rod hangers, with 3/8-inch minimum rods.

F. Install hangers for cast-iron soil piping with the following maximum horizontal spacing and minimum rod diameters:

01. NPS 1-1/2 and NPS 2 (DN 40 and DN 50): 60 inches (1500 mm) with 3/8-inch (10-mm) rod.

02. NPS 3 (DN 80): 60 inches (1500 mm) with 1/2-inch (13-mm) rod.

03. NPS 4 and NPS 5: 60 inches with 5/8-inch rod.

04. NPS 6 and NPS 8: 60 inches with 3/4-inch rod.

05. Spacing for 10-foot lengths may be increased to 10 feet. Spacing for fittings is limited to 60 inches.

G. Install supports for vertical cast-iron soil piping every 15 feet.

H. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:

01. NPS 1-1/4: 72 inches with 3/8-inch rod.

02. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.

03. NPS 2-1/2: 108 inches with 1/2-inch rod.

04. NPS 3 and NPS 5: 10 feet with 1/2-inch rod.

05. NPS 6: 10 feet with 5/8-inch rod.

06. NPS 8: 10 feet with 3/4-inch rod.

I. Install supports for vertical copper tubing every 10 feet.

J. Install hangers for ABS and PVC piping with the following maximum horizontal spacing and minimum rod diameters:

01. NPS 1-1/2 and NPS 2: 48 inches with 3/8-inch rod.

02. NPS 3: 48 inches with 1/2-inch rod.

03. NPS 4 and NPS 5: 48 inches with 5/8-inch rod.

04. NPS 6 and NPS 8: 48 inches with 3/4-inch rod.

K. Install supports for vertical ABS and PVC piping every 48 inches.

L. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

2.07 Connections

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.

C. Connect drainage and vent piping to the following:

01. Plumbing Fixtures: Connect drainage piping in sizes indicated, but not smaller than required by plumbing code.

02. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.

03. Plumbing Specialties: Connect drainage and vent piping in sizes indicated, but not smaller than required by plumbing code.

04. Install test tees (wall cleanouts) in conductors near floor and floor cleanouts with cover flush with floor.

05. Install horizontal backwater valves with cleanout cover flush with floor.

06. Comply with requirements for backwater valves, cleanouts and drains specified in Section 22 13 19 "Sanitary Waste Piping Specialties."

07. Equipment: Connect drainage piping as indicated. Provide shutoff valve if indicated and union for each connection. Use flanges instead of unions for connections NPS 2-1/2 and larger.

D. Where installing piping adjacent to equipment, allow space for service and maintenance of equipment.

E. Make connections according to the following unless otherwise indicated:

01. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.

02. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.

2.08 Identification

A. Identify exposed sanitary waste and vent piping. Comply with requirements for identification specified in Division 22.

2.09 Field Quality Control

A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.

01. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.

02. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.

B. Re-inspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.

C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

D. Test sanitary drainage and vent piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:

01. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.

02. Leave uncovered and unconcealed new, altered, extended, or replaced drainage and vent piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.

03. Roughing-in Plumbing Test Procedure: Test drainage and vent piping except outside leaders on completion of roughing-in. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water. From 15 minutes before inspection starts to completion of inspection, water level must not drop. Inspect joints for leaks.

04. Finished Plumbing Test Procedure: After plumbing fixtures have been set and traps filled with water, test connections and prove they are gastight and watertight. Plug vent-stack openings on roof and building drains where they leave building. Introduce air into piping system equal to pressure of 1-inch wg. Use U-tube or manometer inserted in trap of water closet to measure this pressure. Air pressure must remain constant without introducing additional air throughout period of inspection. Inspect plumbing fixture connections for gas and water leaks.

05. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.

06. Prepare reports for tests and required corrective action.

2.10 Cleaning And Protection

A. Clean interior of piping. Remove dirt and debris as work progresses.

B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.

C. Place plugs in ends of uncompleted piping at end of day and when work stops.

D. Exposed ABS and PVC Piping: Protect plumbing vents exposed to sunlight with two coats of water-based latex paint.

2.11 Piping Schedule

A. Flanges and unions may be used on aboveground pressure piping unless otherwise indicated.

B. Aboveground, soil and waste piping NPS 4 and smaller shall be any of the following:

01. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.

02. Hubless, cast-iron soil pipe and fittings; CISPI hubless-piping couplings; and coupled joints.

C. Aboveground, vent piping NPS 4 and smaller shall be any of the following:

01. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.

02. Hubless, cast-iron soil pipe and fittings; CISPI hubless-piping couplings; and coupled joints.

D. Underground, soil, waste, and vent piping NPS 4 and smaller shall be any of the following:

01. Service class, cast-iron soil piping; gaskets; and gasketed joints.

02. Hubless, cast-iron soil pipe and fittings; CISPI hubless-piping couplings; and coupled joints.

03. Solid wall ABS pipe, ABS socket fittings, and solvent-cemented joints.

04. Solid wall PVC pipe, PVC socket fittings, and solvent-cemented joints.

END OF SECTION

SECTION 22 40 00 PLUMBING FIXTURES

PART 1 - GENERAL

1.01 Related Documents

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

1.02 Summary

B. This Section includes the following conventional plumbing fixtures and related components:

01. Fixture supports.

02. Area/ Trench drains.

1.03 Definitions

C. ABS: Acrylonitrile-butadiene-styrene plastic.

D. Accessible Fixture: Plumbing fixture that can be approached, entered, and used by people with disabilities.

E. Cast Polymer: Cast-filled-polymer-plastic material. This material includes cultured-marble and solid-surface materials.

F. Cultured Marble: Cast-filled-polymer-plastic material with surface coating.

G. Fitting: Device that controls the flow of water into or out of the plumbing fixture. Fittings specified in this Section include supplies and stops, faucets and spouts, shower heads and tub spout, drains and tailpieces, and traps and waste pipes. Piping and general-duty valves are included where indicated.

H. FRP: Fiberglass-reinforced plastic.

I. PMMA: Polymethyl methacrylate (acrylic) plastic.

J. PVC: Polyvinyl chloride plastic.

K. Solid Surface: Nonporous, homogeneous, cast-polymer-plastic material with heat-, impact-, scratch-, and stain-resistance qualities.

1.04 Submittals

L. Product Data: For each type of plumbing fixture indicated. Include selected fixture and trim, fittings, accessories, appliances, appurtenances, equipment, and supports. Indicate materials and finishes, dimensions, construction details, and flow-control rates.

M. Operation and Maintenance Data: For plumbing fixtures to include in emergency, operation, and maintenance manuals.

N. Warranty: Special warranty specified in this Section.

1.05 Quality Assurance

O. Source Limitations: Obtain plumbing fixtures, and other components of each category through one source from a single manufacturer.

01. Exception: If fixtures, or other components are not available from a single manufacturer, obtain similar products from other manufacturers specified for that category.

P. Regulatory Requirements: Comply with requirements in ICC A117.1, "Accessible and Usable Buildings and Facilities"; Public Law 90-480, "Architectural Barriers Act"; and Public Law 101-336, "Americans with Disabilities Act"; for plumbing fixtures for people with disabilities.

Q. Comply with the following applicable standards and other requirements specified for miscellaneous components:

01. Disposers: ASSE 1008 and UL 430.

02. Flexible Water Connectors: ASME A112.18.6.

03. Floor Drains: ASME A112.6.3.

04. Grab Bars: ASTM F 446.

05. Hose-Coupling Threads: ASME B1.20.7.

06. Off-Floor Fixture Supports: ASME A112.6.1M.

07. Pipe Threads: ASME B1.20.1.

08. Plastic Toilet Seats: ANSI Z124.5.

09. Supply and Drain Protective Shielding Guards: ICC A117.1.

PART 2 - PRODUCTS

1.01 Trench drain.

PART 3 EXECUTION

3.01 Examination

A. Examine roughing-in sanitary drainage and vent piping systems to verify actual locations of piping connections before plumbing fixture installation.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 Connections

A. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.

3.03 Field Quality Control

A. Verify that installed plumbing fixtures are categories and types specified for locations where installed.

B. Check that plumbing fixtures are complete with trim, fittings, and other specified components.

C. Inspect installed plumbing fixtures for damage. Replace damaged fixtures and components.

3.04 Cleaning

A. Clean fixtures with manufacturers' recommended cleaning methods and materials. Do the following:

01. Remove sediment and debris and reinstall strainers and spouts.

02. Remove sediment and debris from drains.

B. After completing installation of exposed, factory-finished fixtures, faucets, and repair damaged finishes.

3.05 Protection

A. Provide protective covering for installed fixtures and fittings.

B. Do not allow use of plumbing fixtures for temporary facilities unless approved in writing by Owner.

END OF SECTION

SECTION 23 05 93 TESTING, ADJUSTING, AND BALANCING

PART 1 - **GENERAL**

1.01 Summary

A. This Section includes TAB to produce design objectives for the following:

01. Air Systems:

a. Constant-volume air exhaust systems.

b. Infrared heater systems.

02. Verifying that automatic control devices are functioning properly.

03. Reporting results of activities and procedures specified in this Section.

1.02 Definitions

A. Adjust: To regulate air patterns at the exhaust equipment, such as to reduce fan speed or adjust a damper.

B. Balance: To proportion flows within the distribution system, including submains, branches, and terminals, according to indicated quantities.

C. Barrier or Boundary: Construction, either vertical or horizontal, such as walls, floors, and ceilings that are designed and constructed to restrict the movement of airflow, smoke, odors, and other pollutants.

D. Draft: A current of air, when referring to localized effect caused by one or more factors of high air velocity, low ambient temperature, or direction of airflow, whereby more heat is withdrawn from a person's skin than is normally dissipated.

E. NC: Noise criteria.

F. Procedure: An approach to and execution of a sequence of work operations to yield repeatable results.

G. RC: Room criteria.

H. Report Forms: Test data sheets for recording test data in logical order.

I. Smoke-Control System: An engineered system that uses fans to produce airflow and pressure differences across barriers to limit smoke movement.

J. Static Head: The pressure due to the weight of the fluid above the point of measurement. In a closed system, static head is equal on both sides of the pump.

K. System Effect: A phenomenon that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.

L. System Effect Factors: Allowances used to calculate a reduction of the performance ratings of a fan when installed under conditions different from those presented when the fan was performance tested.

M. TAB: Testing, adjusting, and balancing.

N. Terminal: A point where the controlled medium, such as fluid or energy, enters or leaves the distribution system.

O. Test: A procedure to determine quantitative performance of systems or equipment.

P. Testing, Adjusting, and Balancing (TAB) Firm: The entity responsible for performing and reporting TAB procedures.

1.03 Submittals

A. Qualification Data: Within 15 days from Contractor's Notice to Proceed, submit 4 copies of evidence that TAB firm and this Project's TAB team members meet the qualifications specified in "Quality Assurance" Article.

B. Contract Documents Examination Report: Within 30 days from Contractor's Notice to Proceed, submit 4 copies of the Contract Documents review report as specified in Part 3.

C. Strategies and Procedures Plan: Within 90 days from Contractor's Notice to Proceed, submit 4 copies of TAB strategies and step-by-step procedures as specified in Part 3 "Preparation" Article. Include a complete set of report forms intended for use on this Project.

D. Certified TAB Reports: Submit two copies of reports prepared, as specified in this Section, on approved forms certified by TAB firm.

E. Sample Report Forms: Submit two sets of sample TAB report forms.

F. Warranties specified in this Section.

G. Progress Reports – Report in writing to Engineer and Project Manager Deficiencies or problems with air or water systems that affect balance work. Include items that affect system performance such as broken thermostats, damaged duct work, excessive noise, etc.

H. Full Scale Drawings – Submit one set of drawings with all labeling and identification. Obtain as-built drawings from Project Manager.

1.04 Quality Assurance

A. TAB Firm Qualifications: The TAB firm shall be certified by NEBB or ABBC.

B. TAB Conference: Meet with Owner's and Architect's representatives on approval of TAB strategies and procedures plan to develop a mutual understanding of the details. Ensure the participation of TAB team members,

equipment manufacturers' authorized service representatives, HVAC controls installers, commissioning agent, and other support personnel. Provide seven days' advance notice of scheduled meeting time and location.

01. Agenda Items: Include at least the following:

a. Submittal distribution requirements.

b. The Contract Documents examination report.

c. TAB plan.

d. Work schedule and Project-site access requirements.

e. Coordination and cooperation of trades and subcontractors.

f. Coordination of documentation and communication flow.

C. Certification of TAB Reports: Certify TAB field data reports. This certification includes the following:

01. Review field data reports to validate accuracy of data and to prepare certified TAB reports.

02. Certify that TAB team complied with approved TAB plan and the procedures specified and referenced in this Specification.

D. TAB Report Forms: Use standard forms from NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems" and/or SMACNA's "HVAC Systems - Testing, Adjusting, and Balancing."

E. Instrumentation Type, Quantity, and Accuracy: As described in NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems," Section II, "Required Instrumentation for NEBB Certification."

F. Instrumentation Calibration: Calibrate instruments at least every six months or more frequently if required by instrument manufacturer.

01. Keep an updated record of instrument calibration that indicates date of calibration and the name of party performing instrument calibration.

1.05 Acceptable Tab Contractors

A. N-Demand Test and Balance, LLC.

B. Energy Balance and Integration, LLC.

C. Design Balance, LLC.

1.06 Coordination

A. Coordinate the efforts of factory-authorized service representatives for systems and equipment, HVAC controls installers, and other mechanics to operate HVAC systems and equipment to support and assist TAB activities.

B. Notice: Provide seven days' advance notice for each test. Include scheduled test dates and times.

C. Perform TAB after leakage and pressure tests on air distribution systems have been satisfactorily completed.

1.07 Warranty

A. National Project Performance Guarantee: Provide a guarantee on AABC's "National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems" forms stating that AABC will assist in completing requirements of the Contract Documents if TAB firm fails to comply with the Contract Documents. Guarantee includes the following provisions:

B. Special Guarantee: Provide a guarantee on NEBB forms stating that NEBB will assist in completing requirements of the Contract Documents if TAB firm fails to comply with the Contract Documents. Guarantee shall include the following provisions:

01. The certified TAB firm has tested and balanced systems according to the Contract Documents.

02. Systems are balanced to optimum performance capabilities within design and installation limits.

PART 2 - **PRODUCTS (Not Applicable)**

PART 3 - **EXECUTION**

3.01 Examination

A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper TAB of systems and equipment.

01. Contract Documents are defined in the General and Supplementary Conditions of Contract.

02. Verify that balancing devices, gage cocks, manual volume dampers, are required by the Contract Documents. Verify that quantities and locations of these balancing devices are accessible and appropriate for effective balancing and for efficient system and equipment operation.

B. Examine approved submittal data of HVAC systems and equipment.

C. Examine Project Record Documents described in Division 1 Section "Project Record Documents."

D. Examine design data, including exhaust system descriptions, statements of design assumptions for environmental conditions and systems' output, and statements of philosophies and assumptions about HVAC system and equipment controls.

E. Examine equipment performance data including fan curves. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system. Calculate system effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from those presented when the equipment was performance tested at the factory. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," Sections 7 through 10; or in SMACNA's "HVAC Systems--Duct Design," Sections 5 and 6. Compare this data with the design data and installed conditions.

F. Examine system and equipment installations to verify that they are complete and that testing, cleaning, adjusting, and commissioning specified in individual Sections have been performed.

G. Examine system and equipment test reports.

H. Examine systems for functional deficiencies that cannot be corrected by adjusting and balancing.

I. Examine HVAC equipment to ensure that clean filters have been installed, bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.

J. Examine equipment for installation and for properly operating safety interlocks and controls.

   01. Dampers, valves, and other controlled devices are operated by the intended controller.

   02. Dampers and valves are in the position indicated by the controller.

   03. Integrity of valves and dampers for free and full operation and for tightness of fully closed and fully open positions.

   04. .

   05. Thermostats are located to avoid adverse effects of sunlight, drafts, and cold walls.

K. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.02 Preparation

A. Prepare a TAB plan that includes strategies and step-by-step procedures, including but not limited to:

01. List of preliminary checks to be performed at the job site such as confirmation that manual volume dampers are present, filter are installed, frequency drive units operational, location of control sensors, etc.

02. Identify how air outlets will be measured and type of instruments to be used.

03. Position of doors and windows during balance, i.e. some labs should be balanced with doors shut.

04. Operating static pressures for terminal devices and pressure sensors for controlled devices.

05. Initial test procedures for preliminary balance.

06. Final test procedures.

07. List of deficiencies in mechanical systems that will hinder the balance work such as missing leaky dampers, incomplete systems inadequate fans, etc.

08. Identification of equipment to be used on project and proof of last calibration on each piece.

B. Complete system readiness checks and prepare system readiness reports. Verify the following:

01. Permanent electrical power wiring is complete.

02. Automatic temperature-control systems are operational.

03. Balance, smoke, and fire dampers are open.

04. Windows and doors can be closed so indicated conditions for system operations can be met.

3.03 General Procedures for Testing And Balancing

A. Perform testing and balancing procedures on each system according to the procedures contained in AABC's "National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems" and this Section.

01. Comply with requirements in ASHRAE 62.1-2004, Section 7.2.2, "Air Balancing."

B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary to allow adequate performance of procedures. After testing and balancing, close probe holes and patch insulation with new materials identical to those removed. Restore vapor barrier and finish according to insulation Specifications for this Project.

C. Mark equipment and balancing device settings with spray paint or other suitable, permanent identification material, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, to show final settings.

D. Take and report testing and balancing measurements in inch-pound (IP) units.

3.04 General Procedures for Balancing Air Systems

A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.

B. Prepare schematic diagrams of systems' "as-built" duct layouts.

C. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.

D. Verify that motor starters are equipped with properly sized thermal protection.

E. Check dampers for proper position to achieve desired airflow path.

F. Check for airflow blockages.

G. Check for proper sealing of air-handling unit components.

H. Check for proper sealing of air duct system.

I. Fixed pitch sheaves shall be installed for final speed settings on all fans regardless of size sheaves and belts shall be compatible. Report discrepancies in writing.

3.05 Procedures For Constant-Volume Air Systems

A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.

01. Measure fan static pressures to determine actual static pressure as follows:

a. Measure outlet static pressure as far downstream from the fan as practicable and upstream from restrictions in ducts such as elbows and transitions.

b. Measure static pressure directly at the fan outlet or through the flexible connection.

c. Measure inlet static pressure of single-inlet fans in the inlet duct as near the fan as possible, upstream from flexible connection and downstream from duct restrictions.

d. Measure inlet static pressure of double-inlet fans through the wall of the plenum that houses the fan.

02. Compare design data with installed conditions to determine variations in design static pressures versus actual static pressures. Compare actual system effect factors with calculated system effect factors to identify where variations occur. Recommend corrective action to align design and actual conditions.

03. Obtain approval from Architect for adjustment of fan speed higher or lower than indicated speed. Make required adjustments to pulley sizes, motor sizes, and electrical connections to accommodate fan-speed changes.

04. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload will occur. Measure amperage in full cooling, full heating, economizer, and any other operating modes to determine the maximum required brake horsepower.

3.6 Tolerances

A. Set HVAC system airflow rates within the following tolerances:

01. Exhaust Fans and Equipment with Fans: Plus 5 to plus 10 percent.

3.7 Reporting

A. Initial Construction-Phase Report: Based on examination of the Contract Documents as specified in "Examination" Article, prepare a report on the adequacy of design for systems' balancing devices. Recommend changes and additions to systems' balancing devices to facilitate proper performance measuring and balancing. Recommend changes and additions to HVAC systems and general construction to allow access for performance measuring and balancing devices.

B. Status Reports: As Work progresses, prepare reports to describe completed procedures, procedures in progress, and scheduled procedures. Include a list of deficiencies and problems found in systems being tested and balanced. Prepare a separate report for each system and each building floor for systems serving multiple floors.

3.8 Final Report

A. General: Typewritten, or computer printout in letter-quality font, on standard bond paper, in three-ring binder, tabulated and divided into sections by tested and balanced systems.

B. Include a certification sheet in front of binder signed and sealed by the certified testing and balancing engineer.

01. Include a list of instruments used for procedures, along with proof of calibration.

C. Final Report Contents: In addition to certified field report data, include the following:

01. Fan curves.

02. Manufacturers' test data.

03. Field test reports prepared by system and equipment installers.

04. Other information relative to equipment performance, but do not include Shop Drawings and Product Data.

D. General Report Data: In addition to form titles and entries, include the following data in the final report, as applicable:

01. Title page.

02. Name and address of TAB firm.

03. Project name.

04. Project location.

05. Architect's name and address.

06. Engineer's name and address.

07. Contractor's name and address.

08. Report date.

09. Signature of TAB firm who certifies the report.

010. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.

011. Summary of contents including the following:

a. Indicated versus final performance.

b. Notable characteristics of systems.

c. Description of system operation sequence if it varies from the Contract Documents.

012. Nomenclature sheets for each item of equipment.

013. Data for terminal units, including manufacturer, type size, and fittings.

014. Notes to explain why certain final data in the body of reports varies from indicated values.

015. Test conditions for fans and pump performance forms including the following:

a. Settings for exhaust-air dampers.

b. Variable Frequency Drive settings for variable-air-volume systems.

c. Settings for supply-air, static-pressure controller.

d. Other system operating conditions that affect performance.

E. Fan Test Reports: For exhaust fans, include the following:

01. Fan Data:

a. System identification.

b. Location.

c. Make and type.

d. Model number and size.

e. Manufacturer's serial number.

f. Arrangement and class.

g. Sheave make, size in inches, and bore.

h. Sheave dimensions, center-to-center, and amount of adjustments in inches.

02. Motor Data:

a. Make and frame type and size.

b. Horsepower and rpm.

c. Volts, phase, and hertz.

d. Full-load amperage and service factor.

e. Sheave make, size in inches, and bore.

f. Sheave dimensions, center-to-center, and amount of adjustments in inches.

g. Number of belts, make, and size.

03. Test Data (Indicated and Actual Values):

a. Total airflow rate in cfm.
b. Total system static pressure in inches wg.
c. Fan rpm.
d. Discharge static pressure in inches wg.
e. Suction static pressure in inches wg.

04. Test Data (Indicated and Actual Values):
a. Airflow rate in cfm.
b. Entering-water temperature in deg F.
c. Leaving-water temperature in deg F.
d. Water pressure drop in feet of head or psig.
e. Entering-air temperature in deg F.
f. Leaving-air temperature in deg F.

3.9 Inspections

A. Initial Inspection:

01. After testing and balancing are complete, operate each system and randomly check measurements to verify that the system is operating according to the final test and balance readings documented in the Final Report.

02. Randomly check the following for each system:
a. Measure airflow of at least 10 percent of air outlets.
b. Measure water flow of at least 5 percent of terminals.
c. Measure room temperature at each thermostat/temperature sensor. Compare the reading to the set point.
d. Measure space pressure of at least 10 percent of locations.
e. Verify that balancing devices are marked with final balance position.
f. Note deviations to the Contract Documents in the Final Report.

B. Final Inspection:

01. After initial inspection is complete and evidence by random checks verifies that testing and balancing are complete and accurately documented in the final report, request that a final inspection be made by Architect.

02. TAB firm test and balance engineer shall conduct the inspection in the presence of Commissioning Agent.

03. If the rechecks yield measurements that differ from the measurements documented in the final report by more than the tolerances allowed, the measurements shall be noted as "FAILED."

04. If the number of "FAILED" measurements is greater than 10 percent of the total measurements checked during the final inspection, the testing and balancing shall be considered incomplete and shall be rejected.

05. TAB firm shall recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes and resubmit the final report.

06. Request a second final inspection. If the second final inspection also fails, Owner shall contract the services of another TAB firm to complete the testing and balancing in accordance with the Contract Documents and deduct the cost of the services from the final payment.

3.10 Additional Tests

A. Within 90 days of completing TAB, perform additional testing and balancing to verify that balanced conditions are being maintained throughout and to correct unusual conditions.

B. Seasonal Periods: If initial TAB procedures were not performed during near-peak summer and winter conditions, perform additional testing, inspecting, and adjusting during near-peak summer and winter conditions.

END OF SECTION

DIVISION 26 – ELECTRICAL

SECTION 26 00 51 COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

01. Electrical equipment coordination and installation.

02. Sleeves for raceways and cables.

03. Sleeve seals.

04. Grout.

05. Common electrical installation requirements.

1.02 DEFINITIONS

A. EPDM: Ethylene-propylene-diene terpolymer rubber.

1.03 COORDINATION

A. Coordinate arrangement, mounting, and support of electrical equipment:

01. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.

02. To provide for ease of disconnecting the equipment with minimum interference to other installations.

03. To allow right of way for piping and conduit installed at required slope.

04. So connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.

B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

C. Coordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed. Access doors and panels are specified in Division 8 Section "Access Doors and Frames."

D. Coordinate sleeve selection and application with selection and application of fire stopping specified in Division 7 Section "Through-Penetration Firestop Systems."

PART 2 - PRODUCTS

2.01 SLEEVES FOR RACEWAYS AND CABLES

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral water stop, unless otherwise indicated.

C. Sleeves for Rectangular Openings: Galvanized sheet steel.

01. Minimum Metal Thickness:

a. For sleeve cross-section rectangle perimeter less than 50 inches and no side more than 16 inches, thickness shall be 0.052 inch.

b. For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches and 1 or more sides equal to, or more than, 16 inches, thickness shall be 0.138 inch.

2.02 SLEEVE SEALS

A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.

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

a. Advance Products & Systems, Inc.

b. Calpico, Inc.

c. Metraflex Co.

d. Pipeline Seal and Insulator, Inc.

02. Sealing Elements: EPDM NBR interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.

03. Pressure Plates: Plastic. Include two for each sealing element.

04. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.03 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, non-staining, mixed with water to consistency suitable for application and a 30-minute working time.

PART 3 - EXECUTION

3.01 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

A. Comply with NECA 1.

B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.

C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.

D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.

E. Right of Way: Give to piping systems installed at a required slope.

3.02 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Electrical penetrations occur when raceways, cables, wireways, cable trays, or busways penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.

B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.

C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.

E. Cut sleeves to length for mounting flush with both surfaces of walls.

F. Extend sleeves installed in floors 2 inches above finished floor level.

G. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway or cable, unless indicated otherwise.

H. Seal space outside of sleeves with grout for penetrations of concrete and masonry

01. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.

I. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Division 7 Section "Joint Sealants."

J. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway and cable penetrations. Install sleeves and seal raceway and cable penetration sleeves with firestop materials. Comply with requirements in Division 7 Section "Through-Penetration Firestop Systems."

K. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.

L. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

M. Underground, Exterior-Wall Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch annular clear space between raceway or cable and sleeve for installing mechanical sleeve seals.

3.03 SLEEVE-SEAL INSTALLATION

A. Install to seal exterior wall penetrations.

B. Use type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.04 FIRESTOPPING

A. Apply fire stopping to penetrations of fire-rated floor and wall assemblies for electrical installations to restore original fire-resistance rating of assembly. Fire stopping materials and installation requirements are specified in Division 7 Section "Through-Penetration Firestop Systems."

END OF SECTION

DIVISION 26 – ELECTRICAL

SECTION 26 05 29 HANGER AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes the following:

01. Adjust list below to suit Project.

02. Hangers and supports for electrical equipment and systems.

03. Construction requirements for concrete bases.

1.03 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. IMC: Intermediate metal conduit.

C. RMC: Rigid metal conduit.

1.04 COORDINATION

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 3.

PART 2 - PRODUCTS

2.01 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.

01. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Allied Tube & Conduit.

b. Cooper B-Line, Inc.; a division of Cooper Industries.

c. ERICO International Corporation.

d. GS Metals Corp.

e. Thomas & Betts Corporation.

f. Unistrut; Tyco International, Ltd.

g. Wesanco, Inc.

02. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.

03. Channel Dimensions: Selected for applicable load criteria.

B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.

C. Conduit and Cable Support Devices: Steel clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.

E. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

F. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

01. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.

a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1) Hilti Inc.

2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.

3) MKT Fastening, LLC.

4) Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.

02. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened Portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.

a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1) Cooper B-Line, Inc.; a division of Cooper Industries.

2) Empire Tool and Manufacturing Co., Inc.

3) Hilti Inc.

4) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.

5) MKT Fastening, LLC.

03. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.

04. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.

05. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.

06. Toggle Bolts: All-steel springhead type.

07. Hanger Rods: Threaded steel.

2.02 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

B. Materials: Comply with requirements in Section 055000 "Metal Fabrications" for steel shapes and plates.

PART 3 - EXECUTION

3.01 APPLICATION

A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.

3.02 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.

B. Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC, RMC, EMT, IMC, and RMC may be supported by openings through structure members, as permitted in NFPA 70.

C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

01. To Wood: Fasten with lag screws or through bolts.

02. To New Concrete: Bolt to concrete inserts.

03. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
04. To Existing Concrete: Expansion anchor fasteners.
05. To Steel: Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69.
06. To Light Steel: Sheet metal screws.
07. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.

E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

END OF SECTION

DIVISION 26 – ELECTRICAL

SECTION 26 05 33 RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes raceways, fittings, boxes, enclosures and cabinets for electrical wiring.

1.02 DEFINITIONS

A. EMT: Electrical metal tubing.

B. ENT: Electrical nonmetallic tubing.

C. FMC: Flexible metal conduit.

D. LFMC: Liquidtight flexible metal conduit.

E. RNC: Rigid nonmetallic conduit.

1.03 SUBMITTALS

A. Shop Drawings: For the following raceway components. Include plans, elevations, sections, detail and attachments to other work.

01. Custom enclosures and cabinets.

PART 2 - PRODUCTS

2.01 METAL CONDUIT AND TUBING

A. Rigid Steel Conduit: ANSI C80.1.

B. Aluminum Rigid Conduit: ANSI C80.5.

C. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit.

01. Comply with NEMA RN 1.

02. Coating Thickness: 0.040 inch, minimum.

D. EMT: Comply with ANSI C80.3.

E. FMC: Zinc-coated steel.

F. LFMC: Flexible steel conduit with PVC jacket.

G. Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.

01. Fittings for EMT: Die-cast, set-screw or compression Gland type.

02. Coating for Fittings for PVC-Coated Conduit: Minimum thickness, 0.040 inch, with overlapping sleeves protecting threaded joints.

H. Joint Compound for Rigid Steel Conduit or IMC: Listed for use in cable

connector assemblies and compounded for use to lubricate and protect threaded raceway joints from corrosion and enhance their conductivity.

2.02 NONMETALIC CONDUIT AND TUBING

A. ENT: NEMA TC 13.

B. RNC: NEMA TC 2, Type EPC-40-PVC, unless otherwise indicated.

C. Fittings for ENT and RNC: NEMA TC 3; match to conduit or tubing type and material.

2.03 METAL WIREWAYS

A. Description: Sheet metal sized and shaped as indicated, NEMA 250, Type 1 unless otherwise indicated.

B. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

C. Wireway Covers: Hinged type.

D. Finish: Manufacturer's standard enamel finish.

2.04 BOXES, ENCLOSURES, AND CABINETS

A. Sheet Metal Outlet and Device Boxes: NEMA OS 1.

B. Cast-Metal Outlet and Device Boxes: NEMA FB 1, ferrous alloy Type FD, with gasketed cover.

C. Nonmetallic Outlet and Device Boxes: NEMA OS 2.

D. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

E. Hinged-Cover Enclosures: NEMA 250, Type 1 with continuous-hinge cover with flush latch unless otherwise indicated.

01. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.

F. Cabinets:

01. NEMA 250, Type 1galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.

02. Hinged door in front cover with flush latch and concealed hinge.

03. Key latch to match panelboards.

04. Metal barriers to separate wiring of different systems and voltage.

05. Accessory feet where required for freestanding equipment.

2.05 SLEEVES FOR RACEWAYS

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40,

galvanized steel, plain ends.

B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral water stop, unless otherwise indicated.

C. Sleeves for Rectangular Openings: Galvanized sheet steel with minimum 0.052- or 0138-inch thickness as indicated and of length to suit application.

D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 7 Section "Through-Penetration Firestop Systems."

PART 3 - EXECUTION

3.01 RACEWAY APPLICATION

A. Outdoors: Apply raceway products as specified below unless otherwise indicated:

01. Exposed Conduit: Rigid steel conduit**.**

02. Concealed Conduit, Aboveground: Rigid steel conduit**.**

03. Underground Conduit: RNC, Type EPC-40-PVC or 80-PVC, direct buried, unless noted to be concrete-encased on drawings.

04. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.

05. Boxes and Enclosures, Aboveground: NEMA 250, Type 3Ror 4.

06. Application of Handholes and Boxes for Underground Wiring:

a. Handholes and Pull Boxes in Driveway, Parking Lot, and Off-Roadway Locations, Subject to Occasional, Non-deliberate Loading by Heavy Vehicles: Polymer concrete, SCTE 77, Tier 15 structural load rating.

b. Handholes and Pull Boxes in Sidewalk and Similar Applications with a Safety Factor for Non-deliberate Loading by Vehicles: Polymer-concrete units, SCTE 77, Tier 8 structural load rating.

c. Handholes and Pull Boxes Subject to Light-Duty Pedestrian Traffic Only: Fiberglass-reinforced polyester resin, structurally tested according to SCTE 77 with 3000-lbf vertical loading.

B. Comply with the following indoor applications, unless otherwise indicated:

01. Exposed, Not Subject to Physical Damage: EMT.

02. Exposed, Not Subject to Severe Physical Damage: EMT.

03. Exposed and Subject to Severe Physical Damage: Rigid steel conduit.

Includes raceways in the following locations:

a. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.

b. Mechanical rooms.

04. Concealed in Ceilings and Interior Walls and Partitions: EMT.

05. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.

06. Damp or Wet Locations: Rigid steel conduit.

07. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4 stainless steel in damp or wet locations.

C. Minimum Raceway Size: 3/4-inch trade size.

D. Raceway Fittings: Compatible with raceways and suitable for use and location.

01. Rigid Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated.

02. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with that material. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer.

03. Do not install aluminum conduits in contact with concrete.

3.02 INSTALLATION

A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this article are stricter.

B. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

C. Complete raceway installation before starting conductor installation.

D. Support raceways as specified in Division 16 Section "Electrical Supports and Seismic Restraints."

E. Arrange stub-ups so curved portions of bends are not visible above finished slab.

F. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed.

G. Conceal conduit and EMT within finished walls, ceilings, and floors unless otherwise indicated.

H. Support conduit within 12 inches of enclosures to which attached.

I. Raceways Embedded in Slabs:

01. Run conduit larger than 1-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.

02. Arrange raceways to cross building expansion joints at right angles with expansion fittings.

03. Change from ENT to rigid steel conduit before rising above the floor.

J. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.

K. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG.

L. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire.

M. Raceways for Optical Fiber and Communications Cable: Install raceways, metallic and nonmetallic, rigid and flexible, as follows:

01. 3/4-Inch Trade Size and Smaller: Install raceways in maximum lengths of 50 feet.

02. 1-Inch Trade Size and Larger: Install raceways in maximum lengths of 75 feet.

03. Install with a maximum of Three (3) 90-degree bends or equivalent for each length of raceway unless Drawings show stricter requirements. Separate lengths with pull or junction boxes or terminations at distribution frames or cabinets where necessary to comply with these requirements.

N. Install raceway sealing fittings at accessible locations and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:

01. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.

02. Where otherwise required by NFPA 70.

O. Expansion-Joint Fittings for RNC: Install in each run of aboveground conduit that is located where environmental temperature change may exceed 30 deg F, and that has straight-run length that exceeds 25 feet.

01. Install expansion-joint fittings for each of the following locations, and provide type and quantity of fittings that accommodate temperature change listed for location:

02. Install type and quantity of fittings that accommodate temperature change listed for each of the following locations:

    a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F temperature change.

    b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F temperature change.

    c. Indoor Spaces Connected with Outdoors without Physical Separation: 125 deg F temperature change.

    d. Attics: 135 deg F temperature change.

03. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F of temperature change

04. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at time of installation.

P. Flexible Conduit Connections: Use a maximum of 72 inches of flexible conduit for semi recessed lighting fixtures, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.

01. Use LFMC in damp or wet locations subject to severe physical damage.

02. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.

Q. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block and install box flush with surface of wall.

R. Set metal floor boxes level and flush with finished floor surface.

S. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

3.03 SLEEVE-SEAL INSTALLATION

A. Install to seal underground, exterior wall penetrations.

B. Use type and number of sealing elements recommended by manufacturer for raceway material and size. Position raceway in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.04 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly. Firestopping

materials and installation requirements are specified in Division 7 Section "Through -Penetration Firestop Systems."

3.05 PROTECTION

A. Provide final protection and maintain conditions that ensure coatings, finishes and cabinets are without damage or deterioration at time of Substantial Completion.

01. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.

02. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION

SECTION 26 05 48 - VIBRATION AND SESIMIC CONTROLS FOR ELECTRICAL SYSTEM

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 DEFINITIONS

A. The IBC: International Building Code.

B. ICC-ES: ICC-Evaluation Service.

C. OSHPD: Office of Statewide Health Planning and Development for the State of California.

1.3 PERFORMANCE REQUIREMENTS

A. Seismic-Restraint Loading:
   1. Site Class as Defined in the IBC: C
   2. Assigned Seismic Use Group or Building Category as Defined in the IBC: II
      a. Component Importance Factor: 1.0

1.4 QUALITY ASSURANCE

A. Comply with seismic-restraint requirements in the IBC unless requirements in this Section are more stringent.

B. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

C. Seismic-restraint devices shall have horizontal and vertical load testing and analysis and shall bear anchorage preapproval OPA number from OSHPD, preapproval by ICC-ES, or preapproval by another agency acceptable to authorities having jurisdiction, showing maximum seismic-restraint ratings. Ratings based on independent testing are preferred to ratings based on calculations. If preapproved ratings are not available, submittals based on independent testing are preferred. Calculations (including combining shear and tensile loads) to support seismic-restraint designs must be signed and sealed by a qualified professional engineer.

D. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 VIBRATION ISOLATORS

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

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

2.2 SEISMIC-RESTRAINT DEVICES

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

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

C. General Requirements for Restraint Components: Rated strengths, features, and application requirements shall be as defined in reports by an evaluation service member of ICC-ES.
   1. Structural Safety Factor: Allowable strength in tension, shear, and pullout force of components shall be at least four times the maximum seismic forces to which they will be subjected.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and equipment to receive vibration isolation and seismic-control devices for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Examine roughing-in of reinforcement and cast-in-place anchors to verify actual locations before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLICATIONS

A. Multiple Raceways or Cables: Secure raceways and cables to trapeze member with clamps approved for application by an evaluation service member of ICC-ES.

B. Strength of Support and Seismic-Restraint Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static and seismic loads within specified loading limits.

3.3 SEISMIC-RESTRAINT DEVICE INSTALLATION

A. Equipment and Hanger Restraints:
   1. Install seismic-restraint devices using methods approved by an evaluation service member of ICC-ES.

B. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.

3.4 ACCOMMODATION OF DIFFERENTIAL SEISMIC MOTION

A. Install flexible connections in runs of raceways, cables, wireways, cable trays, and busways where they cross seismic joints, where adjacent sections or branches are supported by different structural elements, and where they terminate with connection to equipment that is anchored to a different structural element from the one supporting them as they approach equipment.

END OF SECTION 26 05 48

DIVISION 26 – ELECTRICAL

SECTION 26 05 53 IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. This Section Includes the following:

01. Identification for raceway and metal-clad cable.

02. Identification for conductors and communication and control cable.

03. Underground-line warning tape.

04. Warning labels and signs.

05. Instruction signs.

06. Equipment identification labels.

07. Miscellaneous identification products.

1.02 COORDINATION

A. Coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual; and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.

B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

C. Coordinate installation of identifying devices with location of access panels and doors.

D. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.01 RACEWAY AND METAL-CLAD CABLE IDENTIFICATION MATERIALS

A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.

B. Colors for Raceways Carrying Circuits at 600 V and Less:

01. Power Circuits: Black letters on an orange field

02. Legend: Indicate system or service and voltage if applicable.

C. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

2.02 CONDUCTOR AND COMMUNICATION AND CONSTROL-CABLE IDENTIFICATION MATERIALS

A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide.

B. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.

2.03 WARNING LABELS AND SIGNS

A. Comply with NFPA 70 and 29 CFR 1910.145.

B. Self-Adhesive Warning Labels: Factory-printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment unless otherwise indicated.

C. Warning label and sign shall include, but are not limited to, the following legends:

01. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES."

02. Fault Current Values: Indicate maximum available fault current and date of fault current calculation in accordance with NEC 110.24.

2.04 INSTRUCTION SIGNS

A. Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch thick for signs up to 20 sq. inches and 1/8 inch thick for larger sizes.

01. Engraved legend with black letters on white face.

02. Punched or drilled for mechanical fasteners.

03. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

2.05 EQUIPMENT IDENTIFICATION LABELS

A. Engraved, Laminated Acrylic or Melamine Label: Punched or drilled for screw mounting. White letters on a dark-gray background. Minimum letter height shall be 3/8 inch.

B. Stenciled Legend: In non-fading, waterproof, black ink or paint. Minimum letter height shall be 1 inch.

2.06 CABLE TIES

A. General-Purpose:

01. Minimum Width: 3/16 inch.

02. Tensile Strength: 50 lb., minimum.

03. Temperature Range: Minus 40 to plus 185 deg F.

04. Color: Black, except where used for color-coding.

2.07 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Paint: Paint materials and application requirements are specified in Division 9 painting Sections.

B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Verify identity of each item before installing identification products.

B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.

C. Apply identification devices to surfaces that require finish after completing finish work.

D. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.

E. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.

F. System Identification Color-Coding Bands for Raceways and Cables: Each color-coding band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.

G. Cable Ties: For attaching tags. Use general-purpose type, except as listed below:

01. Outdoors: UV-stabilized nylon.

02. In Spaces Handling Environmental Air: Plenum rated.

H. Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape directly above line at 6 to 8 inches below finished grade. Use multiple tapes where width of multiple lines installed in a common trench or concrete envelope exceeds 16 inches overall.

I. Painted Identification: Comply with requirements in Division 9 painting Sections for surface preparation and paint application.

3.02 IDENTIFICATION SCHEDULE

A. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits More Than 30A: Identify with orange self-adhesive vinyl label within 12 inches of junction boxes and/or cabinets.

B. Accessible Raceways and Cables of Auxiliary Systems: Identify the following systems with color-coded, self-adhesive vinyl tape applied in bands:

01. Fire Alarm System: Red.

02. Fire-Suppression Supervisory and Control System: Red and yellow.

03. Combined Fire Alarm and Security System: Red and blue.

04. Telecommunication System: Green and yellow.

05. Control Wiring: Green and red.

C. Power-Circuit Conductor Identification: For primary and secondary conductors No. 1/0 AWG and larger in vaults, pull and junction boxes, manholes, and handholes, use marker tape. Identify source and circuit number of each set of conductors. For single conductor cables, identify phase in addition to the above.

D. Branch-Circuit Conductor Identification: Where there are conductors for more than three branch circuits in same junction or pull box, use marker tape. Identify each ungrounded conductor according to source and circuit number.

E. Conductors to Be Extended in the Future: Attach [marker tape to conductors and list source and circuit number.

F. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, signal, sound, intercommunications, voice and data connections.

01. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.

02. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.

03. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual.

G. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring and optical fiber cable. Install underground-line warning tape for both direct-buried cables and cables in raceway.

01. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Comply with 29 CFR 1910.145 and apply self-adhesive warning labels. Identify system voltage with black letters on an orange background. Apply to exterior of door, cover or other access.

02. Equipment with Multiple Power or Control Sources: Apply to door or cover of equipment including, but not limited to, the following:

a. Power transfer switches.

b. Controls with external power connections.

03. Equipment Requiring Workspace Clearance According to NFPA 70: Unless otherwise indicated, apply to door or cover of equipment but not on flush panelboards and similar equipment in finished spaces.

H. Instruction Signs:

01. Operating Instructions: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.

I. Emergency Operating Instructions: Install instruction signs with white legend on a red background with minimum 3/8-inch- high letters for emergency instructions at equipment used for power transfer.

J. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.

01. Labeling Instructions:

a. Indoor Equipment: Engraved, laminated acrylic or melamine label. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on 1-1/2-inch- high label; where two lines of text are

required, use labels 2 inches high.

b. Outdoor Equipment: Engraved, laminated acrylic or melamine label.

c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.

d. Unless provided with self-adhesive means of attachment, fasten labels with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.

02. Equipment to Be Labeled:

a. Panelboards, electrical cabinets and enclosures.

b. Access doors and panels for concealed electrical items.

c. Transformers:

d. Disconnect switches.

e. Enclosed circuit breakers.

f. Motor starters.

g. Contactors.

h. Voice and data cable terminal equipment.

i. Fire-alarm control panel and annunciators.

j. Security and intrusion-detection control stations, control panels, terminal cabinets, and racks.

k. Monitoring and control equipment.

l. Terminals, racks, and patch panels for voice and data communication and for signal and control functions.

3.03 INSTALLATION

A. Verify identity of each item before installing identification products.

B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.

C. Apply identification devices to surfaces that require finish after completing

finish work.

D. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.

E. Attach non-adhesive signs and plastic labels with screws and auxiliary hardware appropriate to the location and substrate.

F. System Identification Color Banding for Raceways and Cables: Each color band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side.

G. Color-Coding for Phase and Voltage Level Identification, 600 V and Less: Use the colors listed below for ungrounded service, feeder, and branch-circuit conductors.

01. Color shall be factory applied or, for sizes larger than No. 20 AWG if authorities having jurisdiction permit, field applied.

02. Colors for 208/120-V Circuits:

a. Phase A: Black.

b. Phase B: Red.

c. Phase C: Blue.

d. Neutral: White.

e. Ground: Green or bare copper.

03. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 2 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.

H. Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape directly above line at 6 to 8 inches below finished grade. Use multiple tapes where width of multiple lines installed in a common trench or concrete envelope exceeds 16 inches overall.

I. Painted Identification: Prepare surface and apply paint according to Division 9 painting Sections.

END OF SECTION

DIVISION 26 – ELECTRICAL

SECTION 26 09 23 LIGHTING CONTROL DEVICES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

01. Time switches.

02. Indoor occupancy sensors.

03. Lighting contactors.

B. Related Requirements:

01. Retain subparagraph below to cross-reference requirements Contractor might expect to find in this Section but are specified in other Sections.

02. Section 262726 "Wiring Devices" for wall-box dimmers and manual light switches.

1.02 DEFINITIONS

A. LED: Light-emitting diode.

B. PIR: Passive infrared.

1.03 SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Show installation details for occupancy and light-level sensors.

01. Interconnection diagrams showing field-installed wiring.

C. Field quality-control test reports.

D. Operation and Maintenance Data: For each type of product to include in emergency, operation, and maintenance manuals.

1.04 QUALITY ASSURANCE

A. Electrical Components, Devices and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.05 COORDINATION

A. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, smoke detectors, fire-suppression system, and partition assemblies.

PART 2 - PRODUCTS

2.01 TIME SWITCHES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

01. Area Lighting Research, Inc.; Tyco Electronics.

02. Grasslin Controls Corporation; a GE Industrial Systems Company.

03. Intermatic, Inc.

04. Leviton Mfg. Company Inc.

05. Lightolier Controls; a Genlyte Company.

06. Lithonia Lighting; Acuity Lighting Group, Inc.

07. Paragon Electric Co.; Invensys Climate Controls.

08. Square D; Schneider Electric.

09. TORK.

10. Touch-Plate, Inc.

11. Watt Stopper (The).

B. Electronic Time Switches: Electric, solid state programmable units with alphanumeric display; complying with UL 917.

01. Contact Rating: 30-A inductive or resistive, 240-V ac.

02. Program: 8 on-off set points on a 24-hour schedule.

03. Program: 2 on-off set points on a 24-hour schedule, allowing different set points for each day of the week.

04. Circuitry: Allow connection of a photoelectric relay as substitute for on-off function of a program on selected channels.

05. Astronomic Time: All channels.

06. Battery Backup: For schedules and time clock.

C. Electromechanical-Dial Time Switches: Type complying with UL 917.

01. Contact Rating: 30-A inductive or resistive, 240-V AC.

02. Circuitry: Allows connection of a photoelectric relay as a substitute for the on-off function of a program.

03. Astronomic time dial.

04. Eight-Day Program: Uniquely programmable for each weekday and holidays.

05. Skip-a-day mode.

06. Wound-spring reserve carryover mechanism to keep time during power failures, minimum of 16 hours.

2.02 OUTDOOR PHOTOELECTRIC SWITCHES

A. Basis-of-Design Product: Subject to compliance with requirements, provide a watt stopper product or comparable product by one of the following:

01. Area Lighting Research, Inc.; Tyco Electronics.

02. Grasslin Controls Corporation; a GE Industrial Systems Company.

03. Intermatic, Inc.

04. Lithonia Lighting; Acuity Lighting Group, Inc.

05. Novitas, Inc.

06. Paragon Electric Co.; Invensys Climate Controls.

07. Square D; Schneider Electric.

08. TORK.

B. Description: Solid state, with SPST dry contacts rated for 1800 VA, to operate connected load, complying with UL 773.

01. Light-Level Monitoring Range: 1.5 to 10 fc, with an adjustment for turn-on and turn-off levels within that range.

02. Time Delay: 30-second minimum, to prevent false operation.

03. Lightning Arrester: Air-gap type.

04. Mounting: Twist lock complying with NEMA C136.10, with base.

2.03 INDOOR PHOTOELECTRIC SWITCHES

A. Basis-of-Design Product: Subject to compliance with requirements, provide a watt stopper product or a comparable product or comparable product by one of the following:

01. Allen-Bradley/Rockwell Automation.

02. Area Lighting Research, Inc.; Tyco Electronics.

03. Eaton Electrical Inc.; Cutler-Hammer Products.
04. Grasslin Controls Corporation; a GE Industrial Systems Company.
05. Intermatic, Inc.
06. Lithonia Lighting; Acuity Lighting Group, Inc.
07. MicroLite Lighting Control Systems.
08. Novitas, Inc.
09. Paragon Electric Co.; Invensys Climate Controls.
10. Square D; Schneider Electric.
11. TORK.
12. Touch-Plate, Inc.

B. Ceiling-Mounted Photoelectric Switch: Solid-state, light-level sensor unit, with separate relay unit, to detect changes in lighting levels that are perceived by the eye. Cadmium sulfide photoresistors are not acceptable.

01. Sensor Output: Contacts rated to operate the associated relay, complying with UL 773A. Sensor shall be powered from the relay unit.

02. Relay Unit: Dry contacts rated for 20-A ballast load at 120- and 277-V ac. Power supply to sensor shall be 24-V dc, 150-mA, Class 2 power source as defined by NFPA 70.

03. Light-Level Monitoring Range: 10 to 200 fc, with an adjustment for turn-on and turn-off levels within that range.

04. Time Delay: Adjustable from 5 to 300 seconds to prevent cycling, with deadband adjustment.

05. Indicator: Two LEDs to indicate the beginning of on-off cycles.

2.04 INDOOR OCCUPANCY SENSORS

A. Wall-Switch Sensors:

01. Products: Subject to compliance with requirements, provide one of the following:

a. Watt Stopper (The); DW-100 (Single Relay).

b. Watt Stopper (The); DW-200 (Dual Relay).

c. Approved Equal.

02. Description: Dual-technology type, 120/277 V, adjustable time delay up

to 20 minutes, 180-degree field of view, with a minimum coverage area of 300 sq. ft.

B. Room Sensors:

01. Products: Subject to compliance with requirements, provide one of the following:

a. Watt Stopper (The); DT-355.

b. Approved Equal.

02. Description: Dual technology, with both passive-infrared-and ultrasonic-type sensing, 120/277 V, adjustable time delay up to 30 minutes, 360-degree field of view, and a minimum coverage area of 1000 sq. ft.

C. Corridor Sensors:

01. Products: Subject to compliance with requirements, provide one of the following:

a. Watt Stopper (The); WT-200

b. Approved equal.

02. Description: Dual technology type, low voltage, adjustable time delay up to 30 minutes, 360-degree field of view, with a minimum coverage area of 55 linear feet.

D. Switch Packs:

01. Products: Subject to compliance with requirements, provide one of the following:

a. Watt Stopper, BZ-50

b. Approved equal.

02. Provide switch packs as required for circuiting and control as shown.

03. Isolated 20A contacts.

2.05 LIGHTING CONSTRACTORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

01. Allen-Bradley/Rockwell Automation.

02. ASCO Power Technologies, LP; a division of Emerson Electric Co.

03. Eaton Electrical, Inc.; Cutler-Hammer Products.

04. GEIndustrial Systems; Total Lighting Control.

05. Grasslin Controls Corporation; a GE Industrial Systems Company.
06. Hubbell Lighting.
07. Lithonia Lighting; Acuity Lighting Group, Inc.
08. MicroLite Lighting Control Systems.
09. Square D; Schneider Electric.
10. TORK
11. Touch-Plate, Inc.
12. Watt Stopper (The).

B. Description: Electrically operated and mechanically held, combination-type complying with NEMA ICS 2 and UL 508.

01. Current Rating for Switching: Listing or rating consistent with type of load served, including tungsten filament, inductive, and high-inrush ballast (ballast with 15 percent or less total harmonic distortion of normal load current).
02. Fault Current Withstand Rating: Equal to or exceeding the available fault current at the point of installation.
03. Enclosure: Comply with NEMA 250.

2.06 CONDUCTORS AND CABLES

A. Classes 2 and 3 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 18 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Conductors and Cables."

B. Class 1 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 14 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Conductors and Cables."

PART 3 - EXECUTION

3.01 SENSOR INSTALLATION

A. Install and aim sensors in locations to achieve not less than 90 percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's written instructions.

3.02 CONTACTOR INSTALLATION

A. Mount electrically held lighting contactors with elastomeric isolator pads to eliminate structure-borne vibration, unless contactors are installed in an enclosure with factory-installed vibration isolators.

3.03 WIRING INSTALLATION

A. Wiring Method: Comply with Section 260519 "Low-Voltage Electrical Conductors and Cables." Minimum conduit size shall be 1/2 inch.

B. Wiring within Enclosures: Comply with NECA 1. Separate power-limited and non-power-limited conductors according to conductor manufacturer's written instructions.

C. Size conductors according to lighting control device manufacturer's written instructions, unless otherwise indicated.

D. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

3.04 IDENTIFICATION

A. Identify components and power and control wiring according to Section 260553 "Identification for Electrical Systems".

01. Identify controlled circuits in lighting contactors.

02. Identify circuits or luminaires controlled by photoelectric and occupancy sensors at each sensor.

B. Label time switches and contactors with a unique designation.

3.05 FIELD QUALITY CONTROL

A. Perform the following field tests and inspections and prepare test reports:

01. After installing time switches and sensors, and after electrical circuitry has been energized, adjust and test for compliance with requirements.
02. Operational Test: Verify operation of each lighting control device, and adjust time delays.

B. Lighting control devices that fail tests and inspections are defective work.

3.06 ADJUSTING

A. Occupancy Adjustments: When requested within 12 of date of Substantial Completion, provide on-site assistance in adjusting sensors to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

3.07 DEMONSRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain lighting control devices.

END OF SECTION

DIVISION 26 – ELECTRICAL

SECTION 26 27 26 WIRING DEVICES

PART 1 - GENERAL

1.01 RELATED DOCUMENT

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

1.02 SUMMARY

A. Section Includes:

01. Receptacles, receptacles with integral GFCI, and associated device plates.

02. Isolated-ground receptacles.

03. Snap switches and wall-box dimmers.

04. Communications outlets.

05. Pendant cord-connector devices.

06. Cord and plug sets.

07. Floor service outlets.

1.03 DEFINITIONS

A. EMI: Electromagnetic interference.

B. GFCI: Ground-fault circuit interrupter.

C. Pigtail: Short lead used to connect a device to a branch-circuit conductor.

D. RFI: Radio-frequency interference.

E. SPD: Surge protection device.

F. UTP: Unshielded twisted pair.

1.04 SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.

1.05 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of wiring device and associated wall plate through one source from a single manufacturer. Insofar as they are available, obtain all wiring devices and associated wall plates from a single

manufacturer and one source.

1.06 COORDINATION

A. Receptacles for Owner-Furnished Equipment: Match plug configurations.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in other Part 2 articles:

01. Receptacles, switches, dimmers and cord sets

a. Cooper Wiring Devices; Division of Cooper Industries, Inc. (Cooper).

b. Hubbell Incorporated; Wiring Device-Kellems (Hubbell).

c. Leviton Mfg. Company Inc. (Leviton).

d. Pass & Seymour/Legrand (Pass & Seymour).

02. Floor boxes, poke through, and multi-outlet assemblies.

a. Hubbell

b. Wiremold

2.02 STRAIGHT-BLADE RECEPTACLES

A. Convenience Receptacles, 125 V, 15 A: Comply with NEMA WD 1, NEMA WD 6 configuration 5-15R, and UL 498.

01. Leviton Decora Series, Residential Grade

02. Leviton Decora Series, Industrial Grade

03. Leviton Straight Blade Series, Commercial Grade

B. Clock Hanger Receptacle, 125V, 15A; Comply with NEMA WD1, NEMA WD6, configuration 5-15R, and UL 498.

C. Tamper-Resistant Convenience Receptacles, 125 V, 15 A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-15R, UL 498 Supplement sd, and FS W-C-596.

01. Products: Subject to compliance with requirements, provide one of the following:

a. Hubbell 5235

02. Description: Straight blade, specialty receptacle, white with stainless steel plate.

2.03 GFCI RECEPTACLES

A. General Description: Straight blade, feed-through type. Comply with NEMA WD 1, NEMA WD 6, UL 498, and UL 943, Class A and include indicator light that is lighted when device is tripped. Duplex GFCI Convenience Receptacles, 125 V, 20 A:

01. Products: Subject to compliance with requirements, provide one of the following:

a. Leviton Decora Series, Commercial Grade

2.04 PENDANT CORD-CONNECTOR DEVICES

A. Description: Matching, locking-type plug and receptacle body connector; NEMA WD 6 configurations L5-20P and L5-20R, heavy-duty grade.

01. Body: Nylon, with screw-open, cable-gripping jaws and provision for attaching external cable grip.

02. External Cable Grip: Woven wire-mesh type made of high-strength, galvanized-steel wire strand, matched to cable diameter, and with attachment provision designed for corresponding connector.

2.05 CORD AND PLUG SETS

A. Description: Match voltage and current ratings and number of conductors to requirements of equipment being connected.

01. Cord: Rubber-insulated, stranded-copper conductors, with Type SOW-A jacket; with green-insulated grounding conductor and ampacity plus a minimum of 30 percent.

02. Plug: Nylon body and integral cable-clamping jaws. Match cord and receptacle type for connection.

2.06 SNAP SWITCHES

A. Comply with NEMA WD 1 and UL 20.

B. Switches, 120/277 V, 20 A, Rocker type:

01. Products: Subject to compliance with requirements, provide one of the following:

a. Leviton Decora Series, Decora Series.
b. Lexiton Decora Series, Commercial Series.

2.07 WALL-BOX DIMMERS

A. Dimmer Switches: Modular, full-wave, solid-state units with integral, quiet on-

off switches, with audible frequency and EMI/RFI suppression filters.

B. Control: Continuously adjustable toggle and slider; with single-pole or three-way switching. Comply with UL 1472.

C. Fluorescent Lamp Dimmer Switches: Modular; compatible with dimmer ballasts; trim potentiometer to adjust low-end dimming; dimmer-ballast combination capable of consistent dimming with low end not greater than 20 percent of full brightness.

2.08 WALL PLATES

A. Single and combination types shall match corresponding wiring devices.

01. Plate-Securing Screws: Metal with head color to match plate finish.

02. Material for Finished Spaces: 0.05-inchi- thermoplastic.

03. Material for Unfinished Spaces: Galvanized steel.

04. Material for Damp Locations: Cast aluminum with spring-loaded lift cover and listed and labeled for use in wet and damp locations.

2.09 FLOOR BOXES

A. Box: Cast metal for concrete encased, Stamped steel for all other construction types.

B. Type: Modular, flush-type, dual-service units suitable for wiring method used.

C. Compartments: Barrier separates power from voice and data communication cabling.

D. Service Plate: Rectangular solid brass with satin finish.

E. Power Receptacle: NEMA WD 6 configuration 5-15R, gray finish, unless otherwise indicated.

F. Voice and Data Communication Outlet: Two modular, keyed, color-coded, RJ-45 Category 6 jacks for UTP cable.

2.10 FINISHES

A. Color: As selected by Architect unless otherwise indicated or required by NFPA.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Comply with NECA 1, including mounting heights listed in that standard, unless otherwise indicated.

B. Coordination with Other Trades:

01. Take steps to ensure that devices and their boxes are protected. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of boxes.

02. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.

03. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.

04. Install wiring devices after all wall preparation, including painting, is complete.

C. Conductors:

01. Do not strip insulation from conductors until right before they are spliced or terminated on devices.

02. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.

03. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.

04. Existing Conductors:

a. Cut back and pigtail or replace all damaged conductors.

b. Straighten conductors that remain and remove corrosion and foreign matter.

c. Pig tailing existing conductors is permitted, provided the outlet box is large enough.

D. Device Installation:

01. Replace devices that have been in temporary use during construction and that were installed before building finishing operations were complete.

02. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.

03. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.

04. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.

05. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, two-thirds to three-fourths of the way around terminal screw.

06. Use a torque screwdriver when a torque is recommended or required by manufacturer.

07. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.

08. Tighten unused terminal screws on the device.

09. When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.

E. Receptacle Orientation:

01. Install ground pin of vertically mounted receptacles down, and on horizontally mounted receptacles to the right.

F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.

G. Dimmers:

01. Install dimmers within terms of their listing.

02. Verify that dimmers used for fan speed control are listed for that application.

03. Install unshared neutral conductors on line and load side of dimmers according to manufacturers' device listing conditions in the written instructions.

H. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multi gang wall plates.

I. Adjust locations of floor service outlets and service poles to suit arrangement of partitions and furnishings.

J. Set metal floor boxes level and flush with finished floor surface.

K. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surfaces.

SECTION 26 27 26 WIRING DEVICES

3.02 IDENTIFICATION

A. Comply with Section 260553 "Identification for Electrical Systems. "

B. Receptacles: Identify panelboard and circuit number from which served. Use hot, stamped, or engraved machine printing with black -filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

END OF SECTION

DIVISION 26 – ELECTRICAL

SECTION 26 51 19 LED INTERIOR LIGHTING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section includes the following types of LED luminaires:

01. Cylinder.

02. Downlight.

03. Linear industrial.

04. Recessed, linear.

05. Strip light.

06. Surface mount, linear.

07. Surface mount, nonlinear.

08. Suspended, linear.

B. Related Requirements:

01. Section 26 09 23 "Lighting Control Devices" for automatic control of lighting, including time switches, photoelectric relays, occupancy sensors, and multipole lighting relays and contactors.

1.03 DEFINITIONS

A. CCT: Correlated color temperature.

B. CRI: Color Rendering Index.

C. Fixture: See "Luminaire."

D. IP: International Protection or 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.

1.04 ACTION SUBMITTALS

A. Product Data: For each type of product.

01. Arrange in order of luminaire designation.

02. Include data on features, accessories, and finishes.

03. Include physical description and dimensions of luminaires.

04. Include emergency lighting units, including batteries and chargers.

05. Include life, output (lumens, CCT, and CRI), and energy-efficiency data.

06. Photometric data and adjustment factors based on laboratory tests IES LM-79 and IES LM-80.

a. Manufacturers' Certified Data: Photometric data certified by manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.

b. Testing Agency Certified Data: For indicated luminaires, photometric data certified by a qualified independent testing agency. Photometric data for remaining luminaires shall be certified by manufacturer.

1.05 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For luminaires and lighting systems to include in operation and maintenance manuals.

01. Provide a list of all lamp types used on Project; use ANSI and manufacturers' codes.

1.06 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

01. Lamps: Ten for every 100 of each type and rating installed. Furnish at least one of each type.

02. Diffusers and Lenses: One for every 100 of each type and rating installed. Furnish at least one of each type.

03. Globes and Guards: One for every 20 of each type and rating installed. Furnish at least one of each type.

1.07 QUALITY ASSURANCE

A. Luminaire Photometric Data Testing Laboratory Qualifications: Luminaire manufacturer's laboratory that is accredited under the NVLAP for Energy Efficient Lighting Products.

B. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by an independent agency, with the experience and capability to conduct the testing indicated, that is an NRTL as defined by OSHA in 29 CFR 1910.7, accredited under the NVLAP for Energy Efficient Lighting Products, and complying with the applicable IES testing standards.

C. Provide luminaires from a single manufacturer for each luminaire type.

D. Each luminaire type shall be binned within a three-step MacAdam Ellipse to ensure color consistency among luminaires.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Protect finishes of exposed surfaces by applying a strippable, temporary protective covering before shipping.

1.09 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 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. Ambient Temperature: 5 to 104 deg F.

01. Relative Humidity: Zero to 95 percent.

B. Altitude: Sea level to 7000 feet.

2.02 LUMINAIRE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Factory-Applied Labels: Comply with UL 1598. Include recommended lamps. Locate labels where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.

01. Label shall include the following lamp characteristics:

a. "USE ONLY" and include specific lamp type.

b. Lamp diameter, shape, size, wattage, and coating.

c. CCT and CRI.

C. Recessed luminaires shall comply with NEMA LE 4.

D. Fixtures shall be manufactured by nationally recognized brands with a manufacturer's sales representative within 250 miles.

E. Lamp:

01. CRI of 80 minimum.

02. CCT of 3000K.

03. Rated life of 50,000 hours to L70.

04. Dimmable from 100 percent to 1 percent of maximum light output.

05. User replaceable lamps.

F. Doors, Frames and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Components are designed to prevent doors, frames, lenses, diffusers and other components from falling accidentally during relamping and when secured in operating position.

G. Diffusers and Globes:

01. Acrylic Diffusers: One hundred percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

02. Glass: Annealed crystal glass unless otherwise indicated.

03. Lens Thickness: At least 0.125-inch minimum unless otherwise indicated.

H. With integral mounting provisions.

I. Standards:

01. ENERGY STAR certified.

02. RoHS compliant.

03. UL Listing: Listed for damp location.

2.03 MATERIALS

A. Metal Parts:

01. Free of burrs and sharp corners and edges.

02. Sheet metal components shall be steel unless otherwise indicated.

03. Form and support to prevent warping and sagging.

B. Steel:

01. ASTM A 36/A 36M for carbon structural steel.

02. ASTM A 568/A 568M for sheet steel.

C. Stainless Steel:

01. Manufacturer's standard grade.

02. Manufacturer's standard type, ASTM A 240/240 M.

D. Galvanized Steel: ASTM A 653/A 653M.

E. Aluminum: ASTM B 209.

2.04 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.

2.05 LUMINAIRE SUPPORT

A. Comply with requirements in Section 26 05 29 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.

B. Single-Stem Hangers: 1/2-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 gauge.

D. Rod Hangers: 3/16-inch minimum diameter, cadmium-plated, threaded steel rod.

E. Hook Hangers: Integrated assembly matched to luminaire, line voltage, and equipment with threaded attachment, cord, and locking-type plug.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for luminaire to verify actual locations of luminaire and electrical connections before luminaire installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 TEMPORARY LIGHTING

A. If approved by the Architect, use selected permanent luminaires for temporary lighting. When construction is sufficiently complete, clean luminaires used for temporary lighting and install new lamps.

3.03 INSTALLATION

A. Comply with NECA 1.

B. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.

C. Supports:

01. Sized and rated for luminaire weight.

02. Able to maintain luminaire position after cleaning and relamping.

03. Provide support for luminaire without causing deflection of ceiling or wall.

04. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and a vertical force of 400 percent of luminaire weight.

D. Flush-Mounted Luminaires:

01. Secured to outlet box.

02. Attached to ceiling structural members at four points equally spaced around circumference of luminaire.

03. Trim ring flush with finished surface.

E. Wall-Mounted Luminaires:

01. Attached to structural members in walls or to a minimum 20-gauge backing plate attached to wall structural members.

02. Do not attach luminaires directly to gypsum board.

F. Suspended Luminaires:

01. Ceiling Mount:

a. Two 5/32-inch diameter aircraft cable supports adjustable to 10 feet in length.

b. Hook mount.

02. Pendants and Rods: Where longer than 48 inches, brace to limit swinging.

03. 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.

04. Continuous Rows of Luminaires: Use tubing or stem for wiring at one point and wire support for suspension for each unit length of luminaire chassis, including one at each end.

05. Do not use ceiling grid as support for pendant luminaires. Connect support wires or rods to building structure.

G. Ceiling-Grid-Mounted Luminaires:

01. Secure to any required outlet box.

02. Secure luminaire to the luminaire opening using approved fasteners in a minimum of four locations, spaced near corners of luminaire.

03. Use approved devices and support components to connect luminaire to ceiling grid and building structure in a minimum of four locations, spaced near corners of luminaire.

H. Comply with requirements in Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables" for wiring connections.

3.04 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 26 05 53 "Identification for Electrical Systems."

3.05 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

01. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.

02. 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.

3.06 ADJUSTING

A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting the direction of aim of luminaires to suit occupied conditions. Make up to two visits to Project during other-than-normal hours for this purpose. Some of this work may be required during hours of darkness.

01. During adjustment visits, inspect all luminaires. Replace lamps or luminaires that are defective.

02. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.

03. Adjust the aim of luminaires in the presence of the Architect.

END OF SECTION

DIVISION 26 – ELECTRICAL

SECTION 26 56 19 EXTERIOR LIGHTING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DEFINITIONS

A. CCT: Correlated color temperature.

B. CRI: Color rendering index.

C. Fixture: See "Luminaire."

D. IP: International Protection or Ingress Protection Rating.

E. Lumen: Measured output of lamp and luminaire, or both.

F. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.03 DELIVERY, STORAGE, AND HANDLING

A. Protect finishes of exposed surfaces by applying a strippable, temporary protective covering prior to shipping.

1.04 FIELD CONDITIONS

A. Verify existing and proposed utility structures prior to the start of work associated with luminaire installation.

B. Mark locations of exterior luminaires for approval by Architect prior to the start of luminaire installation.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Luminaires shall withstand the effects of earthquake motions determined according to **ASCE/SEI 7**.

B. Seismic Performance: Luminaires and lamps shall be labeled vibration and shock resistant.

C. The term "withstand" means "the luminaire will remain in place without separation of any parts when subjected to the seismic forces specified and the luminaire will be fully operational during and after the seismic event."

2.02 MATERIALS

A. Metal Parts: Free of burrs and sharp corners and edges.

B. Sheet Metal Components: **Corrosion-resistant aluminum** or **Epoxy-coated steel**. Form and support to prevent warping and sagging.

C. 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. Doors shall be removable for cleaning or replacing lenses.

D. Lens and Refractor Gaskets: Use heat- and aging-resistant resilient gaskets to seal and cushion lenses and refractors in luminaire doors.

E. Reflecting surfaces shall have minimum reflectance as follows unless otherwise indicated:

01. White Surfaces: 85 percent.

02. Specular Surfaces: 83 percent.

03. Diffusing Specular Surfaces: 75 percent.

F. Housings:

01. Rigidly formed, weather- and light-tight enclosure that will not warp, sag, or deform in use.
02. Provide filter/breather for enclosed luminaires.

G. Factory-Applied Labels: Comply with UL 1598. Include recommended lamps. Labels shall be located where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.

01. Label shall include the following lamp characteristics:

a. "USE ONLY" and include specific lamp type.

b. Lamp diameter, shape, size, wattage and coating.

c. CCT and CRI for all luminaires.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for luminaire electrical conduit to verify actual locations of conduit connections before luminaire installation.

C. Examine walls, roofs, **canopy ceilings and overhang ceilings** for suitable conditions where luminaires will be installed.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 TEMPORARY LIGHTING

A. If approved by the Architect, use selected permanent luminaires for temporary lighting. When construction is substantially complete, clean luminaires used for temporary lighting and install new lamps.

3.03 GENERAL INSTALLATION REQUIREMENTS

A. Comply with NECA 1.

B. Use fastening methods and materials selected to resist seismic forces defined for the application and approved by manufacturer.

C. Fasten luminaire to structural support.

D. Supports:

01. Sized and rated for luminaire weight.

02. Able to maintain luminaire position after cleaning and relamping.

03. Support luminaires without causing deflection of finished surface.

04. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and a vertical force of 400 percent of luminaire weight.

E. Wall-Mounted Luminaire Support:

01. **Attached to structural members in walls** or **Attached to a minimum** 1/8 inch **backing plate attached to wall structural members**.

F. Wiring Method: Install cables in raceways. Conceal raceways and cables.

G. **Install luminaires level, plumb, and square with finished grade unless otherwise indicated.**

H. Coordinate layout and installation of luminaires with other construction.

I. Adjust luminaires that require field adjustment or aiming. **Include adjustment of photoelectric device to prevent false operation of relay by artificial light sources, favoring a north orientation.**

J. Comply with requirements in Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables" and Section 26 05 33 "Raceways and Boxes for Electrical Systems" for wiring connections and wiring methods.

K. Install on concrete base per details on drawings. Cast conduit into base, and finish by troweling and rubbing smooth. Concrete materials, installation, and finishing are specified in Section 03 30 00 "Cast-in-Place Concrete."

3.04 CORROSION PREVENTION

A. Aluminum: Do not use in contact with earth or concrete. When in direct contact with a dissimilar metal, protect aluminum by insulating fittings or treatment.

B. Steel Conduits: Comply with Section 26 05 33 "Raceways and Boxes for Electrical Systems." In concrete foundations, wrap conduit with 0.010-inch-thick, pipe-wrapping plastic tape applied with a 50 percent overlap.

3.05 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 26 05 53 "Identification for Electrical Systems."

3.06 FIELD QUALITY CONTROL

A. Inspect each installed luminaire for damage. Replace damaged luminaires and components.

B. Perform the following tests and inspections:

01. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
02. Verify operation of photoelectric controls.

C. Luminaire will be considered defective if it does not pass tests and inspections.

D. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

3.07 DEMONSTRATION

A. **Train** Owner's maintenance personnel to adjust, operate, and maintain luminaires **and photocell relays**.

3.08 ADJUSTING

A. Occupancy Adjustments: When requested within **12** months of date of Substantial Completion, provide on-site assistance in adjusting the direction of aim of luminaires to suit occupied conditions. Make up to **two** visits to Project during other-than-normal hours for this purpose. Some of this work may be required during hours of darkness.

01. During adjustment visits, inspect all luminaires. Replace lamps or luminaires that are defective.

02. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.

03. Adjust the aim of luminaires in the presence of the Architect.

END OF SECTION

DIVISION 26 – ELECTRICAL

SECTION 26 52 19 EMERGENCY AND EXIT LIGHTING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DEFINITIONS

A. CCT: Correlated color temperature.

B. CRI: Color Rendering Index.

C. Emergency Lighting Unit: A lighting unit with internal or external emergency battery powered supply and the means for controlling and charging the battery and unit operation.

D. Fixture: See "Luminaire" Paragraph.

E. Lumen: Measured output of lamp and luminaire, or both.

F. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.03 DELIVERY, STORAGE AND HANDLING

A. Protect finishes of exposed surfaces by applying a strippable, temporary protective covering before shipping.

1.04 WARRANTY

A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.

01. Warranty Period: Two year(s) from date of Substantial Completion.

B. Special Warranty for Emergency Lighting Batteries: Manufacturer's standard form in which manufacturer of battery-powered emergency lighting unit agrees to repair or replace components of rechargeable batteries that fail in materials or workmanship within specified warranty period.

01. Warranty Period for Emergency Power Unit Batteries: **Five** years from date of Substantial Completion. Full warranty shall apply for **the entire warranty period**.

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS FOR EMERGENCY LIGHTING

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. NRTL Compliance: Fabricate and label emergency lighting units, exit signs, and batteries to comply with UL 924.

C. Comply with NFPA 70 and NFPA 101.

D. Comply with NEMA LE 4 for recessed luminaires.

E. Comply with UL 1598 for fluorescent luminaires.

F. Internal Type Emergency Power Unit: Self-contained, modular, battery-inverter unit, factory mounted within luminaire body.

01. Emergency Connection: Operate **one** at an output of **1100** lumens each upon loss of normal power. Connect unswitched circuit to battery-inverter unit and switched circuit to luminaire ballast.

02. Operation: Relay automatically turns lamp on when power-supply circuit voltage drops to 80 percent of nominal voltage or below. Lamp automatically disconnects from battery when voltage approaches deep-discharge level. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.

03. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:

a. Ambient Temperature: Less than 0 deg F or exceeding 104 deg F, with an average value exceeding 95 deg F over a 24-hour period.

b. Ambient Storage Temperature: Not less than minus 4 deg F and not exceeding 140 deg F.

c. Humidity: More than 95 percent (condensing).

d. Altitude: Exceeding 6000 feet.

04. Test Push-Button and Indicator Light: Visible and accessible without opening luminaire or entering ceiling space.

a. Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.

b. Indicator Light: LED indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.

05. Battery: Sealed, maintenance-free, **nickel-cadmium** type.

06. Charger: Fully automatic, solid-state, constant-current type with sealed power transfer relay.

07. Remote Test: Switch in handheld remote device aimed in direction of tested unit initiates coded infrared signal. Signal reception by factory-installed infrared receiver in tested unit triggers simulation of loss of its normal power supply, providing visual confirmation of either proper or failed emergency response.

08. Integral Self-Test: Factory-installed electronic device automatically initiates code-required test of unit emergency operation at required intervals. Test failure is annunciated by an integral audible alarm and a flashing red LED.

G. External Type: Self-contained, modular, battery-inverter unit, suitable for powering one or more lamps, remote mounted from luminaire.

01. Operation: Relay automatically turns lamp on when power-supply circuit voltage drops to 80 percent of nominal voltage or below. Lamp automatically disconnects from battery when voltage approaches deep-discharge level. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.

02. Battery: Sealed, maintenance-free, nickel-cadmium type.

03. Charger: Fully automatic, solid-state, constant-current type.

04. Housing: NEMA 250, Type 1 enclosure listed for installation inside, on top of, or remote from luminaire. Remote assembly shall be located no less than half the distance recommended by the emergency power unit manufacturer, whichever is less.

05. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.

06. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.

07. Remote Test: Switch in handheld remote device aimed in direction of tested unit initiates coded infrared signal. Signal reception by factory-installed infrared receiver in tested unit triggers simulation of loss of its normal power supply, providing visual confirmation of either proper or failed emergency response.

08. Integral Self-Test: Factory-installed electronic device automatically initiates code-required test of unit emergency operation at required intervals. Test failure is annunciated by an integral audible alarm and a flashing red LED.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for conditions affecting performance of luminaires.

B. Examine roughing-in for luminaire to verify actual locations of luminaire and electrical connections before luminaire installation.

C. Examine walls, floors, roofs, and ceilings for suitable conditions where emergency lighting luminaires will be installed.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 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:

01. Sized and rated for luminaire **and emergency power unit** weight.

02. Able to maintain luminaire position when testing emergency power unit.

03. Provide support for luminaire and emergency power unit without causing deflection of ceiling or wall.

04. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire and emergency power unit weight and vertical force of 400 percent of luminaire weight.

E. Wall-Mounted Luminaire Support:

01. Attached to structural members in walls or to a minimum 20-gage backing plate attached to wall structural members.
02. Do not attach luminaires directly to gypsum board.

F. Suspended Luminaire Support:

01. Pendants and Rods: Where longer than 48 inches , brace to limit swinging.
02. 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.
03. Continuous Rows of Luminaires: Use tubing or stem for wiring at one point and **wire support** for suspension for each unit length of luminaire chassis, including one at each end.
04. Do not use ceiling grid as support for pendant luminaires. Connect support wires or rods to building structure.

G. Ceiling Grid Mounted Luminaires:

01. Secure to any required outlet box.

02. Secure emergency power unit using approved fasteners in a minimum of four locations, spaced near corners of emergency power unit.

03. Use approved devices and support components to connect luminaire to ceiling grid and building structure in a minimum of four locations, spaced near corners of luminaire.

3.03 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 26 05 53 "Identification for Electrical Systems."

3.04 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

01. 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.

3.05 STARTUP SERVICES

A. Perform startup service:

01. Charge **emergency power units' batteries** minimum of one hour and depress switch to conduct short-duration test.

02. Charge **emergency power units and batteries** minimum of 24 hours and conduct one-hour discharge test.

3.06 ADJUSTING

A. Adjustments: Within **12** months of date of Substantial Completion, provide on-site visit to do the following:

01. Inspect all luminaires. Replace lamps, **emergency power units**, **batteries** or luminaires that are defective.

a. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.

02. Conduct short-duration tests on all emergency lighting.

END OF SECTION

SECTION 32 12 16 ASPHALT PAVING

PART 1 - GENERAL

1.01 SCOPE

A. Furnish and install asphalt paving complete with all necessary accessories.

1.02 SUBMITTALS

A. Submit copies of Optimum Moisture Content Test of Sub-Grade. Submit complete design mix and tested properties of all materials proposed for use.

1.03 NOTIFICATION

A. Notify the Architect upon completion of each course prior to proceeding with the next course.

1.04 QUALITY ASSURANCE

A. Perform all tests required by these specifications. Representative samples shall be taken from the asphalt plant and / or lay down surface for testing of one of each of the following standards for each 500 tons of less placed or one each of the following standards per day of operation if placed for the day is less than 50 tons.

01. Resistance to Plastic Flow: ASTM--D 1559-73.

02. Quantitative Extraction of Bitumen from Bituminous Paving Mixture: ASTM-D 2127-71.

03. Sieve or Screen Analyses of Fine and Course Aggregates (extracted sample): ASTM-C 136-71.

04. Density of Bituminous Concrete in Place by Nuclear Method ASTM-D 2950-7, or Density of Field Specimen ASTM-D 1188-71 or ASTM-D 2726-73.

PART 2 - PRODUCTS

2.01 COMPACTED BASE COURSE

A. Aggregates

01. Crushed gravel or other approved materials, mixed with approved binder material of such character that composite material will compact thoroughly

under watering and rolling to hard-bonded surface. Fill material shall be non-expansive soil which may be gravel, sand, silt or clay, or any combination there of. Composite mixture shall conform to the following:

Sieve Designation	Percent by Weight Passing Square Mesh Sieve
4 inch	100
1 inch	90 to 100
No. 4	70 to 100
No. 200	15 to 40
P.I.	<15

Fifty (50) percent of weight of materials above the No. 10 sieve shall have a minimum of two (2) 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 Drawings or as otherwise specified noted or directed. With approval of Architect, Contractor may use cement treated aggregate base course in lieu of aggregate base course. No organic, frozen or decomposed material shall be utilized. Fill material shall be approved by the Geotechnical Engineer.

02. Pavement subgrade and fill below paved areas shall consist of Class I or Class II material as specified in Section 304 of the "New Mexico State Highway and Transportation Department Standard Specifications for Highway and Bridge". Base course shall be compacted to a minimum 95 percent of maximum density as determined by ASTM D – 1557.

.03 Testing of Base Course Material shall be tested in accordance with AASHTO methods as specified below:

Mechanical Analysis	AASHTO T 27
Passing No. 200 Sieve	AASHTO T 11
Liquid Limit	AASHTO T 89
Los Angeles Abrasion	AASHTO T 96
Soundness (5 cycle Magnesium)	AASHTO T 104
Sulphate Solution	Materials Testing
Linear shrinkage	Controls Manual

B. Asphalt Pavement

01. Pavement Section

Location	Asphalt Concrete	Aggregate Base Course
Automobile Parking	3 inch	6 inch
Automobile Driveways	3 inch	6 inch

02. **Asphalt** shall be **Class B** as described in Section 401 of the "New Mexico State Highway and Transportation Department Standard Specifications for Highway and Bridge Construction". Asphalt paving shall exhibit a minimum Marshall stability of 1800 pounds and shall be compacted to a minimum of 96 percent of maximum Marshall density.

2.02 ASPHALT TOPPING MIX

A. Proportion of asphalt cement by weight added to aggregate to be between 4 and 7 percent of dry weight of aggregate.

2.03 PAVEMENT MARKING AND STRIPING

A. Wellborn Acrylic Lead-Free Marking Traffic Paint (TT-P1952D), or acceptable substitution, while, four (4) inches wide when marking parking spaces, use (6) inch wide stripe elsewhere.

PART 3 - EXECUTION

3.01 PREPARATION

A. Ruts, yielding spots, and other areas in compacted subgrade having inadequate compaction shall be corrected, reshaped and recompacted to line up and grade prior to laying of base course.

3.02 INSTALLATION

A. Base Course

01. General

a. Subgrade shall be cleaned of loose and deleterious materials, shall be free from frozen material, and top six (6) inches shall have moisture content not exceeding optimum plus or minus two (2) percentage

points as determined by AASHTO T 180, compacted in accordance with SECTION 02300. EARTHWORK.

b. Mixing shall provide homogenous mixture of unsegregated and uniformly dispersed materials as placed in position for compaction.

c. Base course material and water shall be mixed in an approved mixer. Water shall be added during mixing operation in amount necessary to provide optimum moisture content for placement plus or minus two (2) percentage points. After mixing, base course material shall be transported to job site while it contains proper moisture content and shall be placed without delay on roadbed or parking area substrate or combination by means of an approved aggregate spreader.

02. Spread and compact base course in layers that will permit required density to be obtained. Density requirements will be determined by AASHTO T 180. Unless otherwise provided, base course shall be compacted to not less than 95 percent of laboratory established density. Densities will be determined in compliance with AASHTO T 205, use of nuclear methods in conformity with AASHTO T 238 and T239.

03. Material shall be placed, spread, bladed and compacted by watering and rolling to six (6) inch minimum thickness for asphalt paving and four (4) inch thickness for concrete paving.

B. Surface Course

01. General

a. Tack Coat shall be applied evenly and uniformly to surface of prepared base course preceding the placing of asphalt surface course. Tack coat shall consist of cationic emulsified asphalt as specified in SECTION 112, New Mexico Public Works. Base course surface shall be free of water, all foreign material, or dust when applying tack coat. No greater area shall be treated in any one (1) day than will be covered by asphalt surface course during the same day. Traffic shall be permitted over tack coating.

aa. Application rate shall be minimum o.10 gallons per square yard or as designated by the Architect.

ab. Tack coat shall not be applied on wet surfaces; during wet weather; nor after sunset; nor when atmospheric temperature is below 40 degrees

ac. Apply tack coat to any surface of any course if, in the opinion of the Architect, the surface is such that satisfactory bond cannot be obtained between surface and succeeding course.

ad. Contact surfaces of cold pavement points, curbs, gutters, manholes, etc. shall be painted with tack coat immediately before adjoining asphalt surface course is placed. Surfaces where tack coat is required shall be cleaned to the satisfaction of the Architect before application of tack coat.

b. Deliver asphalt topping mix to job site at temperature of not less than 225 degrees F., lay to lines and grades indicated and compress by power driven roller, overlapping on successive trips by at least one-half width of roller, until roller marks are ironed out and wearing surface compacted to a density of not less than 96 percent in accordance with modified AASHTO T – 180.

c. Areas not readily accessible to roller compaction shall be compacted by use of hand tampers.

d. Upon completion, any spots indicating puddling of water shall be reworked as directed by Architect until remedied.

02. Placing

a. Bituminous mixtures shall be covered with tarpaulins while being hauled. Tarpaulins shall completely cover load and shall be firmly tied down. Mixtures shall be delivered to site without segregation of ingredients and within temperature range specified.

b. Asphalt paving may be placed when temperature is 40 degrees F and rising and weather is favorable as determined by Architect. Do not place asphalt in wet weather or on wet surface. Asphalt shall be evenly spread upon base to such a depth that after rolling it will be specified cross section and grade of course being constructed.

c. Depositing and spreading of asphalt shall be accomplished by means of self-propelled mechanical spreading and finishing machine designed especially for that purpose. Machine shall be equipped with vibrating or tramping screen capable of being accurately regulated and adjusted to distribute layer of material to definite predetermined thickness and template. Paving machine shall be equipped with an automatic leveling device controlled from an external guide. Initial pass for each course shall be made using paver equipped with a 40 foot minimum external reference, except this shall not apply wen asphalt is placed adjacent to concrete pavement of gutter.

Subsequent passes shall utilize matching device of one (1) foot minimum length, riding on adjacent lift.

d. Joints shall be completely bonded.

e. In narrow, deep, or irregular sections, turnouts or driveways, where it is impractical to spread and finish base and level surface mixtures by machine methods, Contractor may use spreading equipment or acceptable hand methods approved by Architect.

C. Rolling

01. Asphalt shall be thoroughly compacted by rolling. Both steel wheel and pneumatic rollers shall be used.

02. Rolling shall be commenced with steel wheel roller along lower edge of area to rolled and be continued until edge is thoroughly compacted throughout and is true to grade and cross section.

03. Rollers shall be maintained in good mechanical condition, and tose that cannot be operated without perking or driven along straight path shall not be used. No leakage from roller shall be allowed to come in contact with pavement being constructed nor shall any roller be permitted to stand motion lesson any portion of the work before it has been properly compacted. Steel roller wheels shall be treated with water or oil to prevent adherence of asphalt, and water or oil may be used on pneumatic-tired rollers by quantity used must not be such as to be detrimental to surface being rolled.

04. Rolling of both base course and surface course shall be continued until all roller marks are eliminated and a density of at least 96 percent of density of laboratory specimen of same mixture. In areas not accessible to roller, 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 surrounding pavement.

05. Where rolling cannot be successfully accomplished due to limited access, Contractor shall use mechanical tamping equipment.

D. Joints

01. Exercise care in connection with construction of joints to insure that surface of pavement is true to grade and cross section. In making joints along any adjoining edge such as curb, gutter or an adjoining pavement and after hot mixture is placed by finishing machine, sufficient hot material shall be carried back to fill any space left open. This joint shall be properly “set up” with back of rake at proper height and level to receive

maximum compression under rolling. Work of "setting up" joint shall be performed by competent workmen who are capable of making a correct, clean and neat joint.

02. Longitudinal and transverse joints shall be made in 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 manner to insure thorough and continuous bond between old and new surfaces. In the case of surface course, edge of old surface course shall be cut back for its full depth to expose fresh surface and, if necessary to obtain well-bonded joint, shall be painted with tack coat after which hot surface mixture shall be placed in contact with it and raked to proper depth and grade. Before placing mixture against contact surfaces of curbs, gutters, headers, manholes, etc. they shall be painted with tack coat.

03. No asphalt surface course shall be placed which cannot be finished within daylight hours of same day it is laid unless otherwise specified or directed by Architect.

E. Manholes and Valve Covers

01. Manhole frames and valve covers shall be raised or lowered prior to placing surface course. Contractor may use extension rings or other methods acceptable to Architect. Manhole covers shall be clean of asphalt.

F. Smoothness

01. Upon completion, pavement shall be true to grade and cross section. Except at intersections or changes in grade, when 10 foot straight edge is laid on finished surface parallel to centerline of roadway, surface shall not vary from edge of straight edge more than 3/16 inch. Areas that are not within this tolerance shall be brought to grade immediately following initial rolling.

02. After completion of final rolling, smoothness of course shall be checked, and irregularities that exceed specified tolerances or that retain water on surface shall be corrected by removing the defective work and replacing with new material as directed by the Architect at the expense of the Contractor.

3.03 FIELD QUALITY CONTROL

A. Tests

01. Provide density tests for compacted base coarse at one (1) per 4000 square feet and wearing surface at one (1) per 4000 square feet, shall be made by Testing Laboratory approved by Architect in accordance with AASHTO T – 180-70. Tests taken at location and at depths designated by Architect. If a test indicates density below that specified, area shall be recompacted as required and additional tests shall be made at Contractor's expense until specified density is achieved.

B. Test Reports

02. One (1) copy of density tst reports delivered directly to Architect for each prescribed test.

C. Costs of Testing

03. Costs of tests specified, or required, shall be paid by Contractor.

3.04 PAVEMENT, MARKING AND STRIPING

A. Thoroughly clean areas to receive markings and striping, locate where indicated on Drawings. Apply paint in strict accordance with the manufacturer's recommendations. Use two (2) coats paint, do not apply on wet or damp surfaces. Use all means necessary to protect painted surfaces until dry.

3.05 CLEANING

A. Thoroughly clean adjacent materials of soiling resulting from the Work.

END OF SECTION

SECTION 32 17 23 PAVEMENT STRIPING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. **Pavement Striping – Inside Apparatus Bay – Bays 1,2,3**

2. **Pavement Striping – On Concrete Apron and Asphalt Paving**

1.02 RELATED SECTIONS

A. Division 01 – General Requirements
B. Division 03 – Concrete – on Structural Drawings
C. Division 32 – Asphalt Paving

1.03 SUBMITTALS

A. Submit product information and color selections.

PART 2 - PRODUCTS

2.01 PAINT

A. **White Traffic Paint / Striping**

1. DuPont #LF32M30P, Hawkins-Hawkins Co. #V10-31, or equal.

2. (6) inch wide stripe typical. Full length of Bay1,2,3, concrete apron, and asphalt paving.

PART 3 - EXECUTION

3.01 STRIPING

A. Mark and stripe uniformly in design, position, and application.

B. Do not apply paint to the paved surface within 24 hours after paving.

C. Apply two coats of paint in accordance with manufacturer's directions.

Protect adjacent surfaces against splatter or stains.

END OF SECTION

SECTION 32 92 19 SEEDING

1.01 SUMMARY - Work to be done includes all labor, materials, transportation, equipment and services required to complete the soil preparation. Execute labor to achieve soil preparation, complete, as shown and as specified planting as indicated

PART 1 - GENERAL

1.01 DESCRIPTION

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

B. Scope: Prepare all areas indicated on the Drawings for **Grass Hydro-Seeding** according to the specifications and drawings contained in the Contract Documents, including: furnishing and installing all seed, fertilizer, organic soil amendments and related maintenance.

1.02 QUALITY ASSURANCE

A. Contractor Qualifications: All work specified herein shall be performed by a licensed landscape contractor experienced with the type and scale of work required and having equipment and personnel adequate to perform the work satisfactorily.

1.03 APPLICABLE STANDARDS

A. All grass seed shall be certified by state of origin. The certification authority for the state of New Mexico is the New Mexico Crop Improvement Association.

1.04 SUBMITTALS

A. Product Data:

1. Proposed source of all native grass seed which shall indicate the location from which the seed was harvested, prior to ordering seed.

2. Submit type and source of soil amendment and fertilizer for approval prior to ordering soil amendment.

B. Seed Tags: Seed bag tags and weights per bag and copies of invoices identified by project name.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Keep fertilizer and seeds in dry storage away from contaminants.

SECTION 32 92 19 SEEDING

1.06 JOB CONDITIONS

A. Sequencing, Scheduling: Schedule to seed to coincide with natural rain events.

1.07 WARRANTY

A. Warranty seeded areas through specified maintenance period, as outlined in Paragraph 3.04, Maintenance.

B. Where native grass is installed in areas without an irrigation system, no warranty shall be required after the date of final acceptance of all the contract work.

PART 2 - MATERIALS

2.00 SEED MIX

A. All native grass seed shall be obtained from sources in New Mexico unless proof is provided that a particular seed is unavailable within the state. Fescue seed shall be obtained from approved producers.

B. Contractor shall furnish certification showing origin of all seed and pure live seed (P.L.S.) content as determined by a certified authority. Pure live seed shall be the product of percent purity time's percent germination. Each bag of seed shall be tagged and sealed by the seed dealer in accordance with the State Department of Agriculture or other local certification authority within the state of origin. The tag or label shall indicate analysis of seed and date of analysis, which shall not be more than 9 months prior to delivery date. Seed may be premixed by the seed dealer and appropriate data indicated on the bag label for each variety.

C. Native Grass Reseeding: The seed mixes shall be as follows: a. Santa Fe Trail - Seed Mix (Irrigated / Non-Irrigated): Seed mix by Curtis and Curtis Seed and Supply 4500 N. Prince St, Clovis, NM 88101. Phone: (575) -762-4759, or approved equal. Seed mix rate: 2.0 lbs/1000 SF

Common Name	**Botanical Name**
Western Wheatgrass	*Agropyron smithii*
Sideoats Grama	*Bouteloua curtipendula*
Galleta	*Hilaria jamesii*
Little Bluestem	*Agropyron scoparium*
Blue Grama	*Boutelua gracilis*
Indian Ricegrass	*Achnatherum hymenoides*
Buffalograss	*Buchloe dactyloides*
Alkali Sacaton	*Sporobolus airoides*
Sheep Fescue	*Festuca ovina*

SECTION 32 92 19 SEEDING

2.02 FERTILIZER

A. Fertilizer shall be manufactured from quality materials, be free from impurities, uniform in composition, meet recognized standards for effectiveness and be free flowing and suitable for application with approved equipment.

B. Fertilizer shall be delivered to the site in bags or other containers, each clearly labeled, conforming to applicable state laws, bearing the grade and trade name of the producer.

C. Application: Care shall be taken when spreading fertilizer that there are no gaps during application. The fertilizer shall be applied under favorable conditions and by such approved methods as will ensure maximum uniformity of distribution.

D. Fertilizer: Exact fertilizer mix may be altered to reflect results of soil analysis, but for purposes of bidding the following fertilizer shall be used in the following applications:

Seed Mix Microrhyza: Mix the following with seed mix at a rate of 1 lb / 5 acres (best done at facility):

- Endomaxia (or approved equal) Soil Secrets LLC & Soil Secrets Worldwide LLC 9 Gilcrease Road, Los Lunas, New Mexico 87031 Phone: 505-866-7645; email: info@soilsecrets.com; web: www.soilsecrets.com

Seed Mix Fertilizer: Mix the following with mulch / tackifier at a rate of 22 bags / 1 acres:

- Protein Crumblies (or approved equal) Soil Secrets LLC & Soil Secrets Worldwide LLC 9 Gilcrease Road, Los Lunas, New Mexico 87031 Phone: 505-866-7645; email: info@soilsecrets.com; web: www.soilsecrets.com

Seed Mix Soil Conditioner: Mix the following with mulch / tackifier at a rate of 44 bags / 1 acres:

- TerraPro (or approved equal) Soil Secrets LLC & Soil Secrets Worldwide LLC 9 Gilcrease Road, Los Lunas, New Mexico 87031 Phone: 505-866-7645; email: info@soilsecrets.com; web: www.soilsecrets.com

2.03 MULCH AND TACKIFIER

A. The tackifier shall be a colloidal polysaccharide or wood fiber tackifier. The tackifier shall be homogeneous within the unit package. It shall have no growth or germination inhibiting factors and be nontoxic. It shall be dry mixed with the fertilizer and soil conditioner at a rate of 1 bale per 1,000 sf.

B. Apply mulch and tackifier at a rate of 1⁄2” layer evenly across seeded areas.

SECTION 32 92 19 SEEDING

PART 3 - EXECUTION

3.00 PREPARATION

A. Preparation of Subgrade: Clear existing soil free of roots, plants, sod, stones, clay lumps and other extraneous materials harmful or toxic to plant growth.

B. Preparation for Seeding:

1. The extent of seed bed preparation shall not exceed the area on which the entire seeding operation can be accomplished to such prepared seed bed within a 24 hour period, unless otherwise directed by the Architect.

2. All areas to be seeded shall be brought to an even grade and shaped to drain. Areas to be seeded shall be graded to meet finished grades, and be uniformly compacted to prevent uneven settlement after seed installation and watering.

3. Rototill to the following depths:
Native Grass: top four (4) inches. Rototill area twice in cross directions. Rototilling shall not occur when the wind is over 10 mph and creates a dust problem to adjoining areas.

4. Fine rake and remove stones over 1/2" in any dimension, sticks, roots, rubbish and any other extraneous matter brought to surface by the rotilling process. Drag to even grade, and compact to ninety (90) percent modified proctor.

5. Water area to be seeded thoroughly. Apply a minimum of two inches of water throughout area. Allow area to dry.

6. Regrade as necessary to insure drainage and to meet proposed grades. Correct any differential settlement.

C. Harvested Topsoil Reapplication:

1. Before spreading topsoil ensure that all necessary erosion and sediment control practices are in place and functioning properly. These practices must be maintained until the site is permanently stabilized.

2. Maintain grades on the areas to receive topsoil according to the approved plan and do not alter them by adding topsoil.

3. Immediately prior to spreading the topsoil, loosen the subgrade by disking or scarifying to a depth of at least 4 inches to ensure bonding of the topsoil and the subsoil. If no amendments have been incorporated, loosen the soil to a depth of at least 6 inches before spreading the topsoil.

4. Uniformly distribute topsoil to a minimum compacted depth of 2 inches on 3:1 slopes and 4 inches on flatter slopes. Topsoil shall not be spread while it is frozen or muddy or when the subsoil is frozen or muddy. Do not apply topsoil to slopes greater than 2:1 to prevent slippage.

5. If topsoil is stockpiled prior to final placement, the top 1 foot of the stockpile material should be mixed with the remainder of the stockpile to ensure that living organisms are distributed throughout the topsoil material at the time of final placement.

D. Moisten prepared areas before seeding if soil is dry. Do not create muddy soil conditions.

E. Approval of Seed Bed Preparation: Seed bed preparation is to be approved by the Architect immediately prior to the seeding operations, and after all seed bed preparation is complete.

3.01 SEEDING

A. General:

1. Do not use wet seed or seed that is moldy or otherwise damaged in transit or storage.

2. Sow not less than the quantity of seed specified or scheduled.

B. Seeding Dates: Shall be accomplished between **June 15th and September 1st** unless specific permission in writing is issued by the Architect to allow seeding before or after these dates.

C. Seeding Rate and Mix: As per Paragraph 2.00.C. D. Drill Seeding:

1. Where indicated on the plans, the seed shall be mechanically broadcast by use of a range drill seeder. Seed should be drilled to a depth of 1⁄4”.

2. Contractor’s vehicles and other equipment are prohibited from traveling over the seeded areas.

3.02 MULCH / TACKIFER

A. Immediately following the drill seeding operation, seeded areas on slopes less than 2:1 shall receive mulch/tackifier at the even rate of 1⁄2” depth throughout the seeded area.

B. Spread mulch to achieve an even coverage.

C. All areas receiving insufficient coverage in the opinion of the Architect shall receive additional mulch / tackifer.

3.03 RESEEDING

A. Void areas greater than one square foot, or repetitive voids smaller than one square foot which amount to more than 10% of any area that occur within 60 days after installation shall be reseeded.

3.04 MAINTENANCE

A. Begin maintenance immediately after planting.

B. Maintain seeded grass for not less than the period stated below, and longer as required to establish an acceptable grass stand.

1. Maintenance shall continue through the first mowing, or until the entire landscape project is accepted, and until the end of the maintenance period. Maintenance period shall be not less than sixty (60) days after substantial completion, unless otherwise approved by the Architect.

2. Maintain seeded areas by watering fertilizing, weeding, mowing, trimming and other operations such as rolling, regrading and replanting as required to establish an acceptable grass stands, free of weeds and eroded or bare areas. Irrigate by means of the underground automatic irrigation system where irrigation is available, as often as necessary to promote healthy grass growth, and until a thick, even stand of grass has been obtained.

3.05 CLEANUP AND PROTECTION

A. During the work, keep all pavements clean and work area in an orderly condition.

B. Protect existing elements from damage due to seeding operations, operations by other contractors, other trades and trespassers. Maintain protection during installation and maintenance periods. Treat, repair or replace damaged work to the satisfaction of the Owner at no cost to the Owner.

C. Preservation of Existing Vegetation: The Contractor shall preserve and protect all existing vegetation adjacent to areas being seeded and which do not unreasonably interfere with construction procedures. The contractor shall replace or restore, at his own expense, all vegetation that may be destroyed or damaged which has not been protected or preserved as specified herein.

SECTION 32 92 19 SEEDING

3.06 OBSERVATION AND ACCEPTANCE

A. When work is completed, including maintenance, the Architect will, upon request, make an observation to determine acceptability.

B. All seed must be well-rooted into sub grade and any bare spots, low areas or dead native grass must be repaired or reseeded to the satisfaction of the Owner prior to acceptance. Final acceptance of all grass areas shall be when a minimum of 80% germination is evidenced and approved by the Architect and all areas have been seeded for a minimum of twenty eight (28) days.

C. When observed work does not comply with requirements, reseed rejected work and continue specified maintenance until re-observed by Architect and found to be acceptable.

D. The owner shall begin grass establishment operations upon acceptance of grassing operations by the Architect.

END OF SECTION

SECTION 34 71 13 VEHICLE BARRIERS

PART 1 - GENERAL

1.01 SUMMARY

A. Work Included:

1. **Fixed Bollards**
2. **Bollard Sleeves**

1.02 REFERENCES

A. ACI - American Concrete Institute Manual of Concrete Practice.

B. ASTM – American Society for Testing and Materials

1.03 SUBMITTALS

A. Comply with Section 01 33 00 – Submittal Procedures

B. Product Data: Submit product data and manufacturer's current printed specifications and catalog cut sheets for the work.

C. Shop Drawings:
1. Show plans, elevations, with dimensions, materials, details of inserts, joints and reinforcements and connections to all adjoining work.

D. Samples:
1. Color and finish for each type of product.

E. Contract Closeout Submittals:
1. Operations and Maintenance Data.

1.04 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Show not less than five (5) years successful and continuous experience in work of the type(s) shown on the Drawings.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Furnish materials in manufacturer's unopened, original packaging, bearing original labels showing quantity, description and name of manufacturer. Verify that materials and components are adequately padded and secure in such a manner that no damage occurs to the product during delivery and unloading at the site.

B. Storage: Damaged materials will be rejected.

1.06 SEQUENCING AND SCHEDULING

A. Acceptance: Do not install prior to acceptance by Architect of area to receive such materials.

B. Coordination:
Coordinate with the work of other sections to insure the following sequence Of construction.

1. **Bollards**: set anchors or sleeves in place and pour footings prior to installation of adjacent paving. Steel pipes to be set true, correctly aligned, and properly anchored. Cores filled with concrete and strike level to top of pipe.

2. Install anchors, bolts and fittings in appropriate formwork prior to installation of adjacent paving or walls.

PART 2- PRODUCTS

2.01 MATERIALS (for bidding purposes only; substitutions may be submitted for consideration)

A. **Bollard Sleeves**

1. POST GUARD BOLLARD COVERS
Encore Commercial Products
37525 Interchange Drive, Farmington Hills, MI 48335
866-737-8900
www.postguard.com

2. To match existing Bollards and Sleeves
a. YELLOW w/ RED REFLECTIVE TAPE STRIPES
b. Approximately 8” Diameter x 52” High – verify in field

END OF SECTION

CUT SHEETS AND PRODUCTS

© Spears Horn Architects

592/599

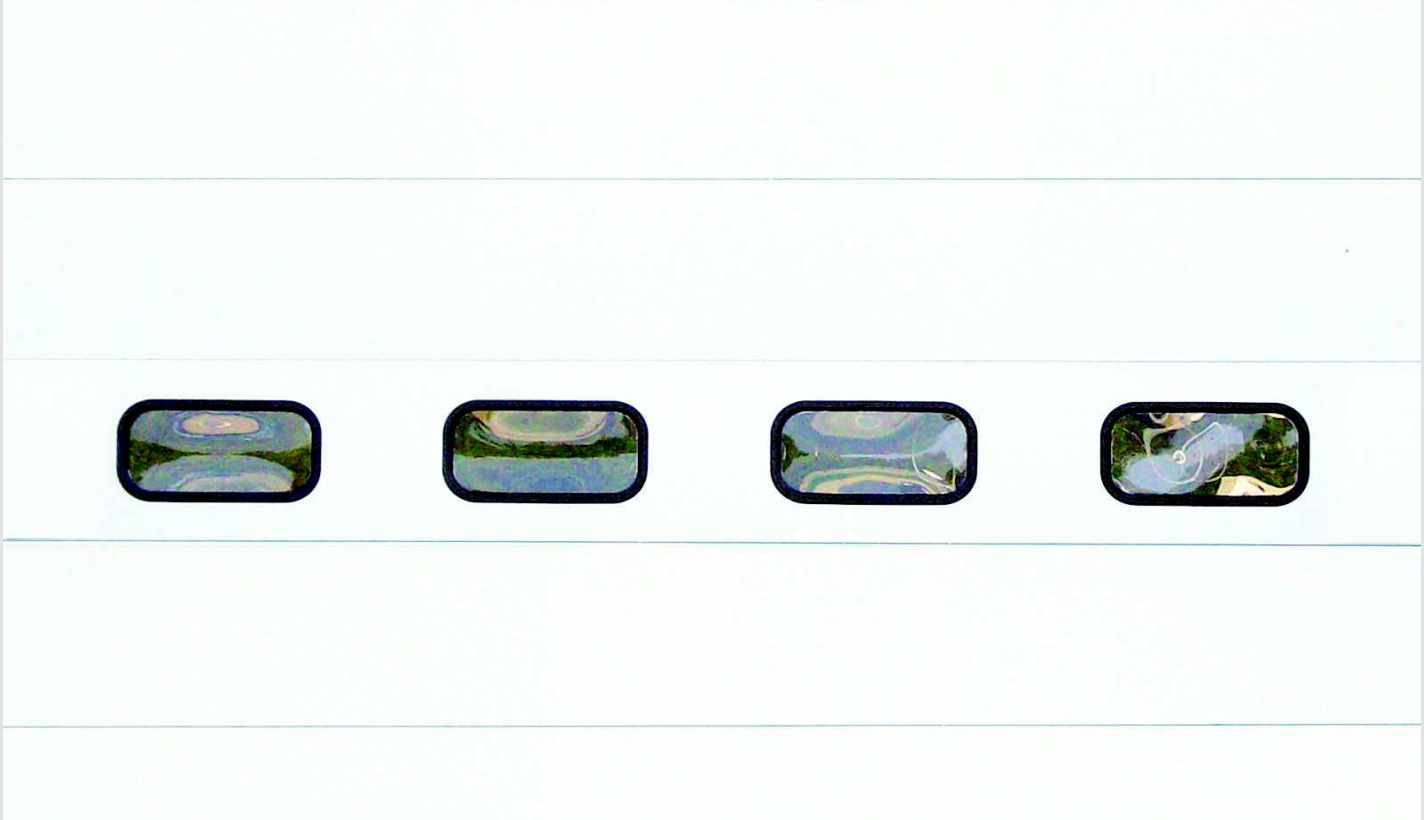
THERMACORE® DOOR SYSTEMS

INSULATED SECTIONAL DOORS

THE BEST TECHNOLOGY.
HIGH THERMAL EFFICIENCY.
DURABLE.

OVERHEAD DOOR®

INDUSTRY LEADING
COMMERCIAL & INDUSTRIAL SOLUTIONS



Standard features at a glance

Thermal efficiency	
R-value*	17.50 (3.09 K m²/W)
U-value	.057 (.324 W/K m²)
Thermal break	PVC
Air infiltration	at 15 mph (24 kmph): .08 cfm/ft² (1.46 m³/hr/m²)
Construction	
Panel thickness	2" (51 mm)
Max height	32'1" (9779 mm)
Max width	40'2" (12243 mm)
Exterior steel	.015" (.38 mm)
Exterior surface	Model 592: Ribbed, textured Model 599: Flush, textured
Standard springs	10,000 cycle
STC rating	Class 26
Color options	
Interior colors	White
Exterior colors	Model 592: White, Tan, Gray, Brown, Model 599: White
Limited warranty	10-year delamination 1-year door 3-year/20,000 cycle door and operator system (material and workmanship)

Options

- Thermal glazing
- Wind load options
- Four-section pass door
- High-usage components
- 592 only: Trinar finish option available in white, brown, and beige (20-year limited warranty)
- Electric operator
- Chain hoist
- Posi-Tension® drums
- Stop bottom fixture
- Bottom sensing edge
- Header and jamb seal
- Aluminum sash section available to 24'2" (7366 mm) wide
- Exhaust ports

***R-value:** R-value is a measure of thermal efficiency. The higher the R-value the greater the insulating properties of the door. Overhead Door Corporation uses a calculated door section R-value for our insulated doors.

Cover image: *Model 592, Aluminum Sash Section with DSB Glazing windows, custom paint finish*

Image above: *Model 599, Double Thermal Acrylic windows, white paint finish*

The most thermally efficient door system

With a 17.50 R-value (3.09 W/Msq) and .057 U-value (.324 Msq/W), the Thermacore® Models 592/599 are the energy-efficient door of choice for commercial use. The 592/599 also incorporate a thermal break and joint seal to prevent thermal transfer between exterior and interior door panel skins. The door is designed for the most demanding situations, including high-cycle, wind load and thermal applications.Built with the best technology in the business.

Model 592, Double Thermal Acrylic windows, White paint finish, pass door

Panel options

Model 592
Ribbed, textured panel

Model 599
Flush, textured panel

Color options

Model 592

White | Industrial Brown | Gray | Tan

Optional: Trinar White, Trinar Beige and Trinar Brown.

Model 599

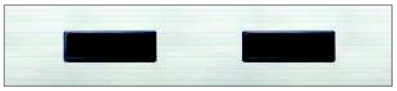
White

Actual colors may vary slightly from these shown due to fluctuations in staining or the printing process.
Ask your Overhead Door™ Distributor for color samples.

Glazing options

Double Thermal Acrylic (25" w by 12" h)

Aluminum Sash Section with DSB glazing



Insulated DSB (24" w by 7" h)

Clear Long* (44" w by 15" h)
*Not available on doors wider than 20'2".

Model 599, Air Force Academy, Colorado Springs.

Architect's Corner

A resource for architects, containing comprehensive technical and resource materials to support your project, including drawings and specifications for commercial doors.

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The original, innovative choice for unequaled quality and service.

Overhead Door Corporation pioneered the upward-acting door industry, inventing the first upward-acting door in 1921 and the first electric door operator in 1926. Today, we continue to be the industry leader through the strength of our product innovation, superior craftsmanship and outstanding customer support, underscoring a legacy of quality, expertise and integrity. That's why design and construction professionals specify Overhead Door™ products more often than any other brand. Our family of over 400 Overhead Door™ Distributors across the U.S. and Canada not only share our name and logo, but also our commitment to excellence.

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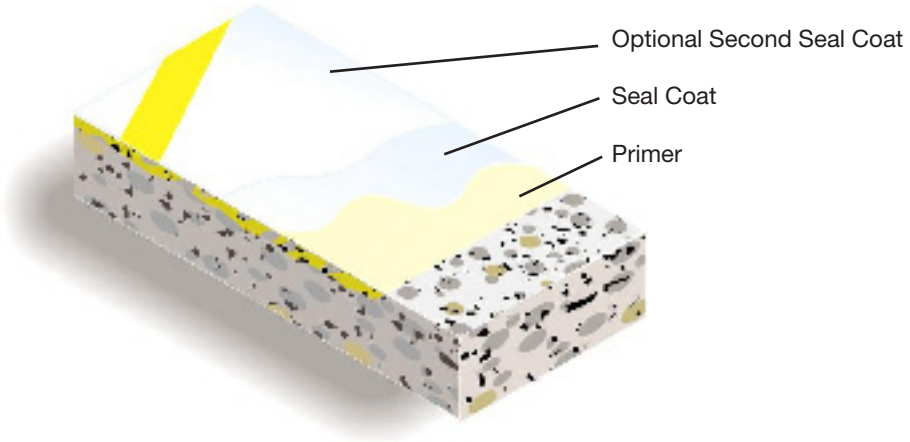
Aircraft Hangar/Industrial

Plant Coating

General Polymers AIRCRAFT HANGAR / INDUSTRIAL PLANT COATING is designed to provide a thin-mil, light reflective, and chemical resistant finish.



Advantages

- High solids
- Easy to maintain
- Chemical and abrasion resistant
- High mil build per coat speeds project turnaround
- Good hiding
- Acceptable for use in USDA inspected facilities

Uses

- Warehouses
- Industrial plants

Typical Physical Properties

Color	Standard Colors Computerized custom color matching available upon request
Abrasion Resistance ASTM D 4060, CS-17 Wheel, 1,000 cycles	100 mgs lost
Resistance to Elevated Temperatures MIL-D-3134J	No slip or flow at required temperature of 158ºF
Adhesion ACI 503R	300 psi concrete failure
Hardness, Shore D ASTM D 2240	75/65
Flammability	Self-extinguishing over concrete

ASTM C = Mortar System
ASTM D = Resin only

Installation

The following information is to be used as a guideline for the installation of the **Epoxy Floor Coatings.** Contact the Technical Service Department for assistance prior to application.

Surface Preparation — General

General Polymers systems can be applied to a variety of substrates, if the substrate is properly prepared. Preparation of surfaces other than concrete will depend on the type of substrate, such as wood, concrete block, quarry tile, etc. Should there be any questions regard a specific substrate or condition, please contact the Technical Service Department prior to starting the project. Refer to Surface Preparation (Form G-1).

Surface Preparation — Concrete

Concrete surfaces shall be abrasive blasted to remove all surface contaminants and laitance. The prepared concrete shall have a surface profile equal to CSP 1-3. Refer to Form G-1.

After initial preparation has occurred, inspect the concrete for bug holes, voids, fins and other imperfections. Excessive surface profile may require a body coat prior to system application. Protrusions shall be ground smooth while voids shall be filled with a General Polymers system filler. For recommendations, consult the Technical Service Department.

Temperature

Throughout the application process, substrate temperature should be 60ºF - 95ºF. Substrate temperature must be at least 5ºF above the dew point. Applications on concrete substrate should occur while temperature is falling to lessen offgassing. The materials should not be applied in direct sunlight, if possible.

Application Information

VOC MIXED		MATERIAL	MIX RATIO	THEORETICAL COVERAGE PER COAT CONCRETE	PACKAGING
<50 g/L	**Primer**	3579	2:1	250 sq. ft. / gal.	3 or 15 gals
<100 g/L	**Seal Coat**	3746	2:1	200-250 sq. ft. / gal.	3 or 15 gals
<250 g/L	**Seal Coat**	4638	2:1	400-500 sq. ft. / gal.	3 or 15 gals

Primer 3579

1. Add 2 parts 3579A (resin) to 1 part 3579B (hardener) by volume. Mix with low speed drill and Jiffy blade for three minutes and until uniform. To insure proper system cure and performance, strictly follow mix ratio recommendations.
2. 3579 may be applied via spray, roller or brush. Apply 5-8 mils, evenly, with no puddles. Coverage will vary depending upon porosity of the substrate and surface texture.
3. Allow to cure 12-24 hours.
4. Check for surface blush.

Seal Coat 3746

1. Premix 3746A (resin) using a low speed drill and Jiffy blade. Mix for one minute and until uniform, exercising caution not to whip air into the material.

2. Add 2 parts 3746A (resin) to 1 part 3746B(hardener) by volume. Mix with low speed drill and Jiffy blade for three minutes and until uniform. Apply material to floor in thin bands and pull out using a red rubber squeegee and back roll using a 1/4" nap roller at a spread rate of 200-250 sq. ft. per gallon to yield 6-8 mils WFT .

3. Allow material to cure before applying second coat.

Seal Coat 4638

1. Premix 4638A (resin) using a low speed drill and Jiffy blade. Mix for one minute and until uniform, exercising caution not to whip air into the materials.
2. Add 2 parts 4638A (resin) to 1 part 4638B (hardener) by volume. Mix with low speed drill and Jiffy blade for three minutes and until uniform. Apply material via airless spray or with a 1/4" nap roller at a spread rate of 400-500 sq. ft. per gallon.
3. Repeat Steps 1& 2. Allow to cure at least 24 hours before opening to light foot traffic. Total system shall be 10-12 DFT mils.

Cleanup

Clean up mixing and application equipment immediately after use. Use toluene or xylene. Observe all fire and health precautions when handling or storing solvents.

Safety

Refer to the MSDS sheet before use. All applicable federal, state, local and particular plant safety guidelines must be followed during the handling and installation and cure of these materials.

Safe and proper disposal of excess materials shall be done in accordance with applicable federal, state, and local codes.

Material Storage

Store materials in a temperature controlled environment (50ºF - 90ºF) and out of direct sunlight.

Keep resins, hardeners, and solvents separated from each other and away from sources of ignition.

Maintenance

Occasional inspection of the installed material and spot repair can prolong system life. For specific information, contact the Technical Service Department.

Disclaimer

The information and recommendations set forth in this document are based upon tests conducted by or on behalf of The Sherwin-Williams Company. Such information and recommendations set forth herein are subject to change and pertain to the product(s) offered at the time of publication. Published technical data and instructions are subject to change without notice.

Consult www.generalpolymers.com to obtain the most recent Product Data information and Application instructions.

Warranty

The Sherwin-Williams Company warrants our products to be free of manufacturing defects in accord with applicable Sherwin-Williams quality control procedures. Liability for products proven defective, if any, is limited to replacement of the defective product or the refund of the purchase price paid for the defective product as determined by Sherwin-Williams, NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY SHERWIN-WILLIAMS, EXPRESSED OR IMPLIED, STATUTORY, BY OPERATION OF LAW OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

To learn more, visit us at

www.sherwin-williams.com/protective
or call 1-800-524-5979
to have a representative contact you.

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Protective & Marine Coatings 1/17

GUIDELINE INSTRUCTIONS FOR CONCRETE SURFACE PREPARATION (FORM G-1, REVISED 01/12)

INTRODUCTION

The following concrete surface preparation guidelines, serves as an aide to owners, design professionals, specifiers and contractors. All surfaces to receive General Polymers sealers, coatings, mortars and resurfacers, must be structurally sound, clean and at minimum, saturated surface dry (SSD). Proper surface preparation is an extremely important factor in the immediate and long-term successful performance of applied polymer floor or wall systems.

The contractor responsible for the installation of the polymer system shall be provided a substrate that is clean, durable, flat, pitched to specifications, SSD and free of surface contaminants. Providing the "proper substrate" is the responsibility of the owner, the owner's appointed representative and the concrete contractor, unless specifically stated otherwise. Guide Specification for “Cast in Place Concrete for Floor Slabs on Ground That Will Receive Semi-Permeable or Impermeable Floor Finishes”, should be referred to for installation of fresh concrete. Regardless of responsibility, the steps listed below must be accomplished prior to the placement of a bonded polymer system on concrete.

PROPER SURFACE PREPARATION

Proper surface preparation includes the following:

1. Inspection of the concrete substrate
2. Removal and replacement of non-durable concrete
3. Decontamination of the concrete surface
4. Creation of surface profile
5. Repair of surface irregularities

1. Inspection of the concrete substrate to determine its general condition, soundness, presence of contaminants, presence of moisture vapor emissions and the best methods to use in preparation of the surface to meet the requirements of the owner or the owner's appointed representative is critical. A proper evaluation will lead to the selection of the proper tools and equipment to accomplish the objective.

2. Removal and replacement of non-durable concrete must be accomplished prior to installation of the polymer system. Localized weak or deteriorated concrete must be removed to sound concrete and replaced with cementitious or polymer concrete repair mortars, or an engineered concrete mix design utilizing GP4700 series polyacrylate polymer additive. For application of these systems and compatibility with the selected polymer sealer, coating, lining or topping refer to the System Bulletins, Technical Data Sheets or the Technical Services Department. Occasionally, plain fresh concrete is required and must be bonded to existing concrete. When bonding fresh concrete to existing, prepare the existing concrete surface by scabbling, scarifying, abrasive (sand) blasting, needle scaling, high pressure water jetting (5,000 to 45,000 psi), or steel shotblasting. Apply a low modulus epoxy as the bonding agent at a rate of 80 square feet per gallon for a WFT of 20 mils, and then place the fresh concrete or mortar. Bonding to lightweight concrete may require a second coat of epoxy if the first coat is readily absorbed into the concrete surface. Always place the fresh concrete within the open time of the epoxy, while the epoxy-bonding agent is still wet. Rough concrete surfaces will require additional material depending on the surface profile. Fresh concrete should have a low water cement ratio (w/c) not to exceed 0.40. When bonding fresh concrete containing latex polymer admixtures, check compatibility of the latex modified concrete mixture by either installing a test patch and performing a pull-off test, or by conducting a slant shear test in accordance with ASTM C 882, in an independent concrete testing laboratory.

3. Decontamination of the concrete surface requires the removal of oils, grease, wax, fatty acids and other contaminants, and may be accomplished by the use of detergent scrubbing with a heavy duty cleaner/degreaser, low pressure water cleaning (less than 5,000 psi), steam cleaning, or chemical cleaning. The success of these methods is dependent upon the depth of penetration of the contaminant; which is completely dependent upon the contaminant's viscosity, the concrete's permeability and the duration of exposure. Special care should be taken when preparing concrete at an "in use" facility for repair, replacement or an initial floor topping. This is especially true for Food Processing facilities. Contaminants can be carried into exposed concrete as most of these facilities use copious amounts of water. The contaminants can be animal fats/oils, blood, cleaning solutions, microbes, etc. They may not be completely removed during preparation (shot blasting). The concrete may appear clean and well profiled.

A simple method to ensure you have sound concrete is to test the pH. The chemistry of concrete is alkaline in nature. Normal concrete should be in the range of 11 to 13. Most of the contaminants mentioned are neutral to acidic in nature. After preparation test the floor in multiple locations using distilled water and the pH paper. If the pH is 10 or lower additional preparation will be required to ensure a good bond. In areas where the contaminants can not be removed, the contaminated concrete must be removed and replaced as in 2., above.

CAUTION: Decontamination methods that introduce large amounts of water may contribute to moisture related problems as referenced in APPENDIX A.

4. Creation of surface profile can be accomplished by a number of methods each utilizing a selection of tools, equipment and materials to accomplish the intended purpose, (See METHODS OF SURFACE PREPARATION below). Selection is dependent upon the type of surface to be prepared and the type of system to be installed. In addition, floors, walls, ceilings, trenches, tanks and sumps each have their own particular requirements. The type and thickness of the selected polymer system also plays an important role in the selection process. Regardless of the method selected or tools employed, we must provide a surface that will accept the application of polymer-based products and allow the mechanical bond of the polymer securely to the concrete. The type of service the structure will be subjected to, will also help to define the degree of profile required. The surface profile is the measure of the average distance from the peaks of the surface to the valleys as seen through a cross sectional view of the surface of the concrete.

This dimension is defined pictorially and through physical samples in the ICRI Technical Guideline No 03732, and is expressed as a Concrete Surface Profile number (CSP 1-9).

- For General Polymers coating and sealing applications from 4 to 15 mils in thickness, the surface profile shall be CSP 1, 2, or 3, typically accomplished through decontamination of the concrete surface as defined in 3. above, followed by acid etching, grinding, or light shotblast.

- For General Polymers EPO-FLEX® and other coating applications from 15 to 40 mils in thickness, the surface profile shall be CSP 3, 4, or 5, typically accomplished through decontamination of the concrete surface as defined in 3. above, followed by light shotblast, light scarification or medium shotblast.

- For General Polymers CERAMIC CARPET™, TRAFFICOTE™, AquArmor™ S, AquArmor MCS, ***FasTop™*** MVT and other topping applications from 40 mils to 1/8", the surface profile shall be CSP 4, 5, or 6. These are typically accomplished through decontamination of the concrete as defined in #3 above, followed by light scarification, medium shotblast or medium scarification.

- General Polymers Terrazzo, CERAMIC CARPET™, TRAFFICOTE™, AquArmor™ S, AquArmor MCS, ***FasTop™*** MVT, ***FasTop*** Slurry and Mortar systems and other topping. Applications greater than 1/8", the surface profile shall be CSP 5, 6, 7, 8, or 9. These are typically accomplished through decontamination of the concrete as defined in 3 above, followed by medium shotblast, medium scarification, heavy abrasive blast, scabbled, or heavy scarification.

5. Repair of surface irregularities including bugholes, spalls, cracks, deteriorated joints, slopes, areas near transition zones, such as around drains and doorways, etc. must be repaired prior to the placement of the polymer system and/or the system must be designed to off-set the thickness of the irregularities. For removal and replacement information and materials, refer to item 2., above. For bugholes and other minor surface irregularities, fill with Epoxy Quick Patch (GP3500), GP4700 Instant Patch Resin or the system resin mixed with a vertical grade aggregate. For treatment of cracks and joints refer to the section below entitled "Crack Isolation". For additional questions, contact the Technical Service Department or, your local sales representative for specific recommendations.

For specific applications, always consult General Polymers System Bulletins, Technical Data Sheets or Technical Services
Department.

METHODS OF SURFACE PREPARATION

Depending upon conditions of the concrete one or more methods of surface preparation may be required. It is common for decontamination to precede mechanical preparation, and if necessary a second decontamination to follow.

The preferred methods for creation of a surface profile, including the removal of dirt, dust, laitance and curing compounds, is steel shotblasting, abrasive (sand) blasting or scarifying. The steel shotblasting or vacuum blasting process is commonly referenced by equipment brand names, such as, Blastrac, Vacu-Blast, Shot-Blast, etc. Vertical and overhead surfaces, such as cove base, wall, and ceiling surfaces shall be prepared utilizing methods of grinding, scarifying, abrasive (sand) blasting, needle scaling, high pressure water jetting (5,000 to 45,000 psi), or vertical steel shotblasting. CAUTION: The use of high pressure water jetting will introduce large amounts of water, which may contribute to moisture related problems as referenced in APPENDIX A. The following table provides a guide for the degree of surface profile required for the coating or overlay to be applied and the preparation methods used to generate each profile.

Application	Profile	Surface Preparation Method
Sealers	0-3 mils	Detergent scrub Low-pressure Water Acid Etching (not recommended) Grinding
Thin Film	4-10 mils	Acid Etching (not recommended) Grinding Abrasive Blast Steel Shot Blast
High-Build	10-40 mils	Abrasive Blast Steel Shot Blast Scarifying
Self-Leveling	50mils-1/8 inch	Abrasive Blast Steel Shot Blast Scarifying Needle Scaling High/Ultra high Pressure Water Jetting
Polymer Overlay	1/8-1/4 inch	Abrasive Blast Steel Shot Blast Scarifying Needle Scaling High/Ultra high Pressure Water Jetting Scabbling Flame Blasting Milling/rotomilling

Surfaces to receive the bonded polymer system must be inspected after the surface is prepared to insure that the substrate is sound and structurally durable. Areas found to be unsound or non-durable must be removed and replaced as described in 2., above. Dust or other deleterious substances not removed after the initial surface preparation must be vacuumed, leaving the surface dust free and clean.

Other surface preparation methods are mentioned in ADDITIONAL SURFACE PREPARATION REFERENCES below.

CRACK ISOLATION

The performance of elastomeric products such as EPO-FLEX® internally flexible epoxy, requires a relatively uniform dry film thickness to resist drying shrinkage and thermal movement of the concrete, while maintaining a seamless bridge or seal over the concrete. Therefore it is critical that all mortar splatter, protrusions, ridges, penetrations, or sharp projections in the surface of the concrete, be ground smooth or otherwise made smooth, in addition to the normal surface preparation outlined above.

Prior to application of an elastomeric system, control/contraction joints, construction joints, and cracks should be sealed with the selected system flexible sealant, i.e., 3580 Joint and Crack Filler, 4880 Polyurea Joint Sealant, EPO-FLEX flexible sealant. This coating should extend a minimum of 6" on either side of the joint or crack. The entire surface area should then receive the specified crack isolation system. Isolation and/or expansion joints should be detailed in accordance with the plans and specifications of an architectural or engineering design professional for the type of structure being considered. Consult the Technical Services Department for the proper selection and use of Isolation materials and the potential use of fiberglass scrim cloth for additional crack bridging capabilities.

NOTE: General Polymers systems can be applied to a variety of substrates if the substrate is properly prepared. Preparation of surfaces other than concrete or steel, such as wood, concrete block, brick, quarry tile, glazed tile, cement terrazzo, vinyl composition tile, plastics and existing polymer systems, can be accomplished to receive bonded polymer sealers, coatings, or toppings. For questions regarding a substrate other than concrete or steel, or a condition not mentioned in this guideline, contact the Technical Service Department prior to starting the project. For steel surfaces, refer to Guideline Instructions for Surface Preparation of Structural Steel, Form G-2.

ADDITIONAL SURFACE PREPARATION REFERENCES

Important and relevant information on surface preparation of concrete is available by referencing the following codes, standards, and guidelines.

SSPC — The Society for Protective Coatings, 40 24th Street, 6th Floor, Pittsburgh, Pa. 15222-4643, (412) 281-2331.

- SSPC-SP 13 Surface Preparation of Concrete
- SSPC-TU 2/NACE 6G197 Design, Installation, and Maintenance of Coating Systems for Concrete Used in Secondary Containment

ICRI — International Concrete Repair Institute, 38800 Country Club Drive Farmington Hills, MI 48331, (248) 848-3809

- Technical Guideline No.03732, "Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays". Includes visual standards to act as a guide in defining acceptable surface profiles for the application of industrial coatings and polymer floor toppings.
- Technical Guideline No.03730, "Guide for Surface Preparation for the Repair of Deteriorated Concrete Resulting from Reinforcing Steel Corrosion".

ASTM — American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, (610) 832-9585

- ASTM D 4258 "Practice for Surface Cleaning Concrete for Coating"
- ASTM D 4260 "Standard Practice for Acid Etching Concrete"
- ASTM D 4261 "Practice for Surface Cleaning Unit Masonry for Coating"
- ASTM D 4262 "Test Method for pH of Chemically Cleaned or Etched Concrete Surfaces"

APPENDIX A:
TESTING FOR MOISTURE VAPOR EMISSION FROM CONCRETE

Excess moisture in concrete can produce harmful effects of discoloration, interruption of the polymerization of products, and delaminating of non-permeable resinous systems. Sources of moisture fall into three distinct categories. Moisture present at the surface prior to or during application, moisture within the concrete that attempts to escape during and after application and a distinct source of moisture in intimate contact with the concrete that provides a continuous supply of moisture. Avoiding moisture related problems and understanding the options available for remediation once they occur is important. Detecting moisture in concrete may be accomplished by employing a number of methods briefly described below:

Relative Humidity Method BS 8201 and BS 5325 - These are British Standards that result in pass/fail of whether or not moisture is being emitted, but does not quantify the results. This is not a useful test.

Gel-B Bridge Test - This test measures electrical resistance of the concrete, but is dependent not only on the moisture content of the concrete, but also on the other constituents of the concrete. Calibration of the results obtained with this method, depend on knowing the mix design of the concrete and the raw material used. At best it is a difficult interpretation.

Radio Frequency (capacitance-impedance) Method- This method relies on portable electronic moisture meters that transmit strong radio waves that are absorbed by water. Calibration of the results obtained with this method depends on knowing the mix design of the concrete and the raw material used.

Carbide-Acetylene Test - This destructive test tells us nothing about the relative movement of moisture out of the concrete. It only quantifies that the portions of concrete removed and tested contain a measured content of moisture.

ASTM F 2170-02– Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using *in situ* Probes - The test method, modeled after the process uses in Europe for several years, requires drilling holes at a diameter of 5/8" to a depth equal to 40% of the slab's thickness. The hole is then lined with a plastic sleeve, capped and allowed to acclimate for 72 hours. The probe is placed in the sleeve, allowed to equilibrate for 30 minutes, and then readings are recorded. Acceptable relative humidity readings for substrates receiving non-permeable flooring are 80% or lower. Testing should take place in an acclimated building and is required to equal 3 tests in the first 1,000 square feet, with one additional test per each additional 1,000 square feet of concrete slab surface. This test method is less subject to conditions occurring at the concrete surface that may influence calcium chloride test results. This method only defines existing moisture content of the sample and cannot address moisture vapor transmission.

ASTM D 4263 - Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method - This qualitative method will indicate the presence of moisture movement, but it will not quantify the amount of moisture movement, and is only useful in determining that additional testing is required.

ASTM F 1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride Moisture Emissions Test - Originally developed by the Rubber Manufacturers Association, General Polymers Moisture Vapor Test Kits use anhydrous calcium chloride to make a quantitative evaluation of vapor emissions from the concrete. To determine the amount of moisture movement, the floor and surrounding environment must be in the anticipated service condition. The test must be conducted over raw exposed concrete, which has been exposed to the environment for at least 24 hours. A quantitative evaluation is conducted wherein the anhydrous calcium chloride container & contents are pre-weighed on a gram scale, allowed to remain in it's container with the lid removed, and the container placed under a sealed dome to prevent loss of moisture for a period of 60 to 72 hours.

Three tests are required for the first 1000 S.F., with one additional test for every 1000 S.F., or fraction thereafter. The container is removed and again weighed on a gram scale to determine the weight gain of the anhydrous calcium chloride. A calculation is performed to determine the amount of moisture adsorbed. These results are quantified as the rate of moisture vapor transmission expressed as pounds per 1000 square feet of surface area per 24 hours. General Polymers has adopted a commonly accepted value for application of polymer coatings or toppings to be not more than 3 pounds of moisture per 1,000 square feet per 24 hrs.

Moisture content and moisture movement, are merely snapshots in time of dynamic conditions within the concrete. Moisture vapor movement is dependent upon the relationship between temperature and humidity of the two adjacent environments. In this case, the internal environment of concrete and the external environment of the air surrounding the concrete. Any change in temperature and/or moisture content of either will result in a change in vapor pressure and the attempted movement of moisture vapor into or out of the concrete as referenced below:

It is the combination of temperature and humidity (called vapor pressure) that determines the direction of moisture movement. Moisture will move from a higher vapor pressure to a lower vapor pressure. When there is air movement over the surface of the concrete, moisture will attempt to move out of the concrete toward the area of air movement.

For these reasons, it is important to measure the temperature and relative humidity during the test period. The Moisture Vapor Test Kit values will not be useful in predicting possible problem areas unless the tests are conducted in the environment in which the structure will be used. The air temperature and humidity around the concrete during the test should be the same air temperature and humidity that will be in place during the useful life of the structure. Contact the Technical Service Department immediately if there are any questions concerning the use of the test kits or interpretation of the results.

- To successfully and predictably reduce moisture vapor emission rates apply one of the following remediation systems:
- FasTop MVT; or
- AquArmor MCS.

Consultation with the Technical Service Department for specific recommendations and utilized in accordance with application instructions. For slabs with potential moisture issues, utilizing systems that are designed to accommodate moisture movement from the slab such as FasTop and AquArmor Systems may be the most cost effective alternative. Whenever, moisture issues present themselves on a project document the conditions, inform the owner representative and consult with General Polymers technical service personnel.

Consult the technical paper, "Prevention of Moisture Related Disbondment of Non-Permeable Flooring Systems", for more details and potential solutions if a problem is detected. For copies of this and other technical articles, please visit our web site at www.generalpolymers.com or contact your local sales representative.

Note: The industry standard for curing concrete is 28 days. This is usually sufficient to allow excess moisture to leave a concrete slab. To minimize moisture related disbondment, new concrete should be allowed to cure 28 days before installation of General Polymers non-permeable resinous flooring systems. If any doubts exist concerning moisture in the slab, Calcium Chloride and/or Humidity tests should be run to document the presence of moisture.

DEW POINT CALCULATION CHART (FAHRENHEIT)

% Relative Humidity	AMBIENT AIR TEMPERATURE °F										
	20	30	40	50	60	70	80	90	100	110	120
90	18	28	37	47	57	67	77	87	97	107	117
85	17	26	36	45	55	65	75	84	95	104	113
80	16	25	34	44	54	63	73	82	93	102	110
75	15	24	33	42	52	62	71	80	91	100	108
70	13	22	31	40	50	60	68	78	88	96	105
65	12	20	29	38	47	57	66	76	85	93	103
60	11	19	27	36	45	55	64	73	83	92	101
55	9	17	25	34	43	53	61	70	80	89	98
50	6	15	23	31	40	50	59	67	77	86	94
45	4	13	21	29	37	47	56	64	73	82	91
40	1	11	18	26	35	43	52	61	69	78	87
35	-2	8	16	23	31	40	48	57	65	74	83
30	-6	4	13	20	28	36	44	52	61	69	77

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AIRVAC 911® SPECIFICATIONS

MODEL: AIRVAC 911®, VERTICAL AIR FLOW DESIGN, CEILING HUNG, RE-CIRCULATING AIR FILTRATION SYSTEM. MANUFACTURED BY: AIR VACUUM CORPORATION, 6 FARADAY DRIVE, DOVER, NH 03820.

FILTRATION: "4-STAGE" FILTER PACK. ALL FILTERS ARE INDUSTRY STANDARD SIZED, UL TESTED & CERTIFIED.

PRE-FILTER (STAGE 1): 24" X 24" X 1". 3-PLY POLYESTER CONSTRUCTION. TWO LAYERS OF 16/40 DUAL DENIER POLY FIBERS WITH A FINAL DUST CATCHING ADHESIVE LAYER. SELF-SEALING FILTER WITH PRE-INSTALLED INTERNAL HEAVY GAGE WIRE FRAME. PERFORMANCE BASED ON A.S.H.R.A.E. 52.1-1992 TEST METHOD. CLASSIFIED AS A UL CLASS 2 FILTER, ACCORDING TO UL STANDARD 900 AND CAN 4-S111.

MAIN MEDIA FILTER (STAGE 2): 24" X 24" X 6". **"HEPA MAX 3000"** HIGH EFFICIENCY PARTICULATE AIR FILTER. DOP TESTED WITH 0.3 MICROMETER SIZED PARTICLES TO HAVE A **MINIMUM EFFICIENCY OF UP TO 95% AND EXCEEDS THE MAXIMUM EFFICIENCY OF 98% ASHRAE 52.1 TESTED FILTERS.** CONSISTS OF A PLEATED MEDIA PACK ENCLOSED WITHIN A GALVANIZED STEEL FRAME ASSEMBLY. ULTRA-FINE FIBERGLASS MEDIA FORMED IN A SERIES OF PLEATS SEPERATED BY CORRUGATED ALUMINUN DIVIDERS TO MAINTAIN UNIFORM SPACING BETWEEN EACH PLEAT FOR OPTIMAL AIRFLOW. CLASSIFIED CLASS 2 ACCORDING TO U.L. STANDARD 900 AND IS CLASSIFIED MERV 16 IN ACCORDANCE WITH ASHRAE STANDARD 52.2. FOR INSTALLATION SAFETY, TOTAL WEIGHT NOT TO EXCEED 16 LBS.

GAS-PHASE EXTRACTOR (STAGES 3&4): ONE 24" X 24" X 4", **"MULTISORB 3000"** BLENDED GAS PHASE EXTRACTOR. 50/50 RESPIRATOR GRADE ACTIVATED CARBON GRANUALS EFFECT FOR REMOVAL OF HIGH WEIGHT MOLECULAR GASES WITHIN DIESEL EXHAUST (VOC'S, HYDROCARBONS, BENZENE, OCTANE, METHANOL AND MORE) AND POTASSIUM PERMANGANATE FOR REMOVAL OF LIGHT WEIGHT MOLECULAR GASES (*SULFUR DIOXIDE, NITROGEN DIOXIDE, FORMALDEHYDE AND MORE*). EACH FILTER IS CONSTRUCTED WITHIN A 24ga METAL FRAME WITH INTERNAL "HONEYCOMB" CONTAINMENT STRUCTURE. 50/50 BLEND EQUATES TO 14 LBS EACH. FOR INSTALLATION SAFETY, TOTAL WEIGHT NOT TO EXCEED 28 LBS.

CABINET CONSTRUCTION: 18 & 16 GAUGE, ALL WELDED STEEL CONSTRUCTION. 25" X 26" X 28" CUSTOM GRAY POWDER COAT PAINT FINISH. TWO HINGED ACCESS PANELS: ONE, TO THE FILTER BANK AND THE OTHER TO THE MOTOR/BLOWER UNIT. A "DWYER" MAGNEHELIC STATIC PRESSURE GAGE, ALLOWS USER TO VISUALLY CHECK ON THE STATUS OF THE FILTER BANK. **FOUR HORIZONTAL & ADJUSTABLE AIRFLOW GRILLS.** "QUICK LATCH" FILTER COMPARTMENT WHICH IS CAPABLE OF HOLDING UP TO 15" OF FILTRATION!

ELECTRICAL: 3/4 H.P., 1725 RPM, 115 VOLT SINGLE PHASE ELECTRIC MOTOR, 13.6 F.L. AMP., RESILIENT MOUNT, AUTOMATIC THERMAL PROTECTION. ELECTRIC MOTOR, RESILIENT MOUNT. ALL MOTORS ARE UL APPROVED.

BLOWER: CONTINENTAL CENTRIFUGAL IMPELLER AND FUNNEL CONE. NON-METAL & CHEMICALLY RESISTANT.

AVEC CONTROL PANEL: UL 508 CERTIFIED CUSTOM "AUTOMATIC VEHICLE EXHAUST CONTROL", MULTI-CIRCUIT AUTOMATIC RESET TIMER CONTROL. TWO CIRCUIT CONFIGURATIONS RATED AT 20 AMPS PER. TIMING RANGE OF .1 TO 120 MIN. ENCLOSED WITHIN A NEMA-4 RATED ENCLOSURE, NECESSARY FOR APPLICATIONS WHERE WATER IS PRESENT (WASHING OF VEHICLES). MANUAL THREE POSITION SWITCH FOR: AUTO MODE, SYSTEM OFF & SYSTEM RUN OVERRIDE. LED "OPERATING" LIGHT.

AUTOMATIC ACTIVATION SWITCHES: (SEE ENCLOSURES) PHOTO ELECTRIC EYES ACTIVATE SYSTEM UPON VEHICLE MOVEMENT (OUTDOOR RANGES OF UP TO 200') AND MAGNETIC DOOR SWITCHES (ONE PER OVERHEAD DOOR).

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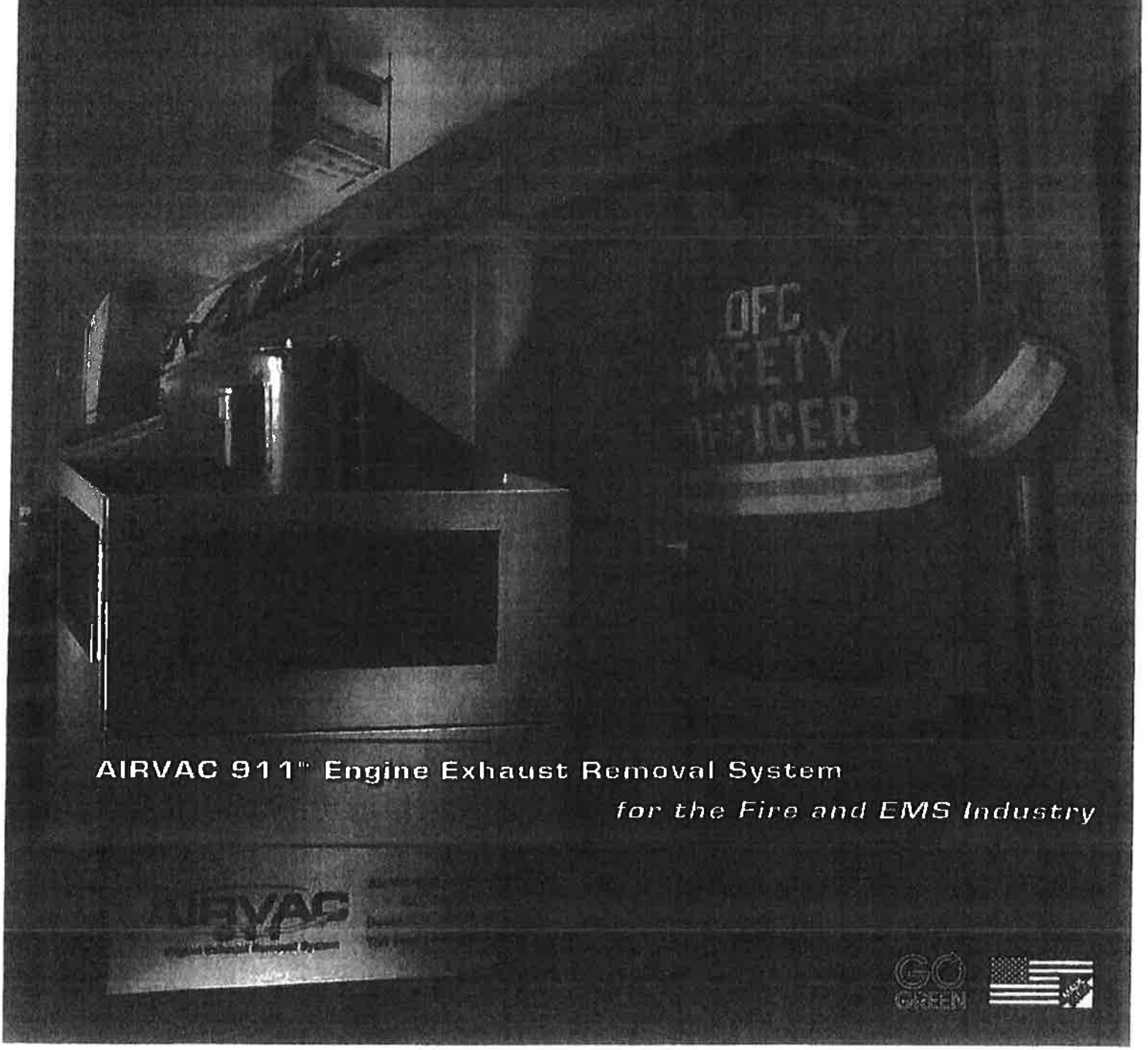


AIRVAC 911™ Engine Exhaust Removal System

for the Fire and EMS Industry

The World's Leading Hands-Free, Hoseless System

AIRVAC 911
Engine Exhaust Removal System

Every day, your fire and EMS personnel work hard to save lives. Who is there to protect ***them*** from the hazards of harmful fire engine and ambulance diesel exhaust?

We are.

Air Vacuum Corporation is the world leader in engine exhaust removal for the fire and EMS industries. The AIRVAC 911® Engine Exhaust Removal System was designed specifically as a self-contained, affordable, attachment-free, fully automatic system for removing hazardous gases and particulate from fire station and EMS station work environments.

The System Of Choice for Fire and EMS Departments Worldwide

Fire departments and EMS facilities know that exposure to high levels of diesel particulate and gases can cause symptoms of headache, dizziness and nausea, and are associated with an increased risk of lung cancer. For EMS facilities, diesel particulate can also contaminate medical equipment and potentially affect patients. Both industries need a system that is 100% effective, safe, cost-efficient, NFPA 1500 and OSHA compliant, and non-disruptive to daily operations. That's why they prefer the most technologically advanced system on the market today... the AIRVAC 911® Engine Exhaust Removal System.

(ZERO interference with day-to-day operations.)

AIRVAC 911® Engine Exhaust Removal System Features and Benefits

The AIRVAC 911® Engine Exhaust Removal System is the most advanced and effective exhaust system available. It automatically removes the particulate and gases that are released within your building every time vehicles start up and return. Automatically activated and shut down by a UL certified "Smart Timer" control panel, it works independently of your vehicle, so there is no need for cumbersome hoses or vehicle hookups.

Benefits for Fire Departments:

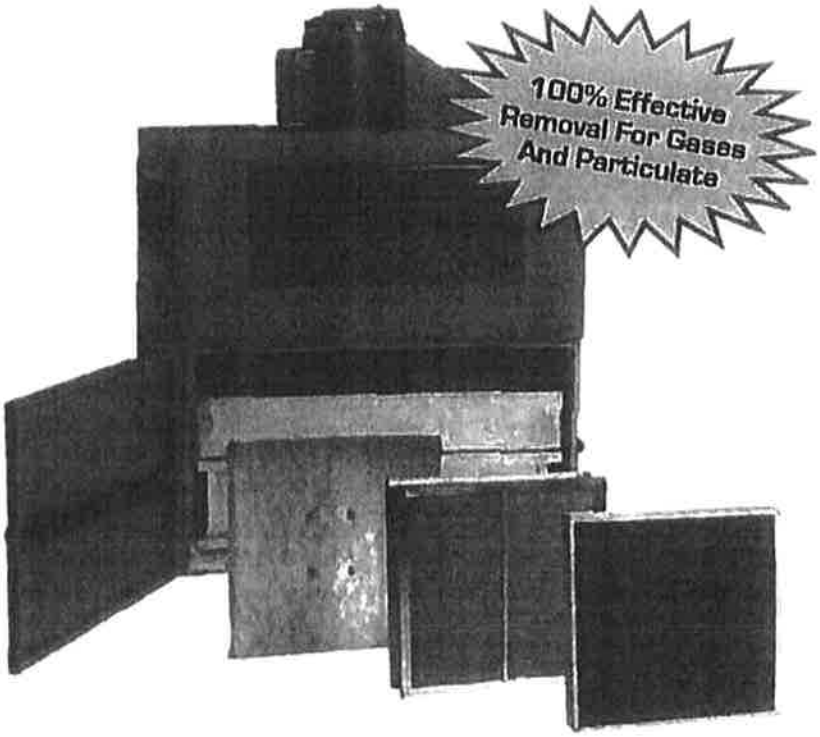
- Removes gases, carcinogens and particulate
- **No hoses, canisters, hook-ups or vehicle connections**
- 100% self-contained and hands free
- Fully-automatic
- Highly affordable – 1/2 the cost of hose systems.
- **Easy to install LEED/GREEN Design**
- Highly user friendly, compact and quiet.
- No changes or disruption to daily operations—non-structural
- Environmentally friendly - No exhausting outdoors.
- **Meets NFPA 1500, OSHA, IBOCA, EPA, GSA standards**
- Energy efficient—no heating or cooling loss
- Limited Maintenance - only periodic filter changes.
- Reduces emergency response time—nothing to disconnect or unhook
- **Only product on the market to remove engine "backwash"**
- Made in the U.S.A.

Benefits for EMS Facilities:

The same benefits as fire departments, plus

- Maintains internal temperature to protect temperature-sensitive medical equipment
- Provides clean, safe environment for workers and patients
- Eliminates particulate residue or contaminants on medical equipment
- Able to install within low-ceiling area
- Reduces emergency response time—nothing to disconnect or unhook.
- Flexible - vehicles may park in any bay.

The World's Leading Hands-Free, Hoseless System



Our System—What Sets It Apart

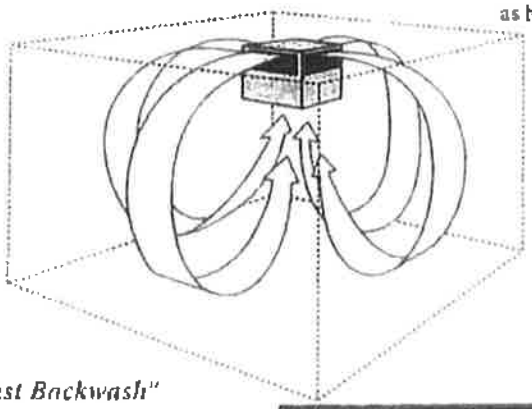
The AIRVAC 911® Engine Exhaust Removal System has many distinct advantages that make it the most unique and effective system on the market.

Manufacturer Direct

The AIRVAC 911® Engine Exhaust Removal System is made in the U.S.A. It is the industry's original hose-less system manufactured and distributed directly by Air Vacuum Corporation. This means you not only cut the cost of the "middleman," you deal directly with the people who know the equipment inside and out.

Multi-Directional Airflow Design

The AIRVAC 911® Engine Exhaust Removal System is the only hoseless system to have a Vertical & Horizontal Airflow Design that maximizes the particulate and gas removal from the breathing zone of the apparatus area. The industry's most effective airflow design, "the Coanda Airflow Design Principle" allows for 360 degree air movement throughout the area, continuously filtering the air and eliminating dead spots of exhaust. In head-to-head comparisons with horizontal systems, the AIRVAC 911® Systems Multi-Directional Air Flow pattern cleans air in a more uniform and natural pattern, at a higher efficiency than horizontal systems.



Only System to Eliminate "Exhaust Backwash"

The AIRVAC 911® Engine Exhaust Removal System is the only system on the market to eliminate the problem of "exhaust backwash"—the exhaust fumes that re-enter the building as vehicles leave and return from their calls.

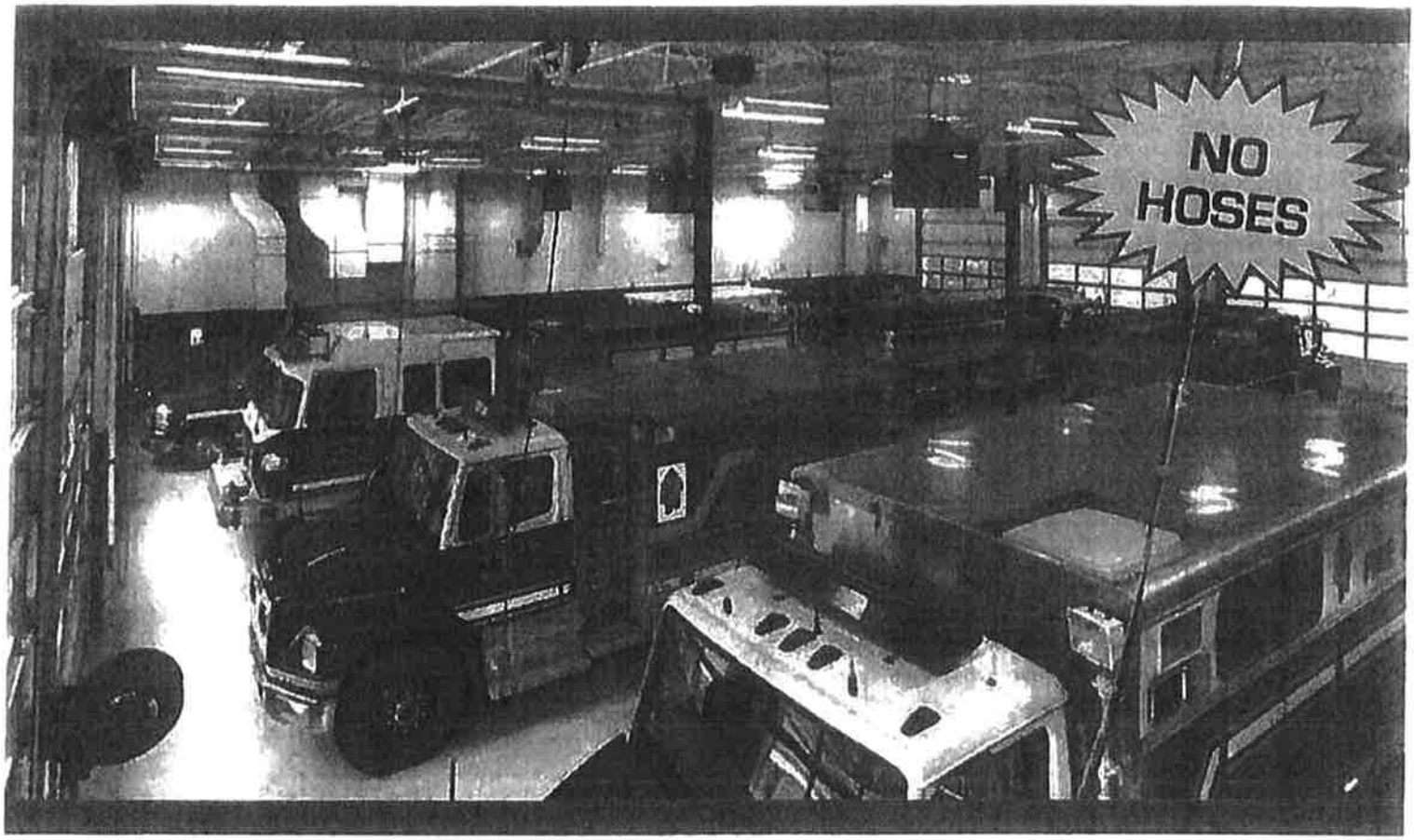
Four-Stage Filter Pack

The AIRVAC 911® Engine Exhaust Removal System comes with four fully adjustable air return vents for maximum airflow. Filters include a three ply polyester pre-filter, a high efficiency particulate air filter (HEPA MAX 3000) UL rated at 95% to 99.97% efficiency, and a two stage carbon gas phase extractor (MULTISORB 3000) for both high weight molecular gases (benzene, octane, methanol and more) and a gas phase extractor to treat light weight gases (sulphur dioxide, nitrogen dioxide and formaldehyde). MERV ratings as high as 16 by ASHRAE Standard 52.2.

Best Warranty in the Industry

The AIRVAC 911® Engine Exhaust Removal System comes with a five year warranty on all unit components excluding consumable filters, the strongest in the industry.

For a free evaluation or proposal,
call 800-540-7264, go to www.airvac911.com, or
email us at sales@airvacuumcorporation.com



Testimonials

"One of the biggest benefits is that the AIRVAC 911® Engine Exhaust Removal system addresses the blast of exhaust received when the apparatus leaves the apron, or 'backwash.' Hose systems disconnect as the unit leaves the bay and do not capture the 'second' dump of fumes. Our white walls are clear, which tells me my folks are working in a safer environment."

Ripon, CA.

"The system is user-friendly, works without any manpower, and is always ready."

Beachwood, NJ

"As an ambulance service, we value having clean equipment and vehicles for our patients as well. The air in our vehicle bay actually feels better and smells better!"

Bethel, VT

FREE SITE SURVEY, PROPOSALS, GRANT ASSISTANCE AND SPECIFICATIONS.

Contact us today

AIRVAC 911
Engine Exhaust Removal System

Air Vacuum Corporation, PO Box 517, Dover, New Hampshire 03821
TOLL FREE: 800-540-7264 • FAX: 603-743-3111 • EMAIL: sales@airvacuumcorporation.com
www.airvac911.com

GSA Contract Holder
Contract GS-07F-0437M

NFPA MEMBER

Find us on Facebook

LEED design? 3 phase available

AIRVAC 911

Engine Exhaust Removal System

PRODUCT FEATURES

Standard: 3/4 HP, 110/208-230 Volt, single phase motor. UL Approved (3 phase available)

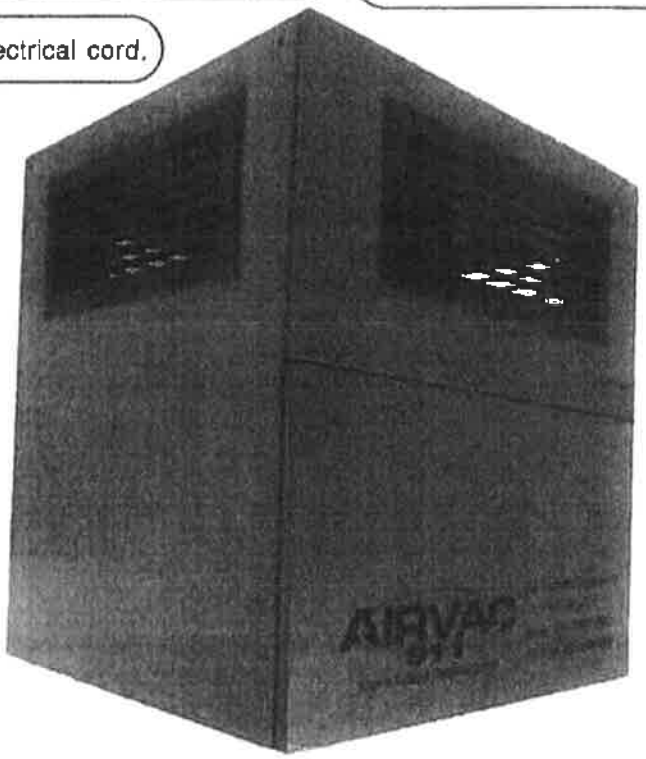
Four Pre-drilled mounting holes for chain mounting or for threaded rod brackets (provided with unit)

8 foot 14-3 pre-molded electrical cord.

UNIT WEIGHT: 190 Pounds with filtration, 135 Pounds without.

Automated filter gauge indicates when it is time to replace filters.

16 Gauge steel construction. Industrial baked "Gray" Powder Coat Finish.



UNIQUE Four-Sided adjustable air flow grills create an "Umbrella Like" clean air pattern.

Feature allows for a customized air flow pattern within any size/shape building.

FULLY AUTOMATIC - NO HOOK UPS, VEHICLE ATTACHMENTS or HANDS ON NEEDED!

Unique 4-stage filter pack. Removes both the gasses and particulate generated via diesel or gas vehicles. Creates a healthier work environment.

NO BUILDING MODIFICATIONS or HEATING LOSS.

HIGHLY AFFORDABLE = 1/3 TO 1/2 THE COST OF HOSE SYSTEMS

ZERO INTERFERENCE WITH VEHICLE OPERATIONS.

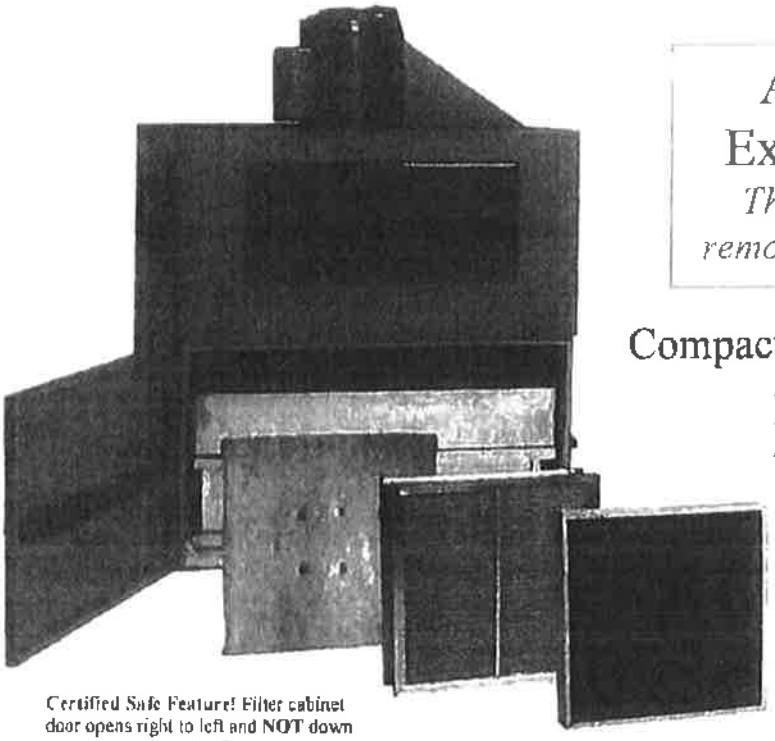
MADE IN THE USA

MEETS NFPA/OSHA/EPA/FEMA

AIRVAC

air vacuum corporation

The World Leader In Engine Exhaust Removal Systems for the Fire and EMS Industry



Certified Safe Feature! Filter cabinet door opens right to left and NOT down onto person changing filters.

AIRVAC 911® Engine Exhaust Removal System

The most effective solution to the removal of hazardous engine exhaust.

Compact, Quiet and Affordable.

Filter replacements under ½ the cost of the competition!

Highest efficiency within the industry!

Filter replacements easily slide in and out.

AIRVAC 911® "4-STAGE" FILTER PACK

(STAGE 1) PRE-FILTER: 24" X 24" X 1". 3-PLY POLYESTER CONSTRUCTION. TWO LAYERS OF 16/40 DUAL DENIER POLY FIBERS WITH A FINAL DUST CATCHING ADHESIVE LAYER. SELF-SEALING FILTER WITH PRE-INSTALLED INTERNAL HEAVY GAGE WIRE FRAME. PERFORMANCE BASED ON A.S.H.R.A.E. 52.1-1992 TEST METHOD. CLASSIFIED AS A UL CLASS 2 FILTER, ACCORDING TO UL STANDARD 900 AND CAN 4-S111.

(STAGE 2) MAIN MEDIA FILTER: 24" X 24" X 6". "HEPA MAX 3000" HIGH EFFICIENCY PARTICULATE AIR FILTER. DOP TESTED WITH 0.3 MICROMETER SIZED PARTICLES TO HAVE A MINIMUM EFFICIENCY OF 95% UP TO 99.97% AND EXCEEDS THE MAXIMUM EFFICIENCY OF 98% ASHRAE 52.1 TESTED FILTERS. CONSISTS OF A PLEATED MEDIA PACK ENCLOSED WITHIN A GALVANIZED STEEL FRAME ASSEMBLY. ULTRA-FINE FIBERGLASS MEDIA FORMED IN A SERIES OF PLEATS SEPERATED BY CORRUGATED ALUMINUN DIVIDERS TO MAINTAIN UNIFORM SPACING BETWEEN EACH PLEAT FOR OPTIMAL AIRFLOW. CLASSIFIED CLASS 2 ACCORDING TO U.L. STANDARD 900 AND IS CLASSIFIED MERV 16 IN ACCORDANCE WITH ASHRAE STANDARD 52.2. FOR INSTALLATION SAFETY, TOTAL WEIGHT NOT TO EXCEED 16 LBS.

(STAGES 3&4) GAS-PHASE EXTRACTOR: ONE 24" X 24" X 4", "MULTISORB 3000" BLENDED GAS PHASE EXTRACTOR. 50/50 RESPIRATOR GRADE ACTIVATED CARBON GRANUALS EFFECT FOR REMOVAL OF HIGH WEIGHT MOLECULAR GASES WITHIN DIESEL EXHAUST (VOC'S, HYDROCARBONS, BENZENE, OCTANE, METHANOL AND MORE) AND POTASSIUM PERMANGANATE FOR REMOVAL OF LIGHT WEIGHT MOLECULAR GASES (*SULFUR DIOXIDE, NITROGEN DIOXIDE, FORMALDEHYDE AND MORE*). EACH FILTER IS CONSTRUCTED WITHIN A 24ga METAL FRAME WITH INTERNAL "HONEYCOMB" CONTAINMENT STRUCTURE. 50/50 BLEND EQUATES TO 14 LBS EACH. FOR INSTALLATION SAFETY, TOTAL WEIGHT NOT TO EXCEED 28 LBS.

P.O. Box 517 • Dover, NH 03821-0517 • Toll Free 800-540-7264 • Tel 603-743-4332 • Fax 603-743-3111 • www.airvac911.com

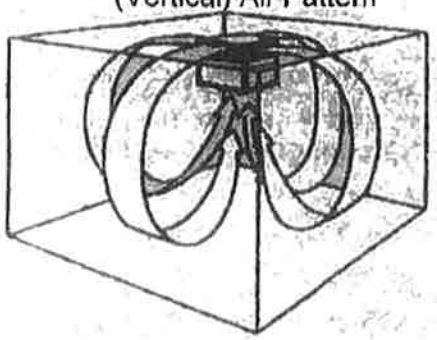
Air Vac-911

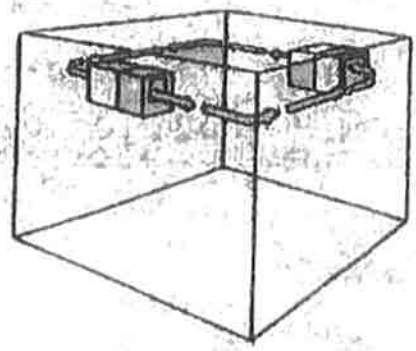
Engine Exhaust Removal System

800-540-7264

www.airvac911.com

Air Vac-911's Coanda (Vertical) Air Pattern





Old-fashion pass thru method

Air Vacuum Corporation is the industries innovator and leader in "Hoseless" engine exhaust removal. See below for how the AIR VAC-911 Filtration System offers the industries most effective and efficient technology.

- The "AIR VAC-911", System utilizes the natural upward movement of air through its unique "coanda" airflow pattern. This System eliminates the pockets of stagnant air that horizontal units may create.
- This advanced "Coanda" (vertical airflow) design is much more effective than older horizontal units which tend to corral exhaust at the ceiling level.
- The "AIR VAC-911" System creates a uniform ceiling to floor movement of air.
- Our Multi unit installation approach is similar to that of a sprinkler fire suppression system by addressing the WHOLE apparatus area.
- There are NO heavy Uni-Directional drafts as with the "horizontal" units.
- In many applications, one "AIR VAC-911" unit will perform more effectively than two old fashion type horizontal units.

Air Vacuum Corporation, P.O. Box 517, Dover, N.H. 03821-0517 Toll Free: 800.540.7264 Fax: 603.743.3111

AIRVAC-911 INSTALLATION DESCRIPTION

EACH UNIT SHALL BE HUNG USING THREADED ROD OR 500 LB. CHAIN (minimum) TO EACH CORNER OF THE "AIR VAC-911" UNIT. ROD WIDTHS SHOULD MEET OR EXCEED THE FOLLOWING: *3/8"* UP TO 30", *1/2" FOR* 30"- 72", *5/8"* FOR 72"-120". THE INSTALLER SHALL PROVIDE A SAFE AND STURDY MOUNT FROM THE CEILING SUPPORTS VIA, PRE-DRILLED UNISTRUT, BOLTING DIRECTLY TO EXISTING CEILING JOIST/TRUSS OR OTHER ACCEPTABLE MEANS (MEETING ALL STATE, LOCAL AND NATIONAL CODES). THE INSTALLATION SHALL PROVIDE A SAFE AND RUGGED MOUNT FOR EACH INDIVIDUAL UNIT. PRE-DRILLED MOUNTING BRACKETS & HOLES FOR "S" HOOKS, SHALL BE PROVIDED BY THE MANUFACTURER AT THE PROPER LOCATIONS FOR EACH UNIT (TOP EACH CORNER). EACH AIRVAC-911 UNIT WEIGHS APPROXIMATELY 130 POUNDS WITHOUT FILTRATION, AND UP TO 190 POUNDS WITH FILTERS. OPTIMUM HEIGHT OF THE AIR VAC-911 UNIT IS 9' TO 11' (BOTTOM OF UNIT).

CONTROL FEATURES:

1. ADJUSTABLE LOW VOLTAGE TIMER (.1 SECONDS TO 120 MINUTES) FOR "AUTO OFF" AFTER ACTIVATION. NORMAL USAGE REQUIRES A RUN TIME OF APPROXIMATELY 18-20 MINUTES. WITH INSTALLATIONS OF OVER 4 UNITS THE CONTROL PANEL MAY "CASCADE ACTIVATE" THE UNITS IN SETS OF TWO'S IN ONE SECOND INTERVALS. DECREASING THE SURGE OF POWER NEEDED TO ACTIVATE THE SYSTEM. (OPTIONAL)

2. FRONT PANEL, ACTIVATION "ON" INDICATOR LIGHT.

3. MANUAL THREE POSITION DIAL PROVIDED FOR THE FOLLOWING FUNCTIONS: "ON" (CONTINUOUS RUN) AND "OFF" (OVERRIDE SHUT DOWN), AND "AUTOMATIC MODE". ALSO PROVIDED, ONE MANUAL "TEST SYSTEM" PUSH BUTTON, TO RUN FOR ONE TIMED CYCLE.

4. THE CONTROL BOX WILL BE CONSTRUCTED USING A NEMA 4 FIBERGLASS ENCLOSURE.

5. FOR PHOTOELECTRIC ACTIVATION - THE CONTROL BOX SHALL BE DESIGNED WITH A 24VAC-2 AMP POWER SUPPLY SO AS TO POWER REMOTE PHOTO ELECTRIC EYE SWITCHES, THESE TYPE SWITCHES ARE RECOMMENDED WITH AN INDOOR RANGE OF UP TO 200'. THESE PHOTO BEAMS & BEAMS OF HIGHER RANGE ARE AVAILABLE THROUGH AIR VACUUM CORP.

SEQUENCE OF OPERATION:

RECOMMENDED LOCATIONS FOR EACH UNIT AND OTHER SYSTEM INFORMATION IS SHOWN ON THE ENCLOSED DRAWINGS OF THE APPARATUS AREA. RECOMMENDATIONS ARE BASED ON OPTIMUM "ZONE CAPTURE" OF EXHAUST EMISSIONS, AS GENERATED, IN THE VICINITY OF ENGINE EXHAUST PIPES; AS WELL AS "AIR CHANGES PER HOUR" (ACH) OF RE-CIRCULATION CAPACITY ON THE FLOOR, BASED ON THE CUBIC FOOTAGE OF THE CONTROLLED AREA AND THE ACTIVITY LEVEL OF THE DEPARTMENT (# OF RUNS). "AUTO ON" ACTIVATION OF ALL UNITS SHOULD BE ACCOMPLISHED WITH LOW VOLTAGE, "MOMENTARY CONTACT" SWITCHES WIRED AS NORMALLY OPEN (PHOTO EYES, DOOR SWITCHES, VEHICLE TRANSMITTERS/RECEIVER, CO/NO2 DETECTORS AND MORE). PHOTO EYES HAVE A RANGE OF 200' (400' MODELS AVAILABLE) AND MAY TRANSMIT THE WIDTH OF THE APPARATUS AREA AND ARE RECOMMENDED TO BE INSTALLED 7' OR HIGHER (TO AVOID UNECESSARY ACTIVATION VIA PERSONNEL BREAKING THE BEAM). ONCE ACTIVATED THE AVEC SMART TIMER" CONTROLER SHALL RUN FOR ITS PRE-SET TIME OF 18 TO 20 MINUTES. HOWEVER, TIMER SETTINGS ARE FULLY ADJUSTABLE FROM 0.5 SECONDS TO 100 HOURS. "MANUAL ON" ACTIVATION MAY ALSO BE ACCOMPLISHED VIA A THREE POSITION DIAL SWITCH ON THE FRONT OF THE AVEC "SMART TIMER" CONTROL PANEL (ON-OFF-AUTO) AND VIA WIRING CONTROL CIRCUIT (MUSHROOM TYPE BUTTONS) TO CONVENIENT LOCATIONS THROUGHOUT THE STATION (I.E.- FLOOR AREA, DISPATCH OFFICES, ETC.)

INSTALLATION WIRING:

STANDARD SINGLE PHASE, 120 VOLT INSTALLATION – "SMART TIMER" CONTROL PANEL SHOULD BE MOUNTED IN A CONVENIENT LOCATION. ALLOW ONE 120 VOLT, 20 AMP CIRCUIT FOR EACH AIR VAC-911 UNIT + ONE ADDITIONAL CIRCUIT TO THE AVEC "SMART TIMER" CONTROL PANEL. RUN LINE SIDE WIRING (FROM HOUSE PANEL)TO CONTROL PANEL & RUN LOAD SIDE WIRING FROM AVEC "SMART TIMER" CONTROL PANEL TO AIRVAC 911 UNIT LOCATIONS AND INSTALL A 120V, 20 AMP RECEPTACLE AT EACH UNIT LOCATION. UNITS ARE SUPPLIED WITH AN 8 FOOT CORD AND PLUG SET.

EXAMPLE: THE AVEC "SMART TIMER" CONTROL REQUIRES A DEDICATED 120V CIRCUIT TERMINATING ON THE 10AMP CIRCUIT BREAKER AND NEUTRAL TERMINALS TO THE RIGHT.

UNIT 1 TERMINATES ON L1 (LINE SIDE), T1 (LOAD SIDE), N1 (NEUTRAL TERMINATION POINT IF DESIRED). UNIT 2 TERMINATES ON L2, T2, N2, ETC...

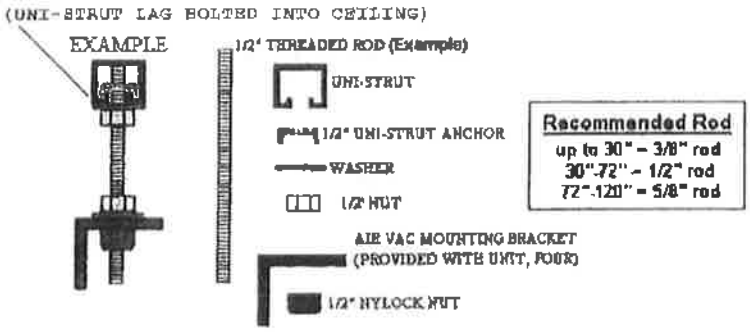
CONTROL DEVICES REQUIRING LOW VOLTAGE POWER (PHOTO EYES, CO/NO2 SWITCHES, ETC...) TERMINATE ON X1 X2 FOR 24V POWER AND S1, S2 FOR SIGNAL (DRY CONTACT MAGNETIC DOOR SWITCHES). AIRVAC-911 SYSTEM OPERATES ON A NORMALLY OPEN MOMENTARY CONTACT FROM ALL FIELD DEVICES. IT IS RECOMMENDED THAT YOU USE 2-CONDUCTOR/SHIELDED CABLE FOR LOW VOLTAGE WIRING THAT SHALL RUN FROM THE CONTROL PANEL TO THE DESIRED SWITCHING DEVICE. ALL WIRING AND GROUNDING MUST CONFORM TO NEC AND LOCAL CODE REQUIREMENTS.

TOLL FREE: 800-540-7264 - www.airvac911.com - sales@airvacuumcorporation.com

INSTALLATION DESCRIPTION (Cont.)

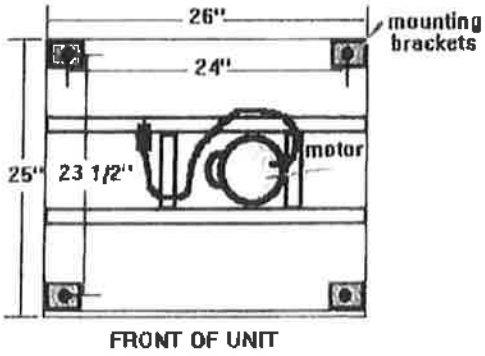
PLEASE CONSULT YOUR SALES REP FOR INSTALLATION INSTRUCTIONS AND DIAGRAMS FOR MOTOR VOLTAGES OF 208 VOLT (SINGLE PHASE) & THREE PHASE INSTALLATIONS.

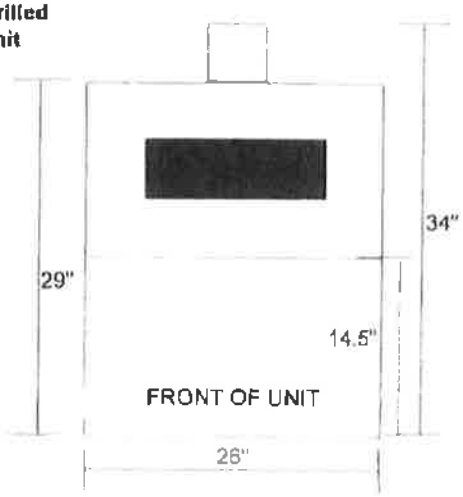
HANGING HARDWARE



Hanging Height: The bottom of each unit should be mounted between 9' to 11' from the floor to provide optimal performance of the "AIR VAC-911" system.

mounting brackets are bolted on to each unit through predrilled mounting holes. These holes may be used to mount the unit with chain and "S" hooks

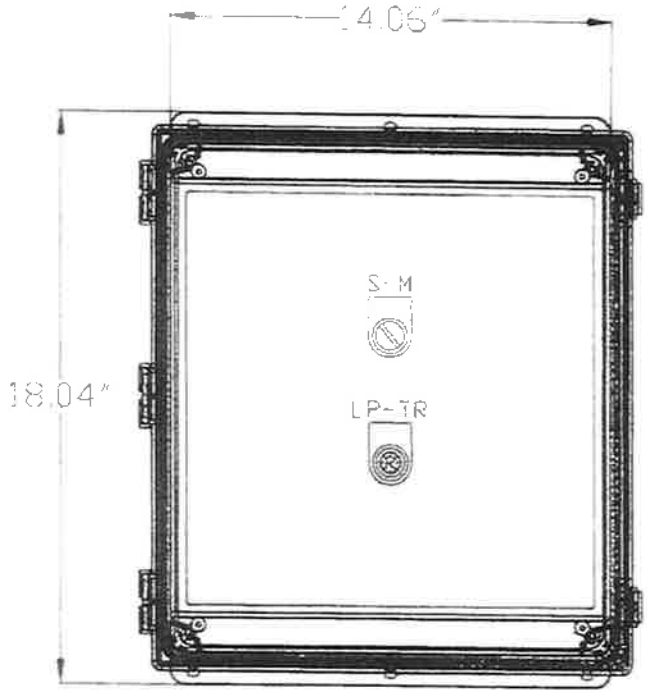




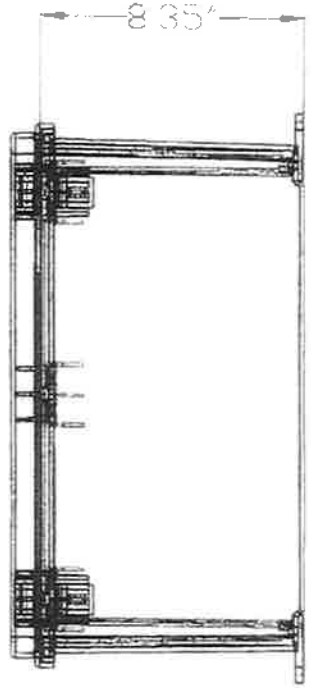
www.airvac911.com

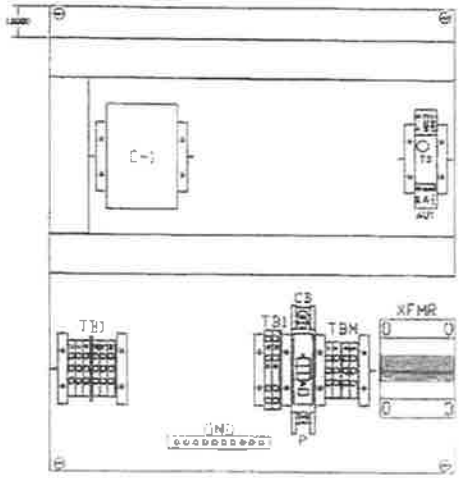
LEGEND
LP - LIGHTED PUSHBUTTON
S - SELECTOR SWITCH

NAMEPLATE LEGEND
CONTACTOR WITH
S-M OH-OFF-AUTO
LP-TR AUTO TEST / (INDICATED)



TYPE 4X ENCLOSURE





PANEL TO BE UL LISTED (UL508, ECL)
INDUSTRIAL CONTROL PANEL
UL508A FILE NO E109698

NOTES
1)

REVISIONS												
1		AS-BUILT		BL	DK							
REVISIONS		ISSUE PURPOSE		BY	CK	REV	REVISIONS	ISSUE PURPOSE		BY	CK	

☐ DRAWING OK FOR PRODUCTION
BY _____
DATE:

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DESIGNED	BL	09/08
DRAWN	BL	09/08
CHECKED		
SCALE NO SCALE		

AUTOMATION CONTROLS INC.
208 MAIN STREET
NEWPORT NEWS, VA 23601

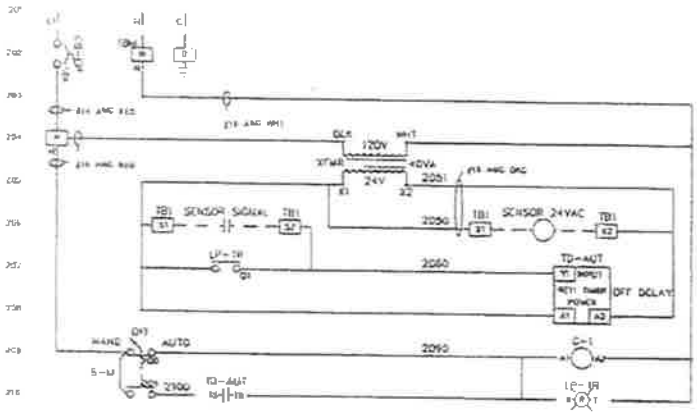
TITLE:
AIR VACUUM PUMP

ENCLOSURE LAYOUT
AVBC PUMP FAN CONFIGURATION
COVER MA

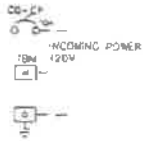
DWG 2011-359-401

CONTROL POWER
120V~1Ø 60 Hz 0.5 FLA
SCCR N/A CONTROLS ONLY

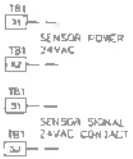
CAUTION FOR USE ON A GROUNDED SOURCE ONLY.



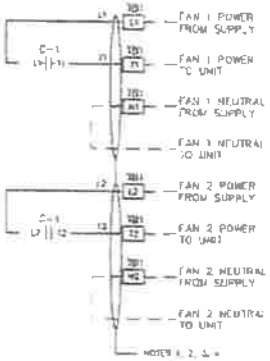
INCOMING POWER CONNECTIONS



SENSOR CONNECTIONS



FAN MOTOR CONNECTIONS



NOTES:
1) #14 AWG YELLOW WIRE
2) EACH FAN MOTOR 120VAC 1PH 60 Hz 0.75 HP 13.8 FLA. SCCR = 5KA RMS SYMMETRICAL @ 120V MAX
3) CAUTION FOR USE ON A GROUNDED SOURCE ONLY.
4) MOTOR OVERLOAD AND SHORT CIRCUIT PROTECTION PROVIDED BY OTHERS
5) THIS PANEL CONTAINS CLASS 2 CIRCUITS

REV	DATE	ISSUE PURPOSE	BY	CK	REV	DATE	ISSUE PURPOSE	BY	CK
1	N/A	AS-BUILT	BL	CK					

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BY: _____
DATE: _____

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DESIGNED	BL	
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CHECKED		
SCALE NO SCALE		

AUTOMATION CONTROLS INC
206 MAIN STREET
NEWPORT NEWS, VA. 23601

FOR
AIR VACUUM CORP

ELECTRICAL SCHEMATIC
MVEC-2C 2 FAN CONFIGURATION
DOVER NH

DWG: 2017 359 A02

AIRVAC 911® Automatic Vehicle Exhaust Control System

Installation Information for
Catalog Number(s) AVC-2C, -4C, -6C, -8C, 10C

GENERAL: Each standard AVC Panel (AVC-2C, -4C, -6C, -8C, -10C) controls multiple AIRVAC 911® units (2, 4, 6, 8, 10 units respectively). All standard AVC Panel are essentially identical, except for how many AIRVAC 911® units they control. Each standard AVC Panel comes with a panel layout and electrical schematic drawing with information for all field connections. Refer to AVC Panel drawings for detailed wiring information.

120V AIR-VAC 911 POWER WIRING: 120V power wiring (through the standard AVC Panel) to individual AIRVAC 911® units must be protected by overcurrent devices per NEC requirements. Refer to AVC Panel drawings for detailed wiring information.

120V CONTROL POWER WIRING: 120V control power wiring to each standard AVC Panel should come from a dedicated 120V power circuit. If a dedicated circuit is not available for this purpose, 120V control power can come from line side wiring of an AIRVAC 911® unit. Refer to AVC Panel drawings for detailed wiring information.

OPERATOR CONTROLS: Each standard AVC Panel comes with an ON-OFF-AUTO Selector and an Illuminated Pushbutton.

- In the ON position, the AVEC startup sequence is initiated and AVEC Units will remain energized.
- In the OFF position, all AVEC Units will be de-energized.
- In the AUTO Position, the AVEC startup sequence is initiated (by an external contact closure or by pressing the Illuminated Pushbutton) and all AVEC Units will remain ON for 15 Minutes (Factory Setting) or desired time.
- The Illuminated Pushbutton will illuminate when AVEC units are ON.

STARTUP SEQUENCE: Upon initiation, two AIRVAC 911® units will energize. Remaining AIRVAC 911® units will energize in groups of two (after 15 second delays) until all AIRVAC 911® units are energized.

24V EXTERNAL SENSOR POWER: Each standard AVC Panel comes with a 40W 120V to 24V transformer to power specific field devices available from Air Vac (i.e Aleph or Takex photo eyes, Macurco/Honeywell E3 CO/NO2 Gas detection switches, etc.). It is recommended that the installer use a 2 pair, shielded and color coded cable for low voltage wiring. Refer to the appropriate standard AVC Panel for detailed wiring information.

120V EXTERNAL (SEQUENCE INITIATE IN AUTO) CONTACT WIRING: Each standard AVC Panel allows the AVEC startup sequence to be initiated by an external contact closure in the AUTO Position. Refer to AVC Panel drawings for detailed wiring information.

AIRVAC 911

Engine Exhaust Removal System

ACTIVATION DEVICES

Some items are options: N505ATM/ST
Magnetic Door Switch & Takex PB030TK
Photo Electric Eye Switches are standard equipment.

OTHER OPTIONS:

Tone Activation
Vehicle ignition transmitters
Manual Push Buttons
CO/NO2 gas detection

air vacuum corporation

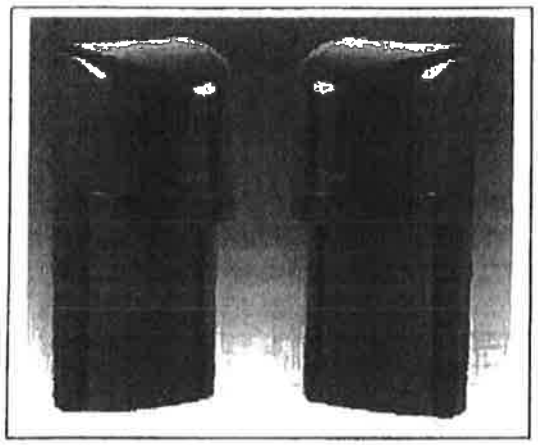
Manufacturer of Air Filtration Equipment

(603-743-4332)

TAKEX

Outdoor Infrared Double Beam Sensor

PB-30TK (60)



The **PB-30TK (60) Takex** Outdoor Infrared Double Beam sensor is the ideal photo beam to use in conjunction with the Air Vac 911 Air Cleaner and the Air Vac AVEC UL control panel.

The **Takex** Beam sensor has been field tested in numerous applications over the past several years and accepted by many for its ease of installation and operation. Its range is 100 (200) feet outdoors and will cover a much larger range indoors.

Air Vacuum Corporation will be pleased to supply you with the PB-30TK (60) Photo Beam along with the AIR VAC-911 air cleaner and AVEC control.

MODEL	PB-30TK	PB-60TK
Detection System	Simultaneous breaking of two (2) beams	
Infrared Beam	LED pulsed beam, Double modulation	
Protection Distance	Outdoor 100' (30m) or less Indoor 200' (60m) or less	Outdoor 200' (60m) or less Indoor 400' (120m) or less
Maximum Beam Range (Approximation)	Outdoor 1000' (300m) Indoor 1000' (300m)	Outdoor 2000' (600m) Indoor 2000' (600m)
Response Time	50msec. To 700msec. (Variable at pot.)	
Supply Voltage	10V to 30VDC (Non-polarity) usable at "24Vac"	
Current Consumption	53mA or less	80mA or less
Alarm Output	Dry contact relay form C Contact action: Interruption time plus delay time (1 to 30 seconds) Contact capacity: 30V AC/DC, 0.5A or less	
Tamper Output	Dry contact relay N/C Action: Activated when cover is detached Contact capacity: 30V AC/DC, 0.5A or less	
Alarm LED	Red LED (Receiver) On: when beam is activated	
Attenuation LED	Red LED (Receiver) On: when beam is attenuated	
Functions	Monitor jack output, AGC circuit, Frost proof cover	
Ambient Temperature Range	-13 F to +140 F (-25 C to +60 C)	
Mounting Position	Indoor / Outdoor	
Wiring	Screw Terminals	
Weight	Transmitter: 13.3oz (380g) / Receiver: 14.0oz (400g)	
Appearance	PC resin (Black)	

PB30/60TK_Sls

Air Vacuum Corporation Tel: (603) 743-4332 Fax: (603) 743-3111

Catalog Number PB-30TK (60)

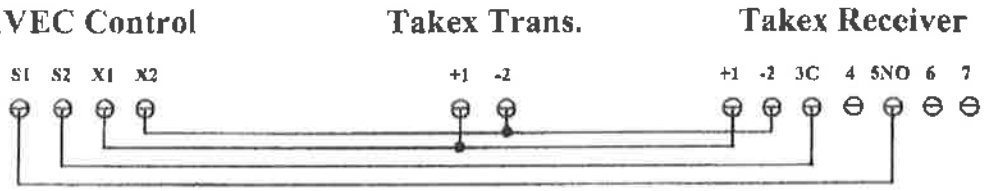
"Takex 100 (200) Foot Outdoor Photo Beam"

Interface Information

The PB-30TK comes complete with installation instructions and it is important that you read them completely before installation. Place Beam at sufficient height so as to avoid tripping by people and animals.

Both the Transmitter and Receiver operate on 24Vac. 24Vac is available from terminals *X1 and X2 of the AVEC control. Although the Takex installation instructions show the connections on their unit as DC, plus (+) and minus (-), there is no polarity and will accept AC. The connections are listed as plus and minus 10 to 30V.

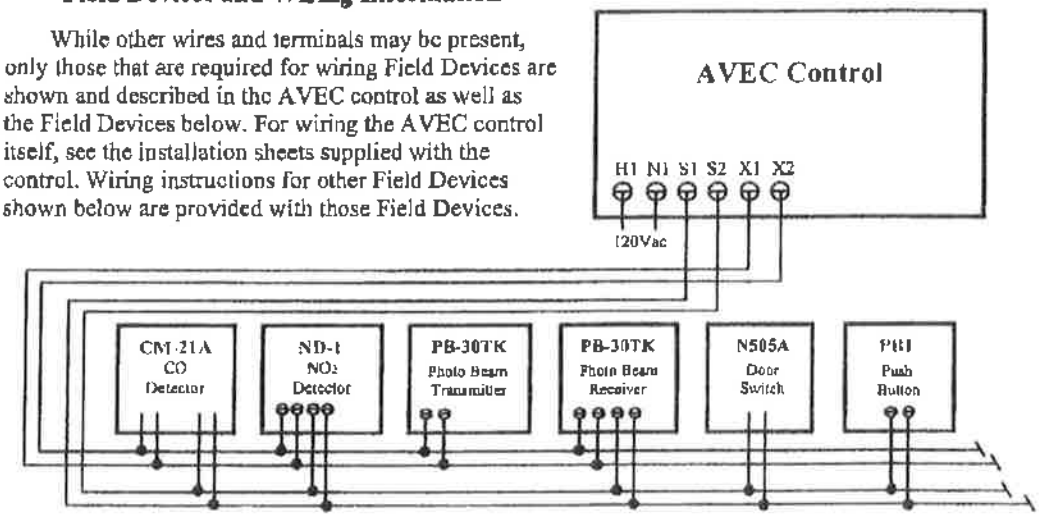
In order to activate the AVEC control, a momentary short must be placed across terminals S1 & S2 of the AVEC control. When the PB-30TK is activated, the control will activate. When the PB-30TK deactivates, timing as set on the time delay relay in the control will begin. As long as the PB-30TK is activated, the unit will run continuously. The wires to connect to on the PB-30TK will be the common (C) and normally open (NO), no polarity.**



Typical Multiple Connections to AVEC Control

Field Devices and Wiring Information

While other wires and terminals may be present, only those that are required for wiring Field Devices are shown and described in the AVEC control as well as the Field Devices below. For wiring the AVEC control itself, see the installation sheets supplied with the control. Wiring instructions for other Field Devices shown below are provided with those Field Devices.



*In some controls, X1 & X2 may be listed as L1 & L2. See control installation information.

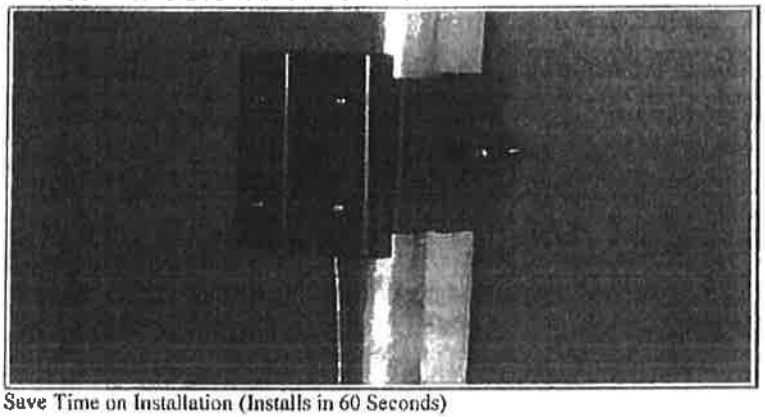
**We recommend the use of 18 Awg shielded and/or twisted pair cable in lieu of a standard two-conductor cable. This should ensure no induced voltage across terminals S1and S2.

PB3060TK-Ins

DISTRIBUTED BY:
AIR VACUUM CORP.
P.O. BOX 517
DOVER, NH 03821
800.540.7264

Industrial Track Mount Switch

N-505ATM for 2inch rails. / N-505ATMC for 3 ¼ inch rails.



Save Time on Installation (Installs in 60 Seconds)

NOTE:
Install these contacts in a normally open momentary position. The magnet will make contact only as it passes by the track mounted switch.
(Do not mount as an alarm type as shown in photograph)

DESCRIPTION:
Fastest installing Overhead Door Contact
Widest Gap in the Security Industry
Anodized Bar Stock Aluminum Housing for Durability
2 foot Stainless Steel Cable Standard
Eliminate Service Calls (Doesn't knock off Rail)
Black Satin Finish

*wire low voltage switches in "parallel" to the AVEC control

SPECIFICATIONS:

	Closed Loop	Open Loop	SPDT	DPDT
Switching Voltage.	100 Volts	30 Volts	30 Volts	30 Volts
Switching Current:	.5 Amps	.25 Amps	.25 Amps	.25 Amps
Watts (Max)(Volt x Amps):	7.5 Watts	3 Watts	3 Watts	3 Watts

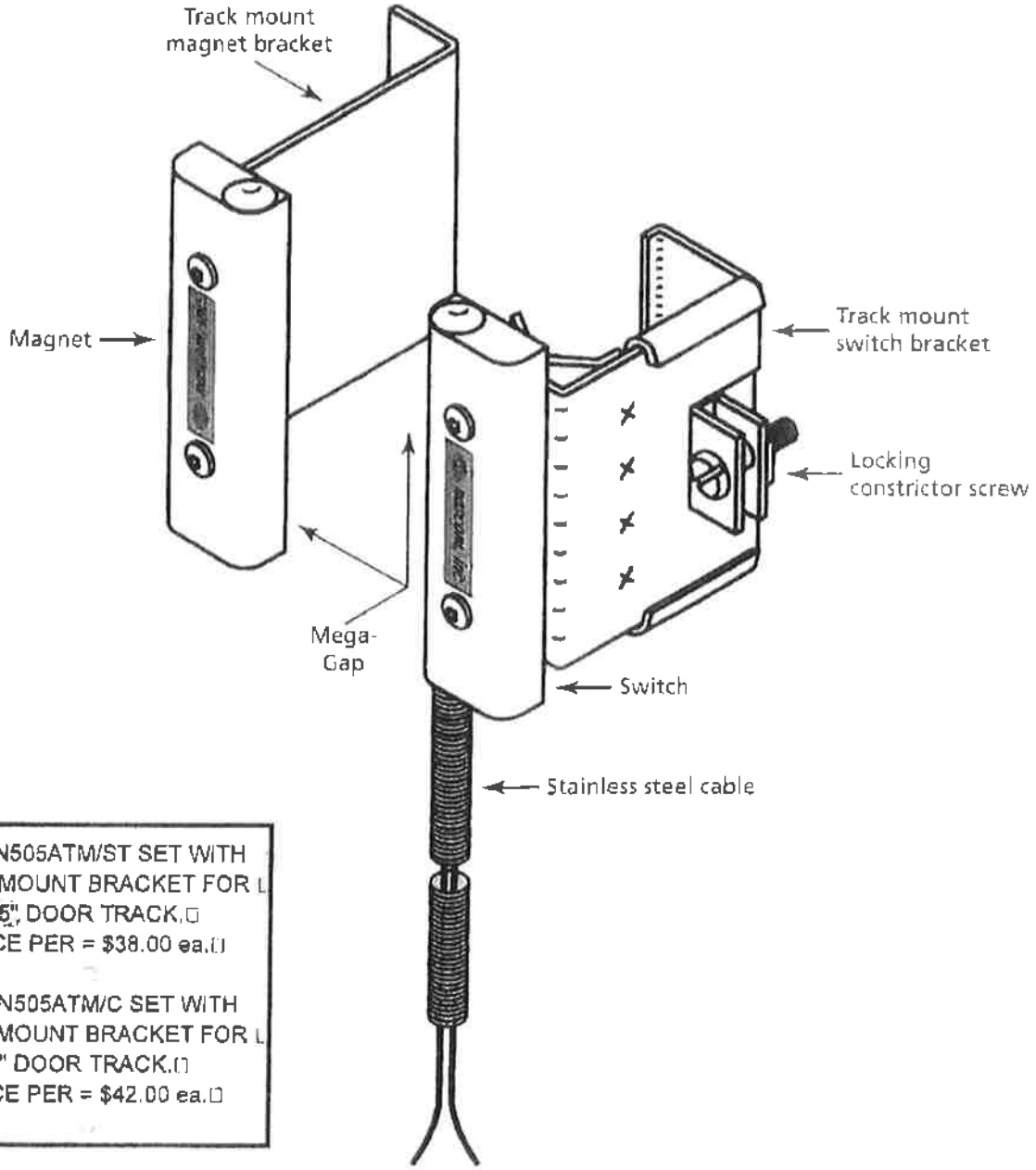
Closed Loop = When a magnet is in close proximity to the switch the switch is closed.
Open Loop = When a magnet is in close proximity to the switch, the switch is open.
SPDT = This switch has a common, closed & open side.
DPDT = This switch has two SPDT reeds in the same switch housing, each having it's own common, closed, and open side.
Dual Single Pole Single Throw = Two closed loop reeds in one switch housing.

Nascom only specifies the most sensitive reeds, which will provide for it's customer the most Gap distance between the switch and magnet, without modification.

PART NO:
N505ATM/ST 2 inch rails.
N505ATMC/ST 3 ¼ inch rails.
Tested under UL Standard 634
Connector & Switches

Distributed by Air Vacuum Corp.
P.O. Box 517. Dover, NH 03821.
800-540-7264

Nascom's N505ATM/ST
Track mount switch for overhead doors



Model: N505ATM/ST SET WITH TRACK MOUNT BRACKET FOR 2.5" DOOR TRACK.
PRICE PER = $38.00 ea.

Model: N505ATM/C SET WITH TRACK MOUNT BRACKET FOR 3" DOOR TRACK.
PRICE PER = $42.00 ea.

Mega-Gap installs in 60 seconds.

"World's finest switch"

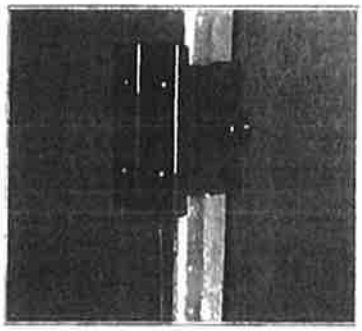
Air Vacuum Corporation Tel: (603) 743-4332 Fax: (603) 743-3111

Catalog Number N505ATMC/ST

nascom, inc. Door Switch

Installation Information

The N505ATMC/ST [normally open] comes pre-wired with a heavy-duty armored cable connected to an industrial housing. The other end is striped and ready for connection within an approved box using acceptable wiring methods. While you may go from door switch to door switch, the circuit is wired in parallel. No polarity is observed.

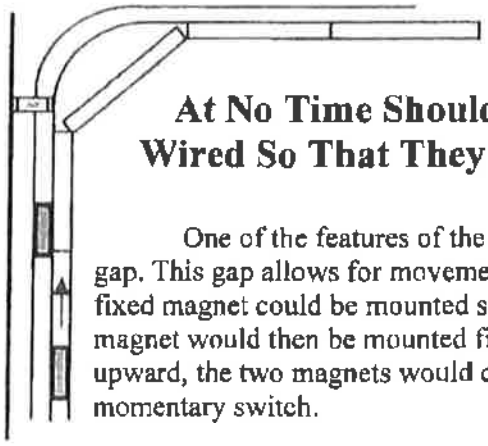


Typical Layout

.3 Amp Max Current @ 100 Volts AC/DC

Contacts Mounted In A Normally Open Momentary Position.

Note: Magnet Makes Contact Only As It Passes By The Fixed Magnet Acting As A Momentary Switch.



At No Time Should The Magnet Be Wired So That They Maintain Contact.

One of the features of the N505ATM magnet is its four (4) inch working gap. This gap allows for movement in the track. As an example only, the fixed magnet could be mounted six feet above the floor while the moveable magnet would then be mounted five feet above the floor. As the door travels upward, the two magnets would come together and then pass by acting as a momentary switch.

SpecData

Air Vacuum Corporation

Table 1 Technical Data

AIRVAC 911

Cabinet Dimensions	26" wide x 25" deep x 35" high
Weight	190 lbs with filtration; 135 lbs without filtration
Construction	18 and 16 gauge steel

Filters	Stage 1	Stage 2	Stage 3, 4
Type	Pre-filter	Main media HEPA 3000	Gas-phase extractor, Multisorb 3000
Size	24" x 24" x 1"	24" x 24" x 6"	24" x 24" x 4"
Testing	–	UL/ULC classified; Class 2 filter ASHRAE 52.2 tested to MERV 16 (>98% efficiency)	–

Motor

Standard:	3/4 HP	115 Volt	1 Phase	60 Hz	13 FL amps	1.25 SF
Optional:	3/4 HP	208-230 volt	1 Phase	60 Hz	6.3-6.5 0 FL amps	1.25 SF
	3/4 HP	190 volt	3 Phase	50 Hz	3 FL amps	1.15 SF
	3/4 HP	380-415 volt	3 Phase	50 Hz	1.5-1.7 FL amps	1.25 SF
	1 HP	115/208-230 volt	1 Phase	60 Hz	14.7/7.2-7.4 FL amps	1.15 SF
	1 HP	208-230/460 volt	3 Phase	60 Hz	3.4-3.4/1.7 FL amps	1.15 SF

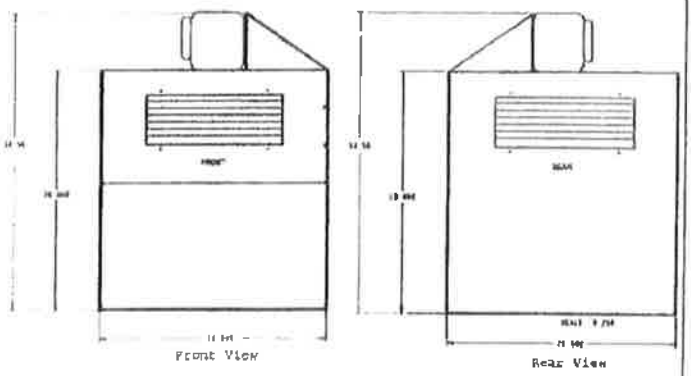
AVEC Smart Timer

Single zone:

AVEC-2C (operates 1-2 units)
AVEC-4C (operates 2-4 units)
AVEC-6C/T2 (operates 4-6 units with sequential start-up)
AVEC-8C/T3 (operates 6-8 units with sequential start-up)
AVEC-10C/T4 (operates 8-10 units with sequential start-up)

Zoned:

AVEC-4C/Z (2 zone; operates 1-2 units per zone)
AVEC-6C/Z (4C + 2C)
AVEC-6C/Z2 (2C + 2C + 2C)
AVEC-8C/Z (4C + 4C)
AVEC-8C/T2/Z (6C/T2 + 2C)
AVEC-8C/Z2 (4C, 2C, 2C)
AVEC-10C/T2/Z (4C + 4C)
AVEC-10C/T3/Z (8C/T3 + 2C)
AVEC-10C/T2/Z2 (6C/T2, 2C, 2C)



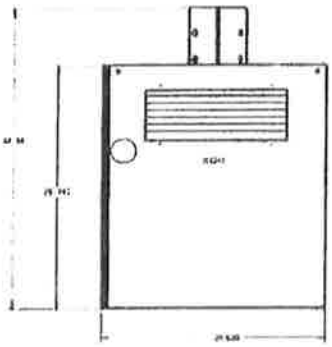
System Activation Devices

Standard

Magnetic door switch (one per overhead door)
Photoelectric eyes (detect vehicle movement)

Optional

Manual push button
Spring wound timer
Vehicle ignition wireless transmitter and receiver
Standalone CO sensor 24V
Standalone CO sensor 120V
CO and NO^2 combo sensor 24V
CO and NO^2 combo sensor 120V
Tone alert activation



CMD

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INSTALLATION / OPERATION / MAINTENANCE

Applies to: **Model VPT 120V 60Hz**
Gas-Fired, Tubular, Radiant,
Low-Intensity Infrared Heater

Model VPT
High/Low Burner/Control Box
with 20 - 70 ft Tube/Reflector Length

FOR YOUR SAFETY
If you smell gas: **1. Open windows.** **2. Don't touch electrical switches.** **3. Extinguish any open flame.** **4. Immediately call your gas supplier.**

FOR YOUR SAFETY
The use and storage of gasoline or other flammable vapors and liquids in open containers in the vicinity of this appliance is hazardous.

WARNING: Improper installation, adjustment, alteration, service, or maintenance can cause property damage, injury or death. Read the installation, operation, and maintenance instructions thoroughly before installing or servicing this equipment.

WARNING: Gas-fired appliances are not designed for use in hazardous atmospheres containing flammable vapors or combustible dust, in atmospheres containing chlorinated or halogenated hydrocarbons, or in applications with airborne silicone substances

Form I-VPT (Version C) Part No. 270684

Introduction.

Welcome to the new range of powered HiLo infra-red heaters. Local regulations may vary and it is the installer's responsibility to ensure that such regulations are satisfied.

All installation, assembly, commissioning and service procedures must be carried out by suitable qualified competent persons and conform with local building codes, or in the absence of local codes, with the National Fuel Gas Code ANSI Z223.1/NFPA 54 or the National Gas and Propane Installation Code CSA B149.1.

When assembling, installing, commissioning and servicing is undertaken on radiant tube heaters specified in these instructions, due care and attention is required to ensure that working at height regulations are adhered to

***PLEASE READ** this document prior to installation to familiarize yourself with the components and tools you require at the various stages of assembly.*

All Dimensions shown are in inches unless otherwise stated.

The manufacturer reserves the right to alter specifications without prior notice.

Document Index.

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1. Installation Requirements.

1.1 Health and Safety

A. Heater is intended for heating non-residential indoor spaces and should only be installed where flammable gases or vapors are not generally present.

B. Heaters may be suspended either horizontal or at any angle. See section 1.3 for clearance dimensions.

C. The installation must conform with local building codes or, in the absence of local codes, with the *National Fuel Gas Code, ANSI Z223.1/NFPA 54* or the *Natural Gas and Propane Installation Code, CSA B149.1.*

D. The unit shall be electrically grounded in accordance with National Electric Code ANSI/NFPA 70 and Canadian Electrical Code CSA C22.1.

E. The heater may be installed in aircraft hangars in accordance with the Standard for *Aircraft Hangars, ANSI/NFPA 409* and in automotive garages when installed in

accordance with the Standard for *Parking Structures, ANSI/NFPA 88A*, or the Standard for *Repair Garages, ANSI/NFPA 88B*, or the *Canadian Natural Gas and Propane Installation Code, CSA B149.1,* and are so marked.
Ensure that minimum clearances will be maintained to vehicles parked below the heater.

F. The standard heaters are approved for installations between 0 - 2000ft (0 - 610m) for the US and 0 - 4500 ft (1370m) for Canada. Conversion kits are available for installations above these heights in the USA.

Note: Any outdoor installations must be installed with a vent cap at the inlet and the flue end.

1.2 Heater Suspension

Attachment to the heater support lugs should be made by D shackle. The hanging attachments to overhead steelwork etc. must be purpose made to sound engineering practice or supplied to others. They must be adequately fixed and designed to carry the whole weight of the heater. In the event of suitable roof steelwork being unavailable, additional steelwork should be fitted to enable vertical hangers to be used for suspending the heaters.

These methods are illustrated in Figure 1. If there are any doubts as to the strength or suitability of roof steelwork to which heaters are to be suspended, please refer to a Consultant, Architect or owner of the building.

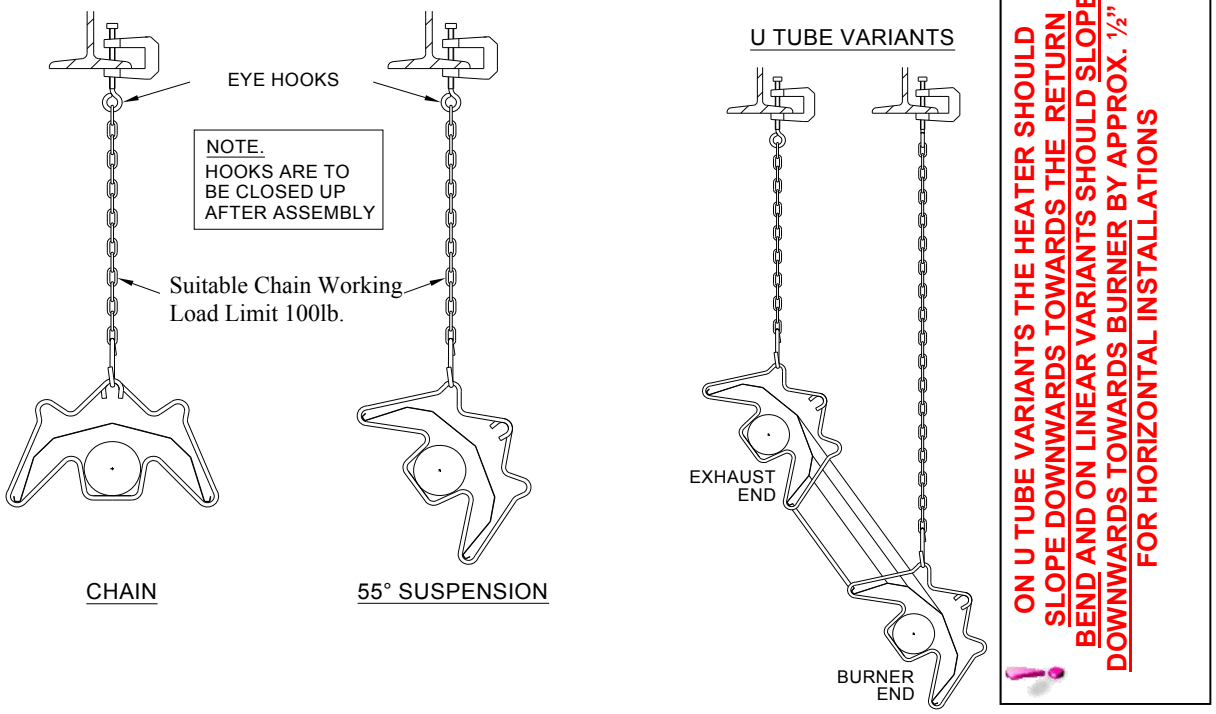
It is recommended that the heater is raised to its final position once the assembly of the tube/bracket/reflector has been completed. Longer tube assemblies may be raised in more than one sub-assembly with final tube connection made in the air.

Ensure that the installer uses the burner roof support mounting bracket when suspending the heater. This is situated on the front of the burner. When packed the bracket is reversed and must be turned to its correct state for mounting. (ref page 15)

WARNING:

If not installed, operated and maintained in accordance with the manufacturer's instructions, this product could expose you to substances in fuel or from fuel combustion which are known to the state of California to cause cancer, birth defects or other reproductive harm.

Figure 1. Recommended Methods of Heater Suspension.



1.3 Clearance to Combustibles.

Minimum clearance to combustibles are shown in Table 1 below.

IMPORTANT:
The stated clearance to combustibles represents a surface temperature of 90°F (50°C) above room temperature. Building material with a low heat tolerance (such as plastics, vinyl siding, canvas, tri-ply, etc.) may be subject to degradation at lower temperatures.

It is the installer's responsibility to assure that adjacent material are protected from degradation.

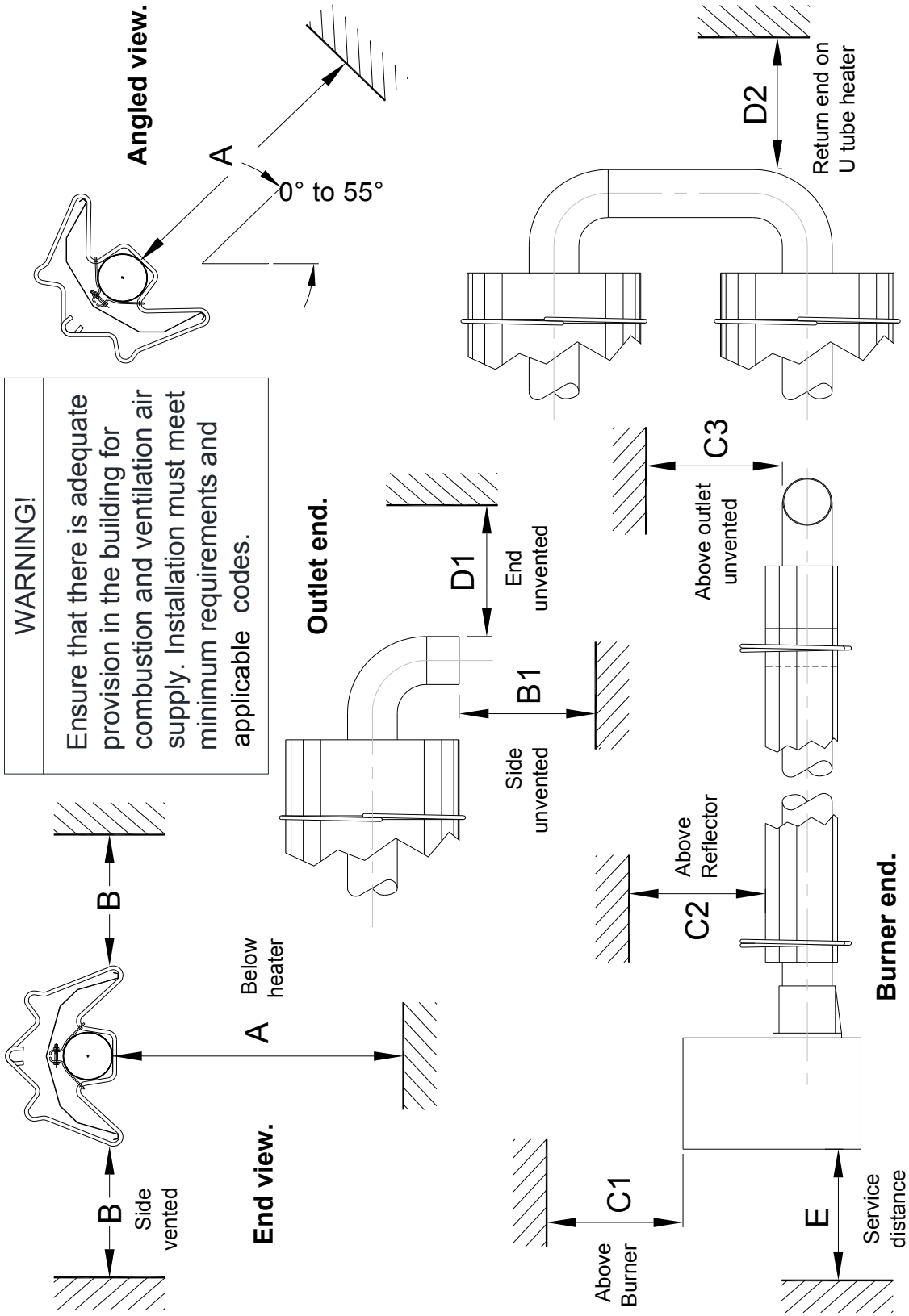
Table 1	**Clearance to Combustibles, inches (cm)**								
MODEL	**A**	**B**	**B1**	**C1**	**C2**	**C3**	**D1**	**D2**	**E**
60	74 (188)	29 (74)	41 (105)	6(16) / 3(8)*	8 (21)	22 (56)	8 (21)	14 (36)	10 (26)
80	74 (188)	29 (74)	41 (105)	6(16) / 3(8)*	8 (21)	22 (56)	8 (21)	14 (36)	10 (26)
100	74 (188)	32 (82)	41 (105)	6(16) / 3(8)*	8 (21)	22 (56)	8 (21)	16 (41)	10 (26)
125	74 (188)	39 (99)	47 (120)	6(16) / 3(8)*	8 (21)	22 (56)	20 (51)	18 (46)	10 (26)
150	74 (188)	39 (99)	48 (122)	6(16) / 3(8)*	8 (21)	22 (56)	20 (51)	18 (46)	10 (26)
170	86 (219)	48 (122)	48 (122)	6(16) / 3(8)*	11 (28)	22 (56)	20 (51)	20 (51)	10 (26)
200	86 (219)	48 (122)	48 (122)	6(16) / 3(8)*	11 (28)	22 (56)	20 (51)	20 (51)	10 (26)

** distance with end caps fitted.*

WARNING: Minimum clearance from the heater must be maintained from vehicles parked below heater. In all situations, clearances to combustibles must be maintained. Signs should be posted in storage areas to specify maximum stacking height to maintain required clearance to combustibles. Such signs must either be posted adjacent to the heater thermostats or in the absence of such thermostats in a conspicuous location. Refer to mounting clearance tables.

Figure 2 Clearance to Combustibles (Standard indoor reflectors).

The minimum clearances to combustible materials are given in the tables below. These minimum distances MUST be adhered to at all times. Adequate clearance MUST be provided around air openings into the combustion chamber and there MUST be suitable clearance for accessibility and for combustion / ventilating air supplies.



1.4 Gas Connection and Supply

WARNING: Before installation, check that the local distribution conditions, nature of gas and pressure, and adjustment of the appliance are compatible.

The gas connection on the heater is ½" N.P.T internal thread.

Injector sizes and manifold pressure for the burners are shown in the table 3. The gas supply piping and connections must be installed so that the minimum pressure stated is achieved.

A gas shut off valve and union should be fitted in the gas supply line close to the heater and a ⅛" N.P.T plugged tapping, accessible for test gauge connection, provided immediately upstream of the appliance gas inlet.

It is essential to provide some flexibility in the final gas connection by use of an approved flexible gas connector. (See Fig 4.)

Take care when making a gas connection to the heater not to apply excessive turning force to the internal controls.

Care must be taken to observe the minimum pipe bend diameter (minimum 10" (254mm), maximum 14"(356mm) & pipe expansion distance (minimum 1⅛" (25.4mm), maximum 3¾"(95mm).

The correct installation as shown will allow for approx 4" of movement due to expansion.

Figure 3. Correct orientation of Ball Valve

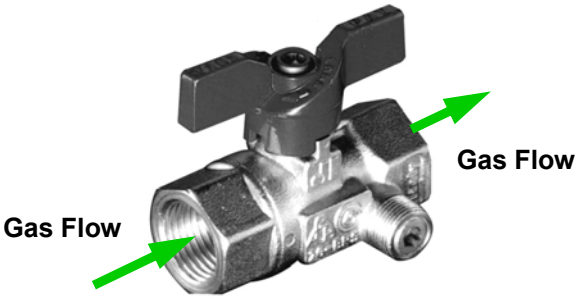
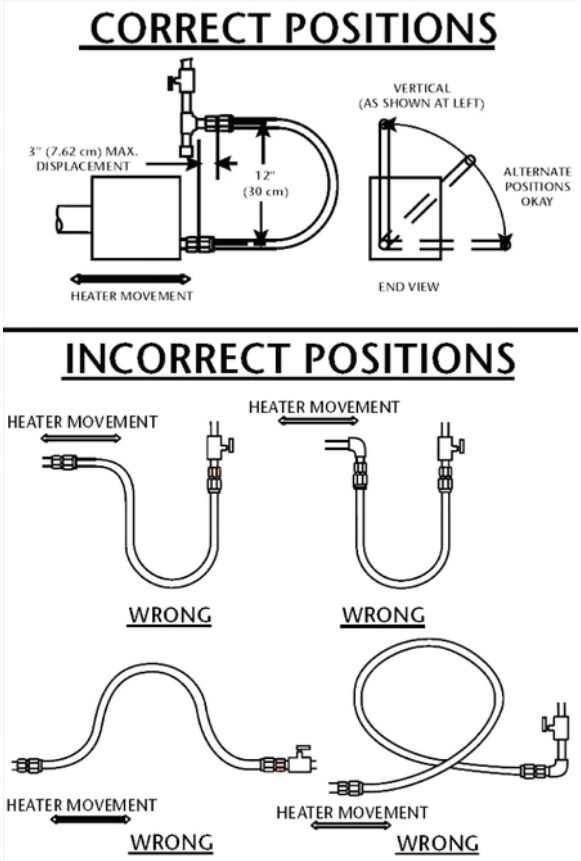


Figure 4. Correct Installation of Flexible Gas Connection



* Connector must be certified for use on a radiant tube type infrared heater and must comply with Standard for Connectors for Gas Appliances, ANSI Z21.24/CSA 6.10 or with the Standard for Elastomeric Composite Hose and Hose Couplings for Conducting Propane and Natural Gas, CAN/CGA 8.1.
For heaters up to 150,000Btu/h, ½" ID x 24" long
For heaters above 150,000Btu/h and above, ¾" ID x 36" long
NOTE: For Canada all heaters MUST use a hose 36" long
See Table 2

Table 3

HOSE SIZE	USA	CANADA
3/4"	CE4	*CONTACT FACTORY*

WARNING: FIRE OR EXPLOSION HAZARD - Expansion of the radiant pipe occurs with each firing cycle causing the burner to move with respect to the gas line. This can result in a gas leak producing an unsafe condition. It is therefore essential to provide some flexibility in the final gas line connection by use of an approved flexible connector as shown in the drawings.

CONNECTOR MUST BE INSTALLED IN A "U" CONFIGURATION. FOR HEATERS UPTO 150,000 BTU/H, A 24" LONG CONNECTOR OF AT LEAST ½" ID MUST BE USED. FOR HEATERS ABOVE 150,000 BTU/H, A 36" LONG CONNECTOR OF AT LEAST ¾" NOMINAL ID MUST BE USED.

Table 3 Gas Supply Pressures

Gas Type	Natural Gas	LP/Propane Gas
Required Gas Pressure (in W.C) (60,000 TO 150,000 BTU)	5.0	11.0
Required Gas Pressure (in W.C) (170,000 TO 200,000 BTU)	7.0	11.0
Max Supply Pressure (in W.C)	14.0	14.0
Gas Supply	Connection ½" N.P.T thread	

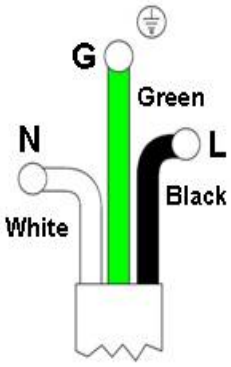
1.5 Electrical Connections

WARNING: Before making electrical connections, switch OFF the main electrical disconnect. There may be more than one disconnect switch. Lock out and tag switch with a suitable warning label. Electrical shock can cause personal injury or death.

This appliance must be electrically grounded

Supply 120V 60Hz single phase.
Standard heater 0.16HP.
Current rating 1.2 amp max (inductive).
Fuse: external 3 amp.

Important: All electrical work should be done by a qualified electrician in strict accordance with the National Electrical Code ANSI/NFPA 70 or Canadian Codes CSA C22.1.

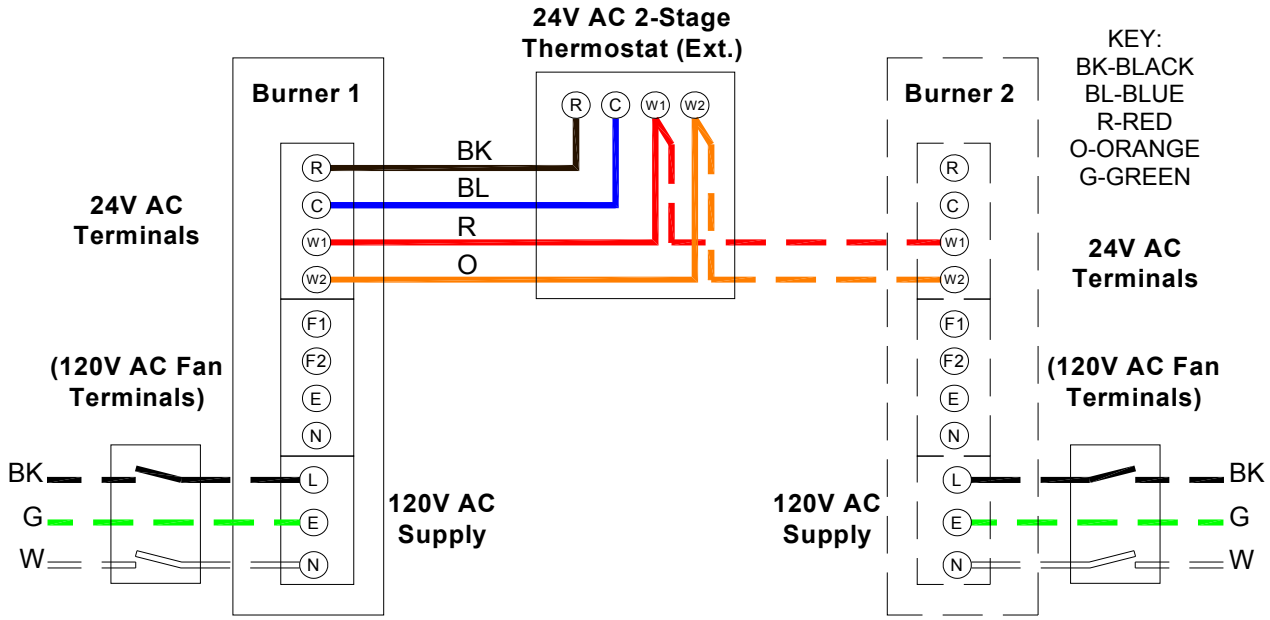


The electrical supply to the heater is by three wires: hot (Live), neutral and ground connections.

Install in accordance with all state & local codes.

Where alternative manufacturers controls are used, please refer to their instructions for their installation details.

Figure 5. External Wiring Schematic.

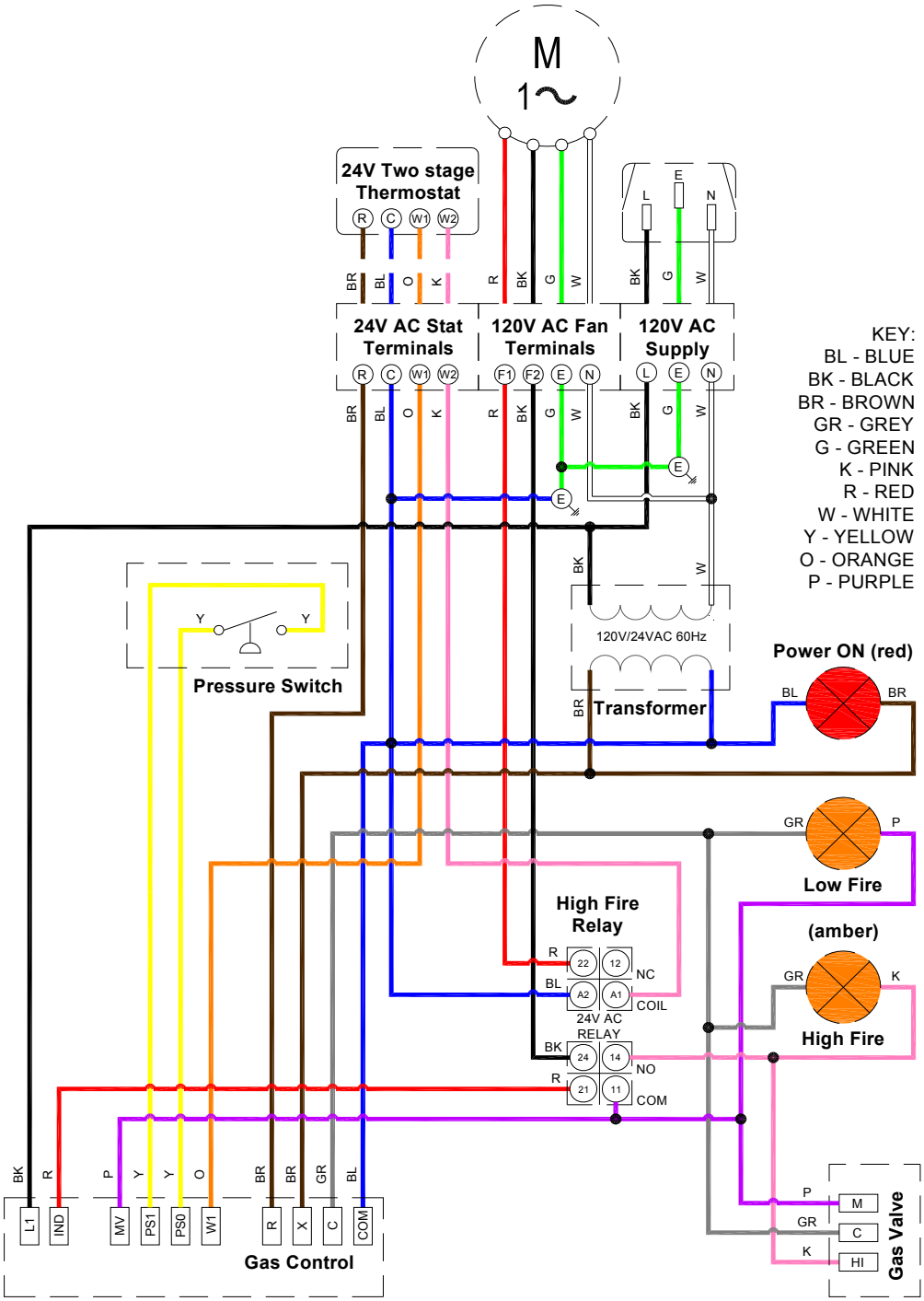


Notes:
Use 18/4 class 2 thermostat cable between heater(s) and thermostat.

Max. length @ 18 Awg (0.8mm²) = 100ft.
No more than 2 burners can operate from one thermostat as supplied. However, a control is

available from the manufacturer that allows up to 8 burners to be operated from one thermostat as a single zone.
When servicing heaters ensure the electricity supply is isolated from the mains supply.
120V AC supply is still present at each burner when the thermostat is switched off.

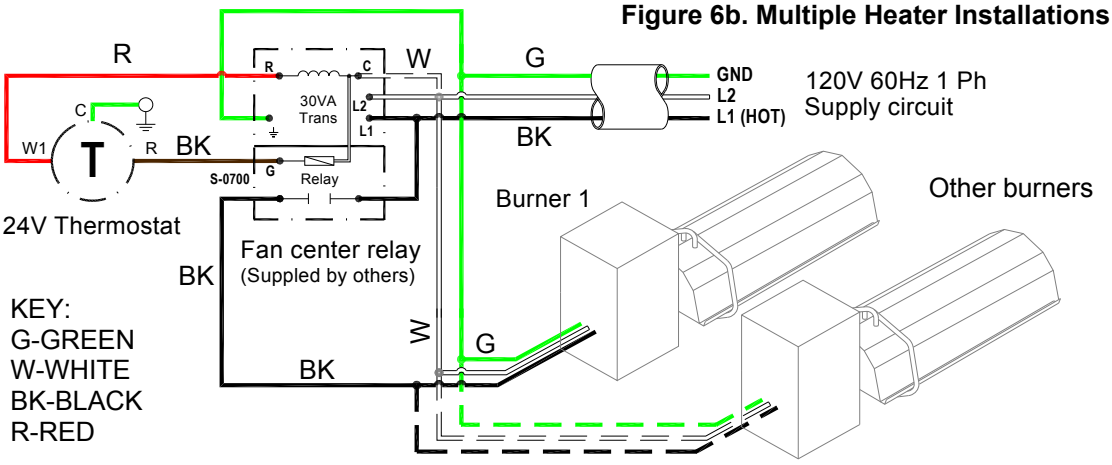
Figure 6a. Internal Burner Wiring Diagram.



NOTES:-
Power On light is permanently illuminated when 120V / 60 Hz AC external supply is connected to burner.
Additional wiring is required to install a thermostat and / or time clock.
Wire specification:- 18 AWG (1.0mm²), Tri-rated, 105°C

⚠ If any of the original wire as supplied with the appliance must be replaced, it must be replaced with wiring material having a temperature rating of at least 220°F/105°C

Figure 6b. Multiple Heater Installations 24V Control



1.6 Vent Requirements and Details

1.6.1 Unvented units

Heaters may be installed without a vent providing the governing building codes are met and consideration is properly given to possibilities of condensation on cold surfaces.

Installation shall meet the following requirements when unvented:

- Internal volume of the heated room must be greater than 214cu.ft. per 100 BTU per hour of heaters installed.

  OR
- Natural or mechanical means shall be provided to supply and exhaust at least 4 CFM per 1000 BTU per hour input of installed heaters.
- Combustion gasses shall not impinge on combustible materials.

1.6.2 Vertical venting

The heater can be installed with a vertical vent.

All vent piping should be adequately supported from the building structure and terminated with an approved terminal. **The maximum recommended vent length is 25ft (7.6m) with a maximum of two elbows**. All connections should be properly sealed. (refer fig 7a)

1.6.3 Horizontal venting

Individual units can be vented horizontally through side walls. Recommended terminals are part numbers 111848 for 4” and 111850 for 6”.

Distances from adjacent public walkways, adjacent buildings, openable windows and building openings, consistent with the *National Fuel Gas Code, ANSI Z223.1/NFPA 54* or the *Natural Gas and Propane Installation Code, CSA B149.1.*

Maximum length of vent is 25ft (7.6m) with two - 90° elbows.

Runs of 12ft (3.6m) or shorter can use 4” (101mm) diameter vent. Runs over 12ft (3.6m) should use 6” (152mm) vent pipe.

Any portion of vent that passes through a combustible wall must be insulated, or use an approved insulating thimble.

Standard vent terminals must extend at least 6” (152mm) from the wall and at least 24” (609mm) from any combustible overhang. Protect the building material from degradation by the vent gasses.

Vent joints should be sealed and secured according to the vent manufactures installation. Should condensation occur the vent should be shortened or insulated.

The terminal should be at least 3ft (0.91m) away from any air intake to the building.

If the heater is equipped with ducted combustion air, the vent terminal must be at least 3ft (0.91m) away from the air inlet and located higher than the inlet.

The vent terminal must be installed at a suitable height above the ground to prevent blockage by snow.

1.7 Fresh Air Intake

Whenever the heater is installed in locations where airborne dust or other pollutants are present, a fresh air supply should be ducted to the burner.

A fresh air duct of 4” (101mm) diameter should be installed from the fresh air to the air intake connection on the burner housing. A flexible jointing piece should be installed at the burner connection with hose clamps to facilitate expansion and contraction.
The maximum recommended length air duct is 25ft (7.6m) and the maximum number of bends is two. The minimum length is 18” (456mm). The location of the fresh air duct inlet must be where it will receive dust free clean air. An inlet cap with bird screen must be fitted at the inlet of the duct. If the duct inlet is located above the roof the underside of the inlet terminal must be at least 2ft (0.61m) above roof level and at least 10” (254mm) above any projection on the roof within 7ft (2.1m) of the inlet. Intake pipe, fittings and sealant are not furnished by the manufacturer. (Refer fig 7c & 7d.)

Figure 7.a Vertical Venting.

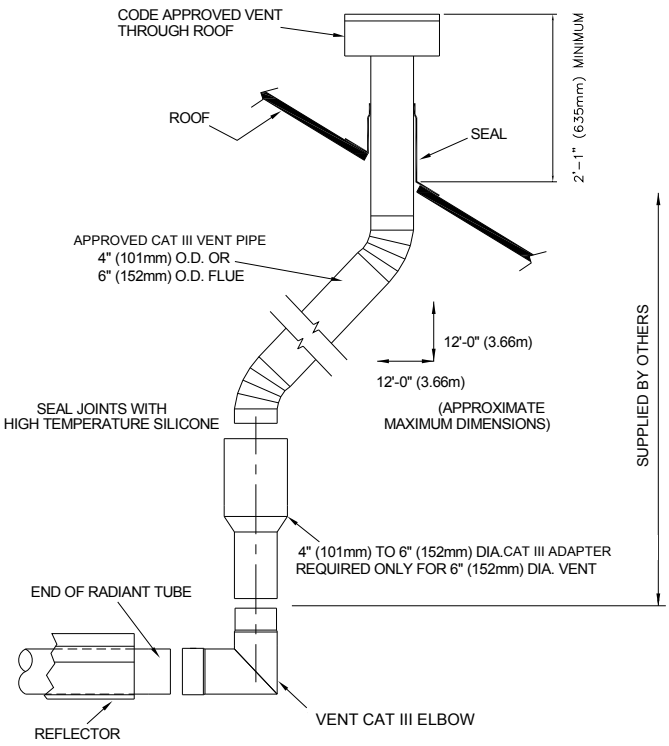
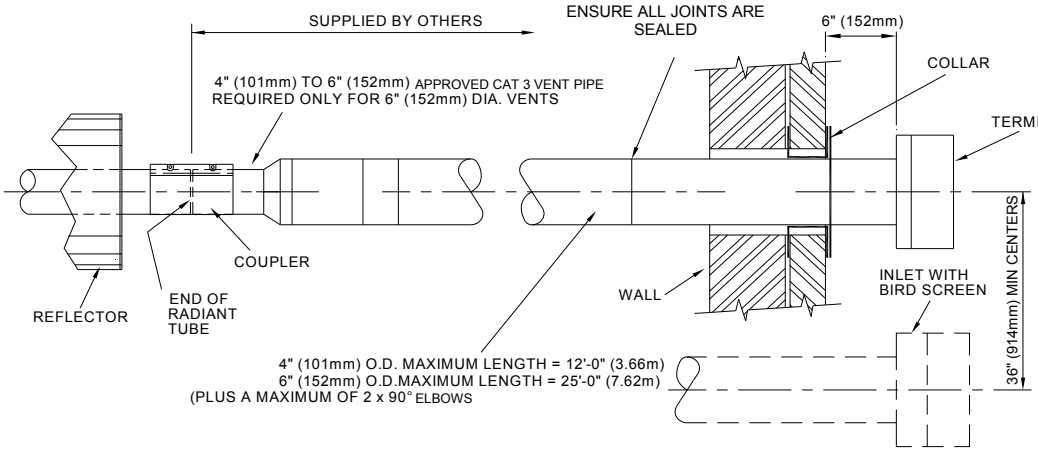


Figure 7.b Horizontal Venting.



NOTE: The vent terminal should be installed so as to be in the same atmospheric pressure zone as the combustion air inlet of the appliance

Figure 7.c Fresh Air Ducted Intake.

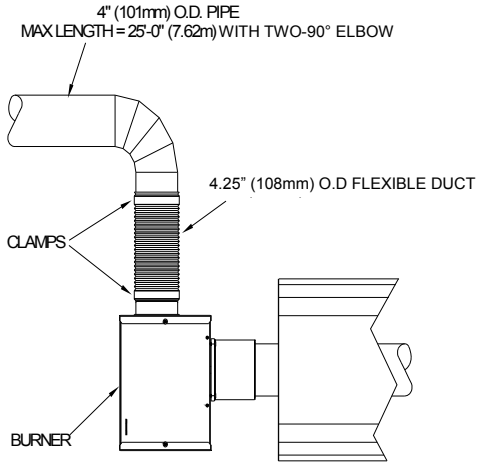
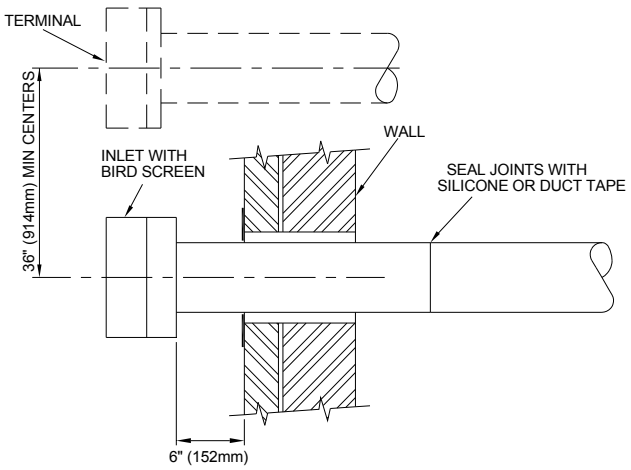


Figure 7.d Wall Terminal Intake Kit.



1.8 Technical Details - Table 4

No of Injectors	1
Gas Connection	½" N.P.T
Electrical Supply	120 volt 1 phase 60Hz
Vent size (in)	4" or 6" (101mm or 152mm)
Unitary Fan Motor Details	120 volt 1 phase 60Hz
Current Rating	1.2A MAX
Ignition	Electronic Program Start up with Spark Ignition
Thermostat	24Vac 60Hz 1.5A Max. total load

MODEL	Natural Gas	LP Gas	Min. Heater Length	Max. Heater Length	Min. Heater Length	Max. Heater Length
	High / Low Rate BTU/Hr	High / Low Rate BTU/Hr	S ft (m)	S ft (m)	U (ft)	U (ft)
60	60,000/45,000	60,000/45,000	20 (6.1)	40 (12.1)	20 (6.1)	40 (12.1)
80	80,000/60,000	80,000/60,000	30 (9.1)	40 (12.1)	40 (12.1)	40 (12.1)
100	100,000/65,000	100,000/65,000	30 (9.1)	40 (12.1)	40 (12.1)	40 (12.1)
125	123,500/95,000	125,000/95,000	30 (9.1)	50 (15.2)	40 (12.1)	40 (12.1)
150	150,000/100,000	150,000/100,000	40 (12.1)	60 (18.3)	40 (12.1)	60 (18.3)
170	169,000/125,000	169,000/125,000	50 (15.2)	70 (21.3)	60 (18.3)	60 (18.3)
200	200,000/150,000	**N/A**	50 (15.2)	70 (21.3)	60 (18.3)	60 (18.3)

ALTITUDE CONVERSION KITS ARE AVAILABLE

MODEL	Natural Gas 0-2000 ft (0-610m)				LP Gas 0-2000 ft (0-610m)			
	Burner Orifice Plate	Injector	Injector Pressure		Burner Orifice Plate	Injector	Injector Pressure	
	Part No.	Part No.	Inches WC.		Part No.	Part No.	Inches WC.	
			High	Low			High	Low
60	269941	270400	4.2	2.4	269948	270398	6.1	3.5
80	269942	270402	3.9	2.3	269949	270399	5.2	3.0
100	269943	270403	4.9	2.1	269950	270399	8.2	3.7
125	269944	270405	4.5	2.7	266951	270400	7.6	4.4
150	269945	270407	4.4	2.2	266952	270401	7.2	3.3
170	269946	270409	4.0	2.4	266953	270403	6.8	3.9
200	269946	270410	4.6	2.8	**N/A**			

CANADA ONLY 10% DERATE	Natural Gas 2001-4500 ft (611-1370m)				LP Gas 2001-4500 ft (611-1370m)			
	Burner Orifice Plate	Injector	Injector Pressure		Burner Orifice Plate	Injector	Injector Pressure	
MODEL	Part No.	Part No.	Inches WC.		Part No.	Part No.	Inches WC.	
			High	Low			High	Low
60	269941	270400	4.1	2.3	269948	270398	6.0	3.4
80	269942	270402	3.7	2.1	269949	270399	5.0	2.9
100	269943	270403	4.7	2.0	269950	270399	8.0	3.5
124	269944	270405	4.3	2.5	269951	270400	7.4	4.2
150	269945	270407	4.2	2.0	269952	270401	7.0	3.1
170	269946	270409	3.8	2.2	**N/A**			
200	269946	270410	4.4	2.6				

MODEL	Natural Gas			LP Gas			All types
	Combustion Fan Details		Pressure Switch	Combustion Fan Details		Pressure Switch	Burner Head
	Fan Type	Orifice Part No.	Part No.	Fan Type	Orifice Part No.	Part No.	Part No.
60	270464	269921	270386	270464	269924	270386	270425
80		269925			269925		
100		269923			269928		
125		269927			266931		
150		269930			269933		
170	270467	266935		270467	269936		
200		269938	270387	N/A			

MODEL	U TUBE			STRAIGHT TUBE						
	U20	U40	U60	S10	S20	S30	S40	S50	S60	S70
60	●	●			●	●	●			
80		●				●	●			
100		●				●	●			
125		●				●	●	●		
150		●	●				●	●	●	
170			●					●	●	●
200			●					●	●	●

MODEL	TUBE TYPE MATERIAL		MIN DISTANCE TO BEND
	Calcoat™	Mild Steel	
60	TUBE 1	REMAINDER	10 (3.1)
80	TUBE 1	REMAINDER	15 (4.6)
100	TUBE 1	REMAINDER	15 (4.6)
125	TUBE 1	REMAINDER	15 (4.6)
150	TUBE 1	REMAINDER	20 (6.1)
170	TUBE 1 & 2	REMAINDER	25 (7.6)
200	TUBE 1 & 2	REMAINDER	25 (7.6)

Options * Not available on LP Gas

1 All standard units fitted with unvented vent, natural gas and aluminized reflectors.
2 1 off 180° 'U' bend or upto 2 off 90° 'L'bends can be fitted at no less than 50% of the total heater length.
3 5ft tube kit, 4*" (101mm) or 6" (152mm) vent terminal.*
4 Combustion air kit.
5 Reflector end caps.
6 Altitude conversion kit.
7 Propane and propane altitude conversion kit.

CP SERIES
RADIANT CEILING PANELS

IDEAL SPACES

- Offices
- Hallways
- Lobbies
- Conference Rooms
- Retail Spaces
- Locker Rooms
- Laboratories
- Yoga Studios
- Living Rooms
- Bedrooms
- Bathrooms
- Basements

COLORS

- Flurry White
- Custom Colors and Silkscreens Available

DIMENSIONS

- 24" x 24" and 24" x 48"
- Custom Sizes Available

- Ideal for invisible, primary or supplemental comfort
- Perfect for offsetting perimeter heat losses or providing primary heat to an entire space
- Full line of custom panels available upon request (see specifications on next page)
- Unit comes standard with 48 in. of 1/2 in. flexible metal conduit and J-Box connector
- Insulation - Made of 1 in., 1 lb. density, high-temperature fiberglass
- Galvanized or aluminized steel housing
- Encapsulated casted element assures uniform temperatures across surface and unit longevity
- Includes ground wire and 48 in. lead wires housed in flexible metal conduit
- All panels come standard with combination Earthquake/T-bar grip clips
- Hanging Clips provide holes for support chains, or can be folded over T-Bar to reduce lateral movement
- Constructed of fire retardant materials; no fire or hazardous rating

c UL us

1 YEAR WARRANTY WORKMANSHIP

5 YEAR WARRANTY ELEMENT

CP SERIES
RADIANT CEILING PANELS

MODELS & SPECIFICATIONS / STANDARD

CATALOG NO.	UPC	VOLTS	WATTS	AMPS	SIZE (in.)	SHIP WT. (LBS)
CP251F	6 85360 01658 0	120	250	2.1	24x24	15
CP258F	6 85360 01663 4	208	250	1.2	24x24	15
CP252F	6 85360 01659 7	240	250	1.0	24x24	15
CP257F	6 85360 01662 7	277	250	0.9	24x24	15
CP253F	6 85360 01660 3	347	250	0.7	24x24	15
CP311F	6 85360 01669 6	120	310	2.6	24x24	15
CP318F	6 85360 01674 0	208	310	1.5	24x24	15
CP312F	6 85360 01670 2	240	310	1.3	24x24	15
CP317F	6 85360 01671 9	277	310	1.1	24x24	15
CP313F	6 85360 01673 3	347	310	0.9	24x24	15
CP371F	6 85360 01675 7	120	375	3.1	24x24	15
CP378F	6 85360 01685 6	208	375	1.8	24x24	15
CP372F	6 85360 01676 4	240	375	1.6	24x24	15
CP377F	6 85360 01677 1	277	375	1.4	24x24	15
CP373F	6 85360 01684 9	347	375	1.1	24x24	15
CP501F	6 85360 01691 7	120	500	4.2	24x48	28
CP508F	6 85360 01696 2	208	500	2.4	24x48	28
CP502F	6 85360 01692 4	240	500	2.1	24x48	28
CP507F	6 85360 01695 5	277	500	1.8	24x48	28
CP503F	6 85360 01693 1	347	500	1.4	24x48	28
CP621F	6 85360 01697 9	120	625	5.2	24x48	28
CP628F	6 85360 01707 5	208	625	3.0	24x48	28
CP622F	6 85360 01698 6	240	625	2.6	24x48	28
CP627F	6 85360 01706 8	277	625	2.3	24x48	28
CP623F	6 85360 01699 3	347	625	1.8	24x48	28
CP751F	6 85360 01713 6	120	750	6.3	24x48	28
CP758F	6 85360 01718 1	208	750	3.6	24x48	28
CP752F	6 85360 01714 3	240	750	3.1	24x48	28
CP757F	6 85360 01717 4	277	750	2.7	24x48	28
CP753F	6 85360 01715 0	347	750	2.1	24x48	28

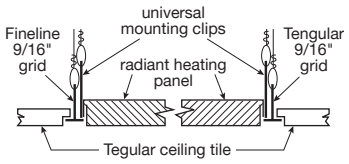
NOTE: When ordering panels with custom features, the catalog number will change. Please see next page for more information on made to order custom products.

ACCESSORIES / STANDARD

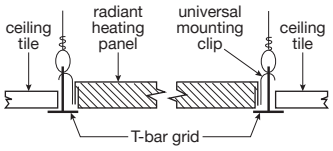
CATALOG NO.	UPC	DESCRIPTION
QSF2424	6 85360 20184 3	Surface Mounting Frame for 24” x 24” Panels
QSF2448	6 85360 20185 0	Surface Mounting Frame for 24” x 48” Panels
QRF2424	6 85360 20186 7	Recess Mounting Frame for 24” x 24” Panels
QRF2448	6 85360 20187 4	Recess Mounting Frame for 24” x 48” Panels

NOTE: Heating panels do not have a fire or hazardous rating, but construction is of fire retardant materials. Panels normally are treated like light fixtures. If necessary, acoustical tile can be placed on top of the panels.

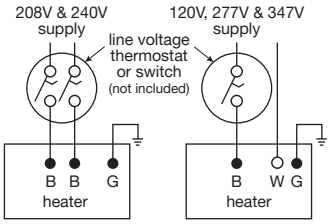
REVEALED EDGE CEILING SYSTEM
TEGULAR
FINELINE TEGULAR

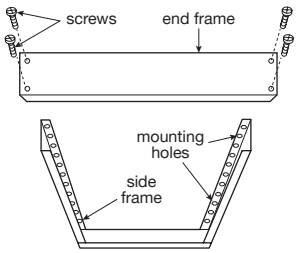


T-BAR SYSTEM

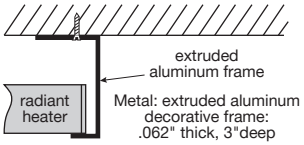


Wiring Diagrams:
Heaters must be properly grounded

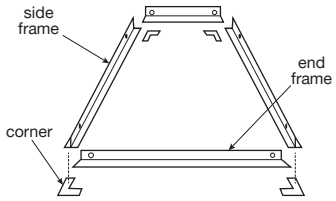




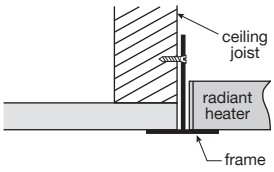
Frame construction for surface mount panels



Wood: heaters can be framed in wood.
Consult your factory representative for specifics.



Frame construction for recessed panels



Metal: extruded aluminum inverted “T”
“T”= .125 thick by 1.432 wide by 1.875 high

ADDITIONAL FEATURES / MADE TO ORDER

TEGULAR (revealed edge): Tegular systems may utilize a standard grid with a 10/16 in. cross-T or a "fine line" grid with a 9/16 in. cross-T. The acoustical title is notched to hang below the grid creating the revealed edge. Tegular panels are built with a support angle on all four sides to allow the panel front to drop flush with the finished ceiling. Tegular and Fine line Tegular panels are supplied standard with universal mounting clips installed for support chain.

SILKSCREEN: Radiant heating panels can be silk screened to provide an architectural blend with leading acoustical tiles. For T-bar, concealed spline and Tegular ceiling systems.

CUSTOM COLORS: Radiant heating panels can be painted any color desired with high temperature acrylic paints without affecting panel performance. Radiant energy is emitted from heating panels in the 8-10 micron wavelength range. One of the principal characteristics of the wavelength is that it is not color selective as are shorter wavelengths. Consequently, the surface color of the panel is unimportant to heating efficiency and can be considered solely in the light of aesthetics.

PANEL FRONTS FOR CONTINUOUS CEILING LINE: To provide a continuous ceiling line around the perimeter of a building, the factory can provide panel fronts to be interspersed between the functioning heating panels.

CONTROLS: P/E Switches - factory prewired to heaters. 20 amps - 120V, 240V, 208V and 277V. Power Relay - factory prewired to heaters. 30 amps single-pole with 24V, 120V, 208/240V or 277V holding coil voltages.

LONGER FLEXIBLE CONDUIT: Panels will replace the standard 48 in. greenfield with up to 11 ft. of 1/2 in. flexible conduit.

STAINLESS STEEL CONSTRUCTION: Special stainless steel panels are available for chlorine storage areas. Panels will be equipped with seal tight connectors and silicone sealed. If orders call for stainless steel construction the panels will be painted unless specified different. Three different finishes available - mill, mirror and brushed.

FACTORY SILICONE-SEALED PANELS: Exterior moisture and condensation do not affect heating panel performance, but water inside the unit can cause the panel to fail. Panels being used in locker rooms and swimming pool areas should be totally sealed with silicone at the factory before shipment, if there is a chance of moisture above the ceiling, then seal tight conduit and seal tight connectors also should be used.

SEAL-TIGHT FLEXIBLE CONDUIT & CONNECTORS: Radiant ceiling panels come with 1/2 in. greenfield flexible conduit and straight connectors. Seal-tight connectors and conduit can be substituted at the factor if panels are to be used in high moisture areas or if required by local electrical codes.

HEAVIER DUTY PANELS: For special installation the factory can use heavier gauge steel in the construction of the panels.

MODULAR WIRING SYSTEMS: For specific jobs, the factor can substitute modular connector for the straight connectors and pig tails that are standard equipment.

MODELS & SPECIFICATIONS / MADE TO ORDER

		WATTS PER PANEL – NOMINAL PANEL LENGTH						
PANEL WIDTH (IN.)	WATT DENSITY	24-35 IN.	36-47 IN.	48-59 IN.	60-71 IN.	72-83 IN.	84-95 IN.	96 IN.
10-13	High	155	235	315	390^	–	–	–
	Med	130	195	260	325^	–	–	–
	Low	105	155	210	260^	–	–	–
14-17	High	235	350	470	585^	–	–	–
	Med	195	295	390	490^	–	–	–
	Low	155	235	315	390^	–	–	–
18-21	High	315	470	625	780	940^^	–	–
	Med	260	390	520	650	780^^	–	–
	Low	210	315	415	520	625^^	–	–
22-28	High	375	565	750	940	1125	1315	1500
	Med	310	470	625	785	940	1095	1250
	Low	250	375	500	625	750	875	1000

NOTE: Custom products are made to order and non-returnable.

HOW TO ORDER

The catalog number for custom panels begins with the QT prefix followed:

- Watt Density (H, M, L)
- Panel Width
- Panel Length
- Voltage (1=120V; 8=208V; 2=240V; 7=277V; 3=347V)

For example, a 13 x 36 in. 240V unit with a high watt density would be QTH13362.

When ordering, please specify panel size as exact or nominal (panels can be up to 7/1 in. less in size).

^ maximum panel length = 60 in.

^^ maximum panel length = 72 in.

Catalog No. for surface mounting frames (QSF) and recess mounting frames (QRF) begin with their respective prefix followed by width and length of panel.

CP SERIES
RADIANT CEILING PANELS

ACCESSORIES / STANDARD	
CUSTOM PANEL OPTIONS	**DESCRIPTION**
SILKSCREEN	To Provide An Architectural Blend With Leading Ceiling Tile, 2x5 ft. Max. There is a Panel Charge Each Time. If Manufacturer Does Not Have A Tile Pattern Screen There Is An Additional One-Time Charge. See Pricebook.
CUSTOM PAINT	Solid Color Custom Painted Panel - To Provide An Accent Strip
TEGULAR or FINELINE TEGULAR	Tegular - Reveal Edge Detail - (For 15/16 in. Grid) Construction Fineline Tegular - Reveal Edge Detail - (For 9/16 in. Grid)
EXTRA-LENGTH GREENFIELD FLEX (1/2" x 48" STANDARD)	Custom Flexlength 1/2 x 60 in. / 72 / 84 / 96 / 108 / 120 in.
SEALTITE CONDUIT	Custom Flexlength 1/2 x 60 in. / 72 / 84 / 96 / 108 / 120 in.
SILICONE SEAL	Seams Sealed For Added Moisture Protection. For Use In Shower Rooms And Above Pool Windows
STAINLESS STEEL CONSTRUCTION	Stainless Steel - 22-Gauge Front Panel, 24-Gauge Back Panel. Includes 1/2 x 48 in. Sealtite Flex And Silicone Seal
HEAVY DUTY CONSTRUCTION	16-Gauge Galvanized Or Aluminized Steel Front Panel
	18-Gauge Galvanized Or Aluminized Steel Back Panel
FILLER PANELS	Finished To Match Standard, Silkscreen Or Custom Painted Panel. Does Not Contain An Element Or Flex Conduit. Standard Construction: Front Only. Tegular / Fineline Tegular: Front And Back Only
POWER RELAY	24, 120, 208, 240, 277 VAC

NOTE: Custom products are made to order and non-returnable.

LHXseries

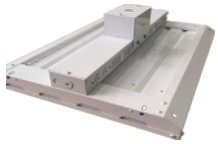
S1
KOMEE
simple & smart

LED LINEAR HIGHBAY

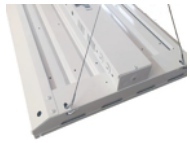
110W / 160W / 220W / 320W

Product Features

- LH Series Linear Highbay can be used in Warehouse, Factories, Retail, Commercial Lighting, etc. It is equivalent to 4 - 10 fluorescent highbay lamps
- For applications with ceiling heights of **12 - 60** ft
- 22 Gauge Steel metal frame, factory pre-treated and powder-coated to meet the most rugged industry standards
- External driver enclosure sits on the back of the fixture
- Standard frosted lens installed
- Chain Mount as standard mounting, optional for Pendant, and Surface Mount
- Available with Sensor options (see below)
- Compatible with EM backup, up to 90 mins
- Built-in surge protection up to 4kV, 10kV in-line surge protector available as option
- UL / cUL Listed, DLC 4.2 Listed



Pendant Hanger



Cable Kit

Surface Mounting

Wire Guard

Application

Warehouse Lighting, Workshop Lighting, Auto Maintenance, Commercial Lighting, High Rack, Retail Application

Dimensions

Power	A	B	C
110w	605mm (23.8")	320mm (12.6")	92mm (3.62")
160W	605mm (23.8")	320mm (12.6")	92mm (3.62")
220W	1166mm (45.9")	1206.6mm (12.6")	92mm (3.62")
320W	1166mm (45.9")	1206.6mm (12.6")	92mm (3.62")

Lumen Chart

Power	Medium
110W	13750lm
160W	19280lm
220W	26730lm
320W	39260lm

Order Code (Example: KMLHX-11050FL-PWHUD)

Part #	Wattage	CCT	Distribution	Mounting	Finish	Input Voltage & Dimming
KMLHX	**110** - 110W (13750 lm) **160** - 160W (19280 lm) **220** - 220W (26730 lm) **320** - 320W (39260 lm)	**50** - 5000K **40** - 4000K	**FL** - Frosted Lens	**C** - Chain Mount **CK** - Cable Kit **P** - Pendant **SM** - Surface Mount	**WH** - White	**UD** - 110-277V & 0-10V Dimming **H** - 347V, 480V

Option

Part #	Description
A-LHX-WG-01	Wire Guard Protector For LHX 110W / 160W Model
A-LHX-WG-02	Wire Guard Protector For LHX 220W / 320W Model
A-OCC-BBP-111-L7	Combo Sensor with IR Capabilities
A-OCC-HBP-112-L7	OCC Sensor
A-EMB-700	Fullham 700 Lumen Package EM*
A-EMB-1400	Fullham 1400 Lumen Package EM*
A-EMB-2000	Fullham 2000 Lumen Package EM*

*Refer to EM Manufacturer Spec sheets for detail.
Specifications are subject to change without notice

Rev.073118

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c UL us LISTED

IL4 SERIES LED INTERIOR LINEAR LIGHT

KOMEE
simple & smart

Client: _____ Project: _____ Type: _____ Qty: _____ **S2**

Technical Specifications

INPUT VOLTAGE
AC 100~277V

FREQUENCY
50~60HZ

COLOR TEMPERATURE
4000K, 5000K

COLOR RENDERING INDEX
80

DISTRIBUTION
Frosted

IP RATING
Damp Location

OPERATING TEMPERATURE
-40°C~+40°C

LIFE SPAN
50,000hrs

DIMMING
0-10V

Product Showcase

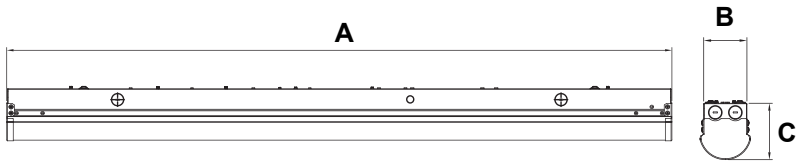
Product Features

FEATURES

- Simple, clean design great for warehouse, office, factory, retail and commercial applications with ceiling heights of 8-20ft.
- 22 Gauge Steel metal frame, factory pre-treated and powder-coated to meet the most rugged industry standards.
- Comes with a polycarbonate Frosted Lens
- Surface Mount standard.
- UL / cUL Listed, DLC Listed.

c UL us LISTED

Dimensions



A	A	A
1219.2mm (48”)	73.2mm (2.88”)	95.4mm (3.76”)

Ordering Information

KMIL4 - [ ] [ ] F - [ ] WH UD

(Wattage: [ ] CCT: [ ] Mounting: [ ])

Series	Size	Wattage	CCT	Lens	Mounting	Finish	Input Voltage & Dimming
KMIL	4	30 - 30W (3850lm) 45 - 45W (5700lm)	50 - 5000K 40 - 4000K	F - Frosted Lens	JM - Surface Mount CK - Gripple Hanger	WH - White	UD - 110-277V & 0-10V Dimming

Accessories/Option Adder

Part #	Description
A-EMB-8W	Integral Emergency Battery (8W)
A-PH-PB-U	Button Photocell (110-277V)
A-SP-LSP4	10kV Surge Protector
A-SENSOR-111	Motion and Photo Sensor 110-277V, IR Capable
A-SENSOR-112	Motion and Photo Sensor 110-277V

Specifications are subject to change without notice.
* Consult with factory.

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GARDCO by signify

Wall Mount

LED Wall Sconce

102L

Project:	EL DORADO FIRE STATION
Location:	
Cat.No:	W1
Type:	WALL SURFACE
Lamps:	Qty: 4EA
Notes:	

Gardco 102 LED wall sconces feature a low-profile design that provides wide flexibility in high performance exterior wall illumination. Full cutoff performance, usable illumination patterns, and powerful wattages combine into a compact and architecturally pleasing design. 102L sconces are available in Type 2, 3, and 4 distributions, and provide output of up to 9500 lumens. Energy saving control options increase energy savings and offer California Title 24 compliance. Emergency Battery Backup option available for path of egress.

Ordering guide

example: 102L-32L-700-NW-G1-3-120-IMRI2-BZ

Prefix	Number of LEDs	Drive Current	LED Color - Generation	Distribution	Emergency	Voltage	Options: Controls	Options: Electrical	Finish
102L	32L	530	NW-G1	3		120	IMRI2		BZ
102L 102L LED Wall Sconce	**16L** 16 LEDs (1 module) **32L** 32 LEDs (2 module)	**530** 530mA **650** 650mA[1] **700** 700mA **1000** 1000mA **1200** 1200mA **530** 530mA **650** 650mA[1] **700** 700mA **1000** 1000mA[2]	**CW-G1** Cool White 5700K, 70CRI Generation 1 **NW-G1** Neutral White 4000K, 70CRI Generation 1 **WW-G1** Warm White 3000K, 70CRI Generation 1	**2** Type 2 **3** Type 3 **4** Type 4	**EBPC** Emergency Battery Pack Cold Weather[3,4,6,12] Leave blank to omitt an emergency option	**UNV** 120-277V **HVU** 347-480V **120** 120V **208** 208V **240** 240V **277** 277V **347** 347V **480** 480V	**DD** 0-10V Dimming Driver[5,6] **DCC** Dual Circuit Control[6,7,8] **DynaDimmer:** Automatic Profile Dimming **CS50** Safety 50% Dimming (7 hours)[7,9,10] **CM50** Median 50% Dimming (8 hours)[7,9,10] **CE50** Economy 50% Dimming (9 hours)[7,9,10] **DA50** All Night 50% Dimming[7,9,10] **Photoelectric systems** **PCB** Photocontrol Button[5,10,11,12] **Infrared Motion Response systems** **IMRI2** Integral with #2 lens[9,12,13] **IMRI3** Integral with #4 lens[9,12,13] **Wireless system** **LLC2** Integral module with #2 lens[5,7,9,14] **LLC3** Integral module with #3 lens[5,7,9,14]	**Fusing** **F1** Single (120, 277, 347VAC)[12] **F2** Double (208, 240, 480VAC)[12] **F3** Canadian Double Pull (208, 240, 480VAC)[12]	**Textured** **BK** Black **WH** White **BZ** Bronze **DGY** Dark Gray **MGY** Medium Gray **Customer specified** **RAL** Specify optional color or RAL (ex: OC-LGP or OC-RAL7024) **CC** Custom color (Must supply color chip for required factory quote)

1. 650mA only available with Emergency Battery Pack Cold Rated (EBPC) option
2. 32L rated for 30°C at 1000mA
3. Available for use with 16L and 32L in 530mA or 650mA only. Rated for -20°C to 35° C.
4. Available in 120 or 277V only.
5. Not available with Dual Circuit Control (DCC) option.
6. EBPC is not available with DCC.
7. Not available with Dimming Driver (DD) option.
8. Available in 32L with 530mA. Consult technical support center for use with photocell and CS/CM/CE/DA.
9. Available in 120-277V (UNV) only.
10. Not available with LLC and DCC.
11. Not available with 480V.
12. Must specifiy input voltage.
13. Not available with DD, DCC or LLC.
14. LLC2/3 Not available with PCB, IMRI, CS/CM/CE/DA. Ships with WS accessory attached to wireless module. Not for use with LLCR accessory.

102L Sconce LED

Wall Mount

Luminaire Accessories (order separately)

Mounting Accessories

Wall Mount

WS Wall Mounted Box for Surface Conduit

Controls Accessories

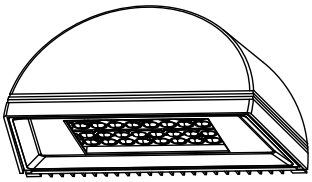
Wireless system remote mount module

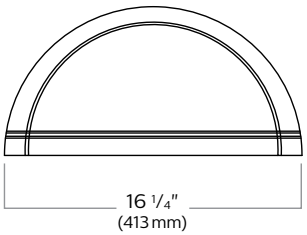
LLCR2-(F) #2 lens - specify finish in place of (F)
LLCR3-(F) #3 lens - specify finish in place of (F)

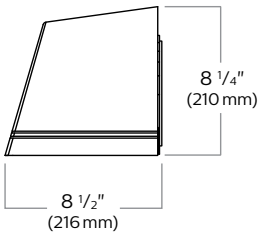
Wireless system remote controller accessory

Wireless system offers a remote radio/sensor module that allows to connected to a Limelight system (sold by other). Remote module can be mounted to wall or pole with j-box supplied. May be specified by choosing one of two different lenses to accommodate a variety of mounting heights/sensor detection ranges. Must specify option DD on luminaires that are planned to be used with remote mount controllers. See page 4 for Wireless system details.

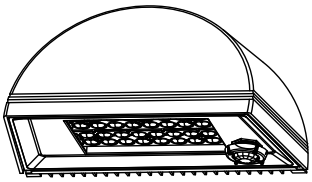
Dimensions

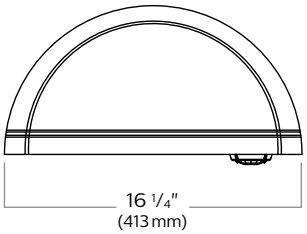


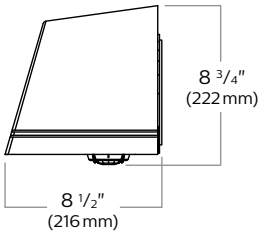




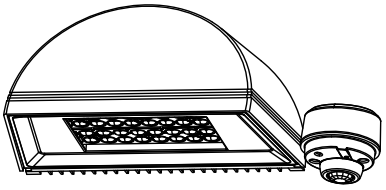
Motion Response

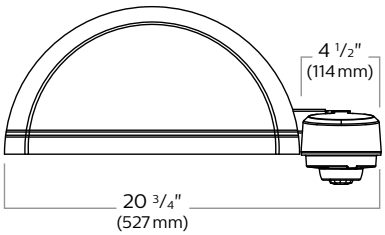


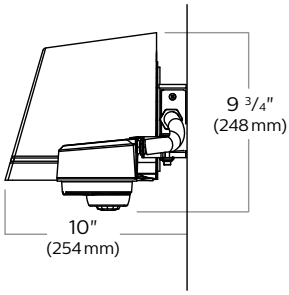


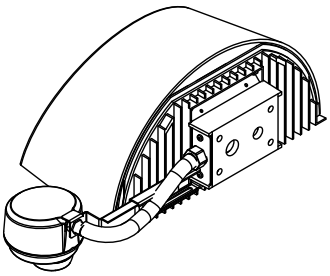


Wireless Controls









Luminaire Weights

LED Wall Sconce 102L	Weight
Luminaire	13.5 lbs
Luminaire - EBPC (EM battery pack)	17.0 lbs
Luminaire - Integrated system controls	16.3 lbs

102L Sconce LED

Wall Mount

LED Wattage and Lumen Values

Ordering Code	LED Qty	LED Current (mA)	Color Temp.	Average System Watts[1]	Type 2			Type 3			Type 4		
					Lumen Output[1,2]	BUG Rating	Efficacy (LPW)	Lumen Output[1,2]	BUG Rating	Efficacy (LPW)	Lumen Output[1,2]	BUG Rating	Efficacy (LPW)
102L-16L-530-NW-G1	16	530	4000K	28	2944	B1-U0-G0	106	2687	B1-U0-G1	97	2747	B1-U0-G1	99
102L-16L-700-NW-G1	16	700	4000K	37	3789	B1-U0-G1	103	3458	B1-U0-G1	94	3535	B1-U0-G1	96
102L-16L-1000-NW-G1	16	1000	4000K	55	5050	B1-U0-G1	92	4609	B1-U0-G1	84	4712	B1-U0-G1	86
102L-16L-1200-NW-G1	16	1200	4000K	65	5744	B2-U0-G1	89	5242	B1-U0-G2	81	5359	B1-U0-G2	83
102L-32L-530-NW-G1	32	530	4000K	52	5698	B2-U0-G1	110	5200	B1-U0-G2	100	5316	B1-U0-G2	102
102L-32L-700-NW-G1	32	700	4000K	70	7242	B2-U0-G1	103	6609	B1-U0-G2	94	6757	B1-U0-G2	96
102L-32L-1000-NW-G1	32	1000	4000K	107	9797	B2-U0-G1	92	8941	B2-U0-G2	84	9140	B2-U0-G2	86

LED Wattage and Lumen Values (Emergency Mode)[3]

Ordering Code	LED Qty	LED Current (mA)	Color Temp.	Ave. System Watts (charging mode)	Type 2	Type 3	Type 4
102L-16L-NW-EBPC	16	N/A	4000K	14	1345	1228	1255
102L-32L-NW-EBPC	32	N/A	4000K	14	1754	1600	1636

1. Wattage and lumen output may vary by +/- 8% due to LED manufacturer forward volt specification and ambient temperature. Wattage shown is average for 120V through 277V input. Actual wattage may vary by an additional +/- 10% due to actual input voltage.
2. Lumen values based on photometric tests performed in compliance with IESNA LM-79.
3. For emergency EBPC option, publish values are based on initial lumens.

Luminaire options

DD: 0-10V dimming driver with leads supplied through back of luminaire (for secondary dimming controls by others).

Dynadimmer Automatic Profile Dimming: Automatic dimming profiles (CS50/CM50/CE50) offer safety, median, or economy settings, for shorter or longer duration. Dimming profiles provide flexibility towards energy savings goals while optimizing light levels during specific dark hours. 50% dimming is standard. DA50 offers 50% instantaneous dimming all night (during all dark hours). Other dimming settings are also available if different light levels are required (contact Technical Support for details).

Profile	Dimming		
	Schedule	Duration	Level
Economy	9 PM - 6 AM	9 hours	50%
Median	10 PM - 6 AM	8 hours	50%
Safety	11 PM - 6 AM	7 hours	50%
Reactive 50	all night	dynamic	50%

IMRI2, IMRI3: Infrared Motion Response Integral (IMRI). IMRI module is mounted integral to the luminaire door and is available with two different sensor lens types to accommodate various mounting heights and occupancy detection ranges (see charts for approximate detection patterns). Motion response for option IMRI is set/operates in the following fashion: The motion sensor is set to a constant 50%. When motion is detected by the PIR sensor, the luminaire returns to 100% light output. Dimming on low is factory set to 50% with 5 minute default in "full power" prior to dimming back to low. When no motion is detected for 5 minutes, the motion response system reduces the wattage by 50% of the normal constant wattage reducing the light level. IMRI can also be specified with automatic profile dimming for the added benefit of a combined dimming profile with sensor detection, where the PIR sensor will override the dimming profile when occupancy is detected. Passive infrared (PIR) motion sensor, WattStopper FSP-211, equipped with lens choice specified. Available from 120V to 277V input only. Motion sensor off state power is 0.0 watts. The FSP-211 can also be reprogrammed with WattStopper's FS1R-100 remote programming tool accessory.

DCC: Dual Circuit Control permits separate switching of 32L models only, where a quantity of (2) 16 LED modules are controlled independently by use of two sets of leads, one for each module.

Wireless system: 102L luminaires are available with optional wireless controllers ready to be connected to a Limelight system (sold by other). The system allows you to Wirelessly manage the entire site, independent lighting groups or individual luminaires while on-site or remotely.

Based on a high density mesh network with an easy to use web-based portal, you can conveniently access, monitor and manage your lighting network remotely. Wireless System can be combined with site and area, pedestrian, and parking garage luminaires as well, for a completely connected outdoor solution.

F1: Fusing Single (for 120, 277 or 347VAC)

F2: Fusing Double (for 208, 240 or 480VAC)

F3: Fusing Canadian Double Pull (for 208, 240 or 480VAC)

EBPC: Emergency battery pack is cold weather rated down to -20C (-4F) and integral to the luminaire , allowing for a consistent look between emergency and non-emergency sconces. A separate surface mount accessory box is not required. Dual light engines (32L) are wired in parallel, both operating in emergency mode to meet various redundancy lamp requirements. Also available with single light engine (16L). Secondary driver with relay immediately detects AC power loss and powers luminaire for a minimum of 90 minutes from the time power is lost.

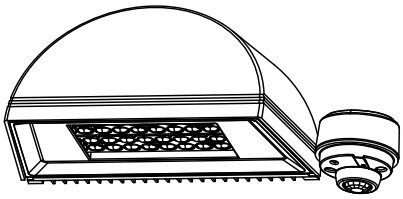
102L Sconce LED

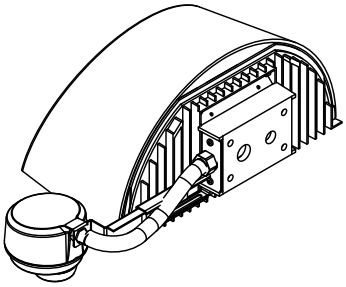
Wall Mount

Infrared Motion Response and Wireless system sensor coverage patterns

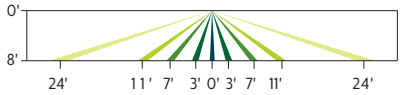
LLC2/3 Luminaire Mounted Controller

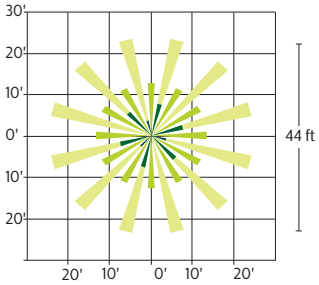
Controller attached to luminaire and Includes radio, photocell and motion sensor with #2 or #3 lens for 8-20' mounting heights.



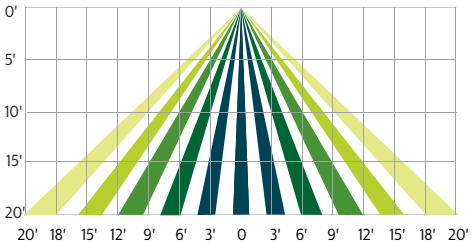


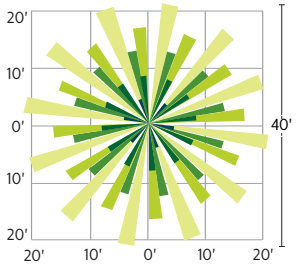
IMRI2/LLC2/LLCR2





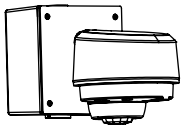
IMRI3/LLC3/LLCR3



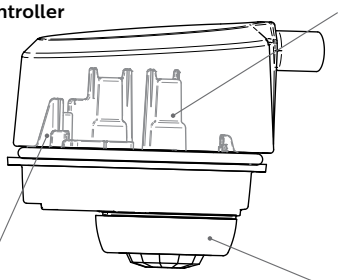


Remote Mount Wireless Controller

Used to extend the communication on site, to extend motion response and add other luminaires that are not pole mounted. Consult factory for more information.



Controller



Wireless Radio

- 1.8 Watts max (no load draw)
- Operating voltage 120-277 VAC RMS
- Communicates using the ZigBee protocol
- Carries out dimming commands from Gateway
- Reports ambient light readings to 1500 Ft-Cd
- Transmission Systems Operating within the band 2400-2483.5Mhz
- ROHS Compliant

Photocell

- Ambient light photocell on every wireless radio that averages the light levels of up to 5 controllers for an accurate reading and optimal light harvesting activity.
- Reports ambient light readings to 1500 Fc.

Motion Response

- Detects motion through passive infrared sensing technology with three different lens configurations
- Motion sensor coverage can be adjusted from a narrow to a wide detection range, which helps reduce false triggers to further increase energy savings.
- Sensing profiles can be updated to adapt to activity levels in the environment, such as occupancy level, wind, and mounting height

102L Sconce LED

Wall Mount

Specifications

Housing

Main body cast housing and back plate made of a low copper die cast Aluminum alloy for a high resistance to corrosion, 0.100" (2.5mm) minimum thickness. Hinged door allows access to driver and LED compartment.

Mounting

Mounting is completed through integral back plate that features a separate recessed feature for hook and lock quick mount plate that secures with two set screws from bottom of luminaire. Mounting plate is located in the center of the luminaire width and 3.5" above the luminaire bottom (lens down position). Luminaire ships fully assembled, ready to install.

Light Engine

Composed of 4 main components: Heat Sink / LED Module / Optical System / Driver. Electrical components are RoHS compliant. IP66 sealed light engines. LEDs tested by ISO 17025-2005 accredited lab in accordance with IESNA LM-80 guidelines extrapolations in accordance with IESNA TM-21. Metal core board ensures greater heat transfer and longer lifespan.

Heat Sink

Integral door/heat sink design made of low copper die cast Aluminum alloy for a high resistance to corrosion.

LED Module

Composed of high performance white LEDs. Color temperature as per ANSI/NEMA bin Neutral White, 4000K nominal (+/- 275K), CRI 70 Min. Available in other color temperatures including Cool White, 5700K and Warm White, 3000K.

Hardware

All exposed screws shall be stainless and/or corrosion resistant and captive.

Optical System

The advanced LED optical systems provide IES Types 2, 3, 4. Composed of high performance UV stabilized optical grade polymer refractor lenses to achieve desired distribution optimized to get maximum spacing, target lumens and a superior lighting uniformity. System is rated IP66. Performance shall be tested per LM-63, LM-79 and TM-15 (IESNA) certifying its photometric performance. Dark sky compliant with 0% uplight and U0 per IESNA TM-15.

Driver

High power factor of 90% min. Electronic driver, operating range 50/60 Hz. Auto adjusting universal voltage input from 120 to 277 VAC or 347 to 480 VAC rated for both application line to line or line to neutral, Class I, THD of 20% max. The current supplying the LEDs will be reduced by the driver if the driver experiences internal overheating as a protection to the LEDs and the electrical components. Output is protected from short circuits, voltage overload and current overload. Automatic recovery after correction. Standard built in driver surge protection of 2.5kV (min).

Surge Protection

Each luminaire is provided as standard with surge protector (designed SP1) tested in accordance with ANSI/IEEE C62.45 per ANSI/IEEE C62.41.2 Scenario I Category C High Exposure 10kV/5kA waveforms for Line Ground, Line Neutral and Neutral Ground, and in accordance with U.S. DOE (Department of Energy) MSSLC (Municipal Solid State Street Lighting Consortium) Model Specification for LED Roadway Luminaires Appendix D Electrical Immunity High Test Level 10kV / 5kA.

LED Performance

Predicted lumen depreciation data[1]

Ambient Temperature (°C)	Driver mA	Calculated L_{70} hours[1,2]	L_{70} per TM-21[2,3]	Lumen Maintenance % @ 60,000 hours
25°C	up to 1200 mA	>100,000	>60,000	88%

1. Predicted performance derived from LED manufacturer's data and engineering design estimates, based on IESNA LM-80 methodology. Actual experience may vary due to field application conditions.
2. L_{70} is the predicted time when LED performance depreciates to 70% of initial lumen output.
3. Calculated per IESNA TM21-11. Published L_{70} hours limited to 6 times actual LED test hours.

Wiring (supplied by others)

Splices must be made in the junction box.

Finish

Five standard colors offered in textured black, white, bronze, dark gray and medium gray. Color in accordance with the AAMA 2604 standard. Application of polyester powder coat paint 2.5 mils minimum. The thermosetting resins provides a discoloration resistant finish in accordance with the ASTM D2244 standard, as well as luster retention in keeping with the ASTM D523 standard and humidity proof in accordance with the ASTM D2247 standard. RAL and custom color matching available.

LED Products Manufacturing Standard

The electronic components sensitive to electrostatic discharge (ESD) such as light emitting diodes (LEDs) are assembled in compliance with EC61340-5-1 and ANSI/ESD S20.20 standards so as to eliminate ESD events that could decrease the useful life of the product.

LED Useful Life

Luminaire Useful Life accounts for LED lumen maintenance. Refer to IES files for energy consumption and delivered lumens for each option. Based on ISTMT in situ thermal testing in accordance with UL1598 and UL8750, LED LM-80/TM-21, expected to reach 100,000 + hours with >L70 lumen maintenance @ 25°C.

Certifications and Compliance

cULus Listed for Canada and USA suitable for wet locations when mounted downward facing. cULus Listed for Canada and USA suitable for damp locations when inverted upward facing when mounted in covered ceiling application. Emergency Battery Pack option is tested and listed to UL924 and CSA C22.2 No. 141-10 DesignLights Consortium qualified on models as listed on DLC QPL. Luminaire is rated for operation in ambient temperature of -40°C (-40°F) up to +40°C (+104°F).

Limited Warranty

5-year limited warranty. See philips.com/warranties for details and restrictions.
Visit our eCatalog or contact your local sales representative for more information.

signify

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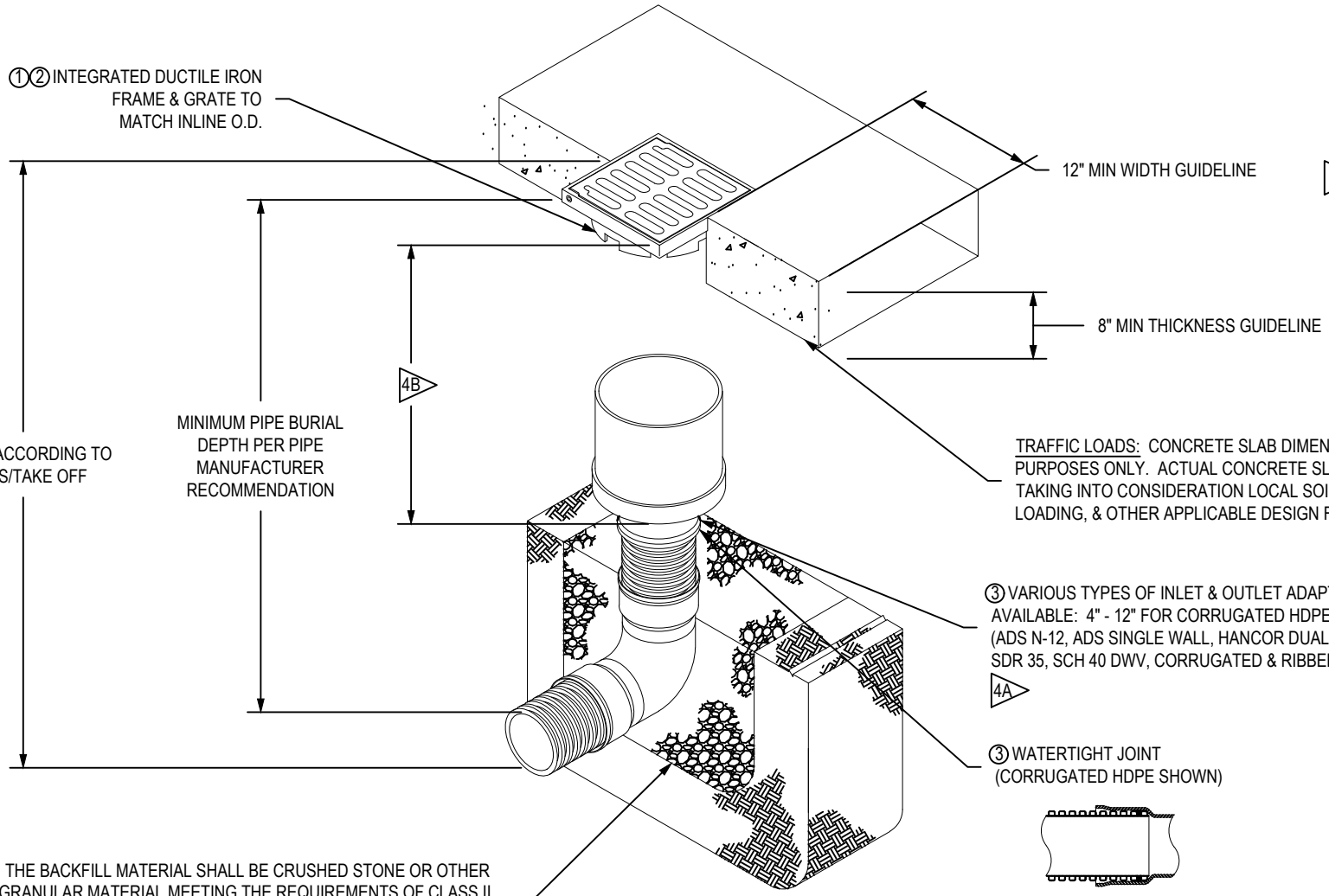
Signify Lighting, North America Corp.,
200 Franklin Square Drive,
Somerset, NJ 08873
Tel. 855-486-2216

Signify Lighting, Canada Ltd.,
281 Hillmount Rd, Markham, ON,
Canada L6C 2S3
Tel. 800-668-9008

NYLOPLAST 12" INLINE DRAIN: 2712AG _ _ X



4

A	B
4"	10.50"
6"	11.50"
8"	11.50"
10"	11.25"
12"	6.00"

① - GRATES/SOLID COVERS SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05 WITH THE EXCEPTION OF THE BRONZE GRATE.
② - FRAMES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
③ - DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS & HANCOR DUAL WALL) & SDR 35 PVC

GRATE OPTIONS	LOAD RATING	PART #	DRAWING #
PEDESTRIAN	MEETS H-10	1299CGP	7001-110-202
STANDARD	MEETS H-20	1299CGS	7001-110-203
SOLID COVER	MEETS H-20	1299CGC	7001-110-204
PEDESTRIAN BRONZE	LIGHT DUTY	1299CGPB	7001-110-205
DOME	N/A	1299CGD	7001-110-206
DROP IN GRATE	LIGHT DUTY	1201DI	7001-110-021

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DRAWN BY EBC
DATE 4-3-06
APPD BY CJA
DATE 4-3-06
DWG SIZE A

MATERIAL
PROJECT NO./NAME

SCALE 1:20 SHEET 1 OF 1

Nyloplast
3130 VERONA AVE
BUFORD, GA 30518
PHN (770) 932-2443
FAX (770) 932-2490
www.nyloplast-us.com

TITLE
12 IN INLINE DRAIN QUICK SPEC INSTALLATION DETAIL

DWG NO. 7003-110-025 REV B

Z:\DETAILS\2018 BLOCKS\Civil\12 in Inline Drain Quick Spec Installation Detail.dwg, 2/5/2019 2:12:57 PM, DWG To PDF.pc3

Encore Commercial Products, Inc.
37525 Interchange Dr., Farmington Hills, MI 48335
Toll Free 1- 866 -737- 8900 Fax 248-354-4095
www.postguard.com

Title: Post Guard Bollard Cover		Drawing Number: PG1
Recommended Use: Bollard, Post, or Pole Cover	**Specifications:** See Below	Date: 3-15-17
		Style: Round Cover
		Page: 1 of 1

POST GUARD COVER SPECIFICATION SHEET

MATERIAL

Marlex ™ HHM 5502 BN High Density Polyethylene

Microthene™ MP635662 Linear Low Density Polyethylene*

HDPE, hexene copolymer, is tailored for blow molded products that require excellent stiffness, impact strength and UV resistance. HDPE is designed for an optimum balance of density, molecular weight distribution, demonstrating maximum property advantages for large products. Blow molded HDPE products are durable and recyclable for sustainability. Six year UV stabilizer package and antic-static package are combined with the HDPE.

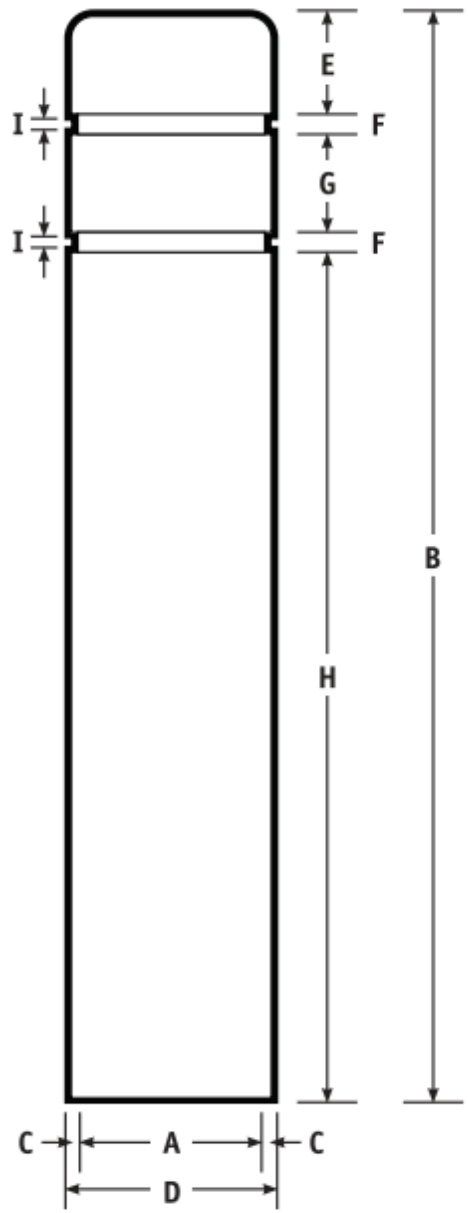
*Low Density PE, ethylene hexene copolymer. LDPE Resin is tailored for rotationally molded large hollow objects that require impact strength, warp resistance, stress crack resistance and UV stabilization.

** The Yellow color 8-7/8" x 72" Post Guard bollard cover is stocked in HDPE. Other colors may be available in 8-7/8" HDPE as the market demands.

Reflective Tape: High quality reflective tape
Installation Strips: 2 foam strips

INSTALLATION

1. Crisscross the two foam strips over the top of the bollard.
2. Slide the Post Guard cover over the foam strips and the bollard.



	A ID Width/Dia	B Height/Length	C Thickness	D OD Width/Dia	E	F Recess	G	H	I Reflect Tape
4.5" x 52"	4.72	52	.1406	5	2.875	.875	5.875	41.50	.75w
4.5" x 64"	4.72	64	.1406	5	2.875	.875	5.875	53.50	.75w
7" x 52"	7	52	.1719	7.34	2.875	.875	5.875	41.50	.75w
7" x 60"	7	60	.1719	7.34	2.875	.875	5.875	49.50	.75w
7" x 72"	7	72	.1719	7.34	2.875	.875	5.875	61.50	.75w
8⅞ x 72"**	8.8125	72	.19	9.1857	3.875	.875	5.75	60.62	.75w
10⅞ x 60"*	10.875	60	.22	11.3125	3.0	.875	5.75	49.50	1.0w
12¾ x 60"*	13.00	60	.20	13.4	3.0	.875	5.75	49.50	1.0w

POST GUARD BOLLARD COVER COLORS

Whether you call them post covers, bollard covers, or post sleeves, they are available in a wide variety of colors. Post Guard covers are designed with smooth sides. They have two reflective stripes that are recessed near the top of the cover. The reflective striping is available in red, white/silver, and blue.

POST GUARD BOLLARD COVER SIZES

Round Diameter	Height	Square	Height
4.5"	52"	4.5" x 4.5"	55"
4.5"	64"	6.5" x 6.5"	55"
7"	60"		
7"	72"		
8-7/8"	72"		
10-7/8"	60"		
12-3/4"	60"		

WHAT SIZE POST GUARD BOLLARD COVER DO I NEED?

Diameter Measures	Post Guard Needed
4.5 or less	4.5" Post Guard
Greater than 4.5" less than 7"	7" Post Guard
Greater than 7" Less than 8 -7/8"	8-7/8" Post Guard
Greater than 8-7/8" Less than 10-7/8"	10-7/8" Post Guard

November 29, 2018

EL DORADO FIRE + RESCUE - ADDITION

El Dorado, NM

PLUMBING FIXTURES

		WC	Urinals	Lavatory	DF	Service Sink
Req'd Fixtures Total						
(B)	29 Occ	2		1	1	1
(S2)	14 Occ	1		1		
Total		3	1	2	1	1
Existing Fixtures		3	1	3	0	1
Provided Fixtures		0	0	0	*	0

Water cooler provided in lieu of drinking fountain

Fixture chart below provided by MEP Engineer. Revised by SHA 11.29.18 based on existing conditions.

Eldorado Fire Station	WC	SINK	SHOWER	FD	TD			
OFFICE/RR (WOMANS)	4	1	0	0	0	5	1985	
SHOWER (MENS)	4	1	2	0	0	7	1985	
DF	0	1	0	0	0	1	1985	
STORAGE	0	0	0	1	0	1	1985	
MEN RR1	2	1	0	0	0	3	1996	OUT OF SCOPE
WOMEN RR2	4	1	0	0	0	5	1996	IN SCOPE
KIT COUNTER SINKS (3)	0	3	0	0	0	3	1996	NO LONGER IN PLACE / REMOVED
WASHER BOX	0	1	0	0	0	1	1996	DOES NOT DRAIN TO SEPTIC
NEW BAY TD (2)	0	0	0	0	4	4	2019	

The new bay drains flow to check dams and not to the septic system. The same system is in place for the existing trench drain in the existing bay.

FACILITY USAGE

The following is feedback from Wendy Servey (District Fire Chief) on August 26, 2018 regarding facility usage.
"The real usage is 1-5 people per day in/out and 12-15 each Saturday morning for 4 hours"

Sincerely,

James Horn, AIA, NCARB
Principal Architect
Spears Horn Architects

architecture · landscape architecture · urban design
1334 Pacheco Street · Santa Fe, New Mexico 87505
505.983.6966 · studio@spearshorn.com

GEO-TEST

GEOTECHNICAL ENGINEERING SERVICES
JOB NO. 1-80906
144 AVENIDA VISTA GRANDE
FIRE STATION NO.1 ADDITION
EL DORADO, NEW MEXICO

PREPARED FOR:

SANTA FE COUNTY-PUBLIC WORKS-PROJECT DIVISION

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GEO-TEST

October 29, 2018
Job No. 1-80906

Santa Fe County
Public Works – Projects Division
P.O. Box 276
Santa Fe, New Mexico 87504

ATTN: Ron Sandoval

RE: Geotechnical Engineering Services Report
144 Avenida Vista Grande
Fire Station No. 1 - Addition
El Dorado, New Mexico

Dear Mr. Sandoval:

Submitted herein is the Geotechnical Engineering Services Report for the above referenced project. The report contains the results of our field investigation, laboratory testing, and recommendations for foundation design, slab support, pavement section, as well as criteria for site grading and paving.

It has been a pleasure to serve you on this project. If you should have any questions, please contact this office.

Respectfully submitted: Reviewed by:

GEO-TEST, INC.

Timothy Matson

Timothy Matson, Staff Engineer

cc: Addressee

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INTRODUCTION

This report presents the results of the geotechnical engineering services investigation performed for the proposed addition to the existing fire station located at 144 Avenida Vista Grande in El Dorado, New Mexico.

The objectives of this investigation were to:

1) Evaluate the nature and engineering properties of the subsurface soils underlying the site.

2) Provide recommendations for foundation design, slab support, pavement section, as well as criteria for site grading.

The investigation includes subsurface exploration, selected soil sampling, laboratory testing of the samples, performing an engineering analysis and preparation of this report.

PROPOSED CONSTRUCTION

It is understood that the project consists of an addition to the existing Eldorado Fire Station No. 1. The addition will be located adjacent to the south side of the existing building and will consist of a new apparatus bay and storage space. No basements or below grade structures are planned and slab on grade construction is anticipated. Foundation lads are unknown at this time but are estimated not to exceed 50 kips on columns and 2 kips per lineal foot on walls. In addition, the existing septic tank located on the south side of the building will be relocated with a new leach field.

Should structural loads or other project details vary significantly from those outlined above, this firm should be notified for review and revision of recommendations contained herein.

FIELD EXPLORATION

A total of four exploratory borings were drilled at the site, 2 to a depth of 15½ feet below existing site grades for the addition and 2 to a depth of 10 feet in the new leach field area. The locations of the borings are shown on the attached Boring Location Map, Figure 1. During the test drilling, the soils encountered in the borings were continuously examined, visually classified and logged. The boring logs are presented in a following section of this report. Drilling was accomplished with a truck mounted drill rig using 5.5-inch diameter continuous flight hollow stem auger. Subsurface materials

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were sampled at five-foot intervals or less utilizing an open tube split barrel sampler driven by a standard penetration test hammer. Auger cuttings were collected from the leach field borings.

LABORATORY TESTING

Selected soil samples were tested in the laboratory to determine certain engineering properties of the soils. Moisture contents were determined to evaluate the various soil deposits with depth. The results of these tests are presented on the boring logs.

Sieve analysis and Atterberg limits tests were performed on selected samples to aid in soil classification. Results of these tests are presented in the Summary of Laboratory Results and on the individual test reports presented in a following section of this report.

SITE CONDITIONS

A brief site reconnaissance was performed during our site exploration. The area for the new addition is relatively flat and then slopes somewhat steeply to the south beyond the existing paved drive. A septic tank was observed in within the footprint of the proposed addition.

SUBSURFACE SOIL CONDITIONS

As indicated by the exploratory borings, the soils underlying the site vary in the upper 4 feet, consisting of non-plastic medium dense sand with various amounts of silt in boring no. 1 and low plasticity, loose, clayey sand in boring no. 2. Below a depth of 4 feet, sandy clays were encountered and extended to depths of about 6½ feet below existing site grade. These soils are high in plasticity and moderately firm to firm. Below the sandy clay layer, clayey sand was encountered. The clayey sand is low in plasticity, medium dense to dense and extends to about 13 feet below existing site grade in boring no. 1 and to full depth explored in boring no.2. Dense, non-plastic sand with silt and gravel was encountered below the clayey sand in boring no. 1 and extended to full depth explored.

No free groundwater was encountered in the borings and soil moisture contents were generally low to moderate throughout the extent of the borings.

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CONCLUSIONS AND RECOMMENDATIONS

As indicated by the standard penetration test data and laboratory work, the near surface soils range from loose to medium dense. In addition, the sandy clay soils between depths of about 4 and 6½ feet are of high plasticity and possess a medium expansive potential in their existing condition. These soils could create excessive upward movements (heave) of shallow spread-type footings and slabs on-grade, particularly upon significant moisture increases. In addition, due to the existing construction and septic tank, there is a potential that some man-made fill soils are present underlying at least some areas of the proposed addition. Accordingly, the existing, near surface native soils and man-made are not considered suitable in their present condition to provide reliable support of shallow footings and slabs on-grade.

However, with special site preparation, and to provide a uniform bearing condition, the proposed structure can be supported on shallow spread type footings bearing directly on properly compacted structural fill. The special site preparation would involve overexcavation of a portion of the existing soils throughout the entire building area. These soils should be overexcavated to such an extent as to provide for at least 3.0 feet of properly compacted structural fill below all foundations and floor slabs, or to such an extent as to remove all high plasticity sandy clays, whichever is the greater depth of overexcavation. Where possible, the limits of the overexcavation should also extend a laterally a minimum distance of 3.0 feet from the footing perimeters. In addition, after removal of the existing septic tank, any man-made fill soils associated with the existing septic tank should be removed in their entirety. The exposed native soils at the base of the excavations should be densified prior to placement of structural fill. The void left from the removal of the septic tank should be backfilled with structural fill. Detailed recommendations concerning the required site preparation and for foundation design are presented in the following sections of this report.

Post-construction moisture increases in the supporting soils could cause some differential foundation movements. Therefore, moisture protection is considered an important design consideration and should be reflected in overall site grading and drainage details as recommended in the Moisture Protection section of this report.

FOUNDATIONS

Shallow spread-type footings bearing directly on a minimum of 3.0 feet of

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properly compacted structural fill, are recommended for the support of the structure. An allowable soil bearing pressure of 2,000 pounds per square foot is recommended for footing design. This bearing pressure applies to full dead load plus realistic live loads and can be safely increased by one-third for totals loads including wind and seismic forces.

Exterior footings should be established a minimum of 2.0 feet below lowest adjacent finished grade, while interior footings should be at least 12 inches below finished floor grade. The minimum recommended width of square and continuous footings is 2.0 and 1.33 feet, respectively.

Total settlements (or heave) of foundations designed and constructed as recommended herein are estimated not to exceed ¾ inch for the soil moisture contents encountered during this investigation or moisture contents introduced during construction. Differential movements should be less than 75 percent of total movements.

Significant post-construction moisture increases in the supporting soils could create additional movements, and thus, the moisture protection provisions as recommended in a following section of this report are considered important for the satisfactory performance of the structures.

LATERAL LOADS

Resistance to lateral forces will be provided by soil friction between the base of floor slabs and footings and the soil and by passive earth resistance against the sides of footings and stem walls. A coefficient of friction of 0.40 should be used for computing the lateral resistance between bases of footings and slabs and the soil. With backfill placed as recommended in the site grading section of this report, a passive soil resistance equivalent to a fluid weighing 325 pounds per cubic foot should be used for analysis.

Lateral pressure against any retaining walls on the project will depend upon their degree of restraint. Walls which are restrained so as to limit movement at the top of the wall to less than 0.001 times the height of the wall should be designed for an 'at rest' earth pressure of 60 pounds per square foot of depth. Walls free to move at the top should be designed using an 'active' earth pressure equal to 40 pounds per square foot per foot of depth. These recommended lateral pressures are applicable to a condition of horizontal backfill without surcharge loads. Analysis of earth pressures produced by sloping backfill or surcharge loads can be provided by this firm upon request.

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The lateral pressures presented above assume no build-up of hydrostatic pressures behind the walls. To prevent the buildup of hydrostatic pressures, adequate weep holes should be provided or composite drainage systems such as Miradrain or equivalent can be installed on the backside of the walls prior to backfilling. The drainage layer should be connected to a non- perforated collector pipe at the base of the walls and routed to a sump or to a positive gravity drain.

Retaining wall backfill should meet the structural fill specifications outlined in the Site Grading section of this report. During backfilling, the contractor should be limited to the use of hand operated compaction equipment within a zone of about 3 feet horizontally from the back of the walls. The use of heavier equipment could apply lateral pressures well in excess of the recommended design earth pressure, particularly over the upper portions of the walls.

SLABS ON GRADE

Adequate support for lightly loaded slab-on-grade floors will be provided by the structural fill when placed as recommended in a following section of this report. Thus, the use of granular base for structural support of lightly loaded slabs is not considered necessary. However, should it be desired as a working surface, a course of granular base can be placed beneath concrete floor slabs.

Heavily loaded floor slabs bearing directly on structural fill can be designed using a modulus of subgrade reaction (k) value of 200 pci. This value can be increased to 300 pci provided the slab bears on a 6-inch thickness of granular base placed and compacted beneath the slabs.

Where granular base is used beneath the slabs, it should have a plasticity index of no greater than 3 and meet the following grading requirements:

Sieve Size Square Openings	Percent Passing by Dry Weight
1 Inch	100
¾ Inch	70-100
No. 4	35-85
No. 200	0-10

The granular base should be compacted to at least 95 percent of maximum dry density as determined in accordance with ASTM D1557.

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The granular base will act as a capillary barrier but will not totally eliminate the rise of moisture to the slabs. If floor coverings are proposed which are highly sensitive to moisture, it is recommended the slab be placed in accordance with the procedures recommended by the American Concrete Institute (ACI 302.1R-04).

PAVEMENTS

The existing near surface subgrade soils generally classify as sand with silt (SW-SM) and clayey sand (SC) according to the Unified Soil Classification System (USCS). These soils classify as A-1-b and A-6 according to the American Association of State Highway and Transportation Officials (AASHTO) soil classification system. According to the NMDOT, these soils possess correlated R-values ranging from 11 to 69 and are considered a good to poor subgrade soils for pavements.

Based on the above, it is recommended that the soils in areas to be paved be overexcavated to such an extent as to provide for at least 12 inches of sub-base with an R-Value of 30 or greater. In general, to have an R-Value of 30 or greater, the soil should have a plasticity less than 10 and have no more than 35 percent passing the #200 sieve size. Prior to the placement of the sub-base, the exposed surface of the native soils should be scarified and compacted as recommended in the Site Grading section of this report.

With the above recommended subgrade preparation, a flexible pavement section consisting of 3.0 inches of Hot Mix Asphalt (HMA) over 6.0 inches of aggregate base course, placed directly over a minimum of 12.0 inches of properly compacted sub-base material with an R-Value of 30 or greater is recommended for the project. The recommended pavement section applies to automobile parking and drive lanes only. Areas subjected to heavy truck traffic, including delivery, trash collection, and fire trucks should have the asphaltic concrete sections thickened by 1.0 inch. The pavement recommendations are in general conformance with publications prepared by the *Asphalt Institute.*

The HMA should be SPIII or SPIV, compacted to a target density of 94.5 percent, with a minimum compaction of 92 and a maximum compaction of 97 percent of the theoretical maximum density. The Performance Graded (PG) asphalt binder used should be based on the NMDOT's Pavement Type Selection and Design Guideline.

With the above recommended subgrade preparation, a rigid pavement section consisting of 6.0 inches of Portland Cement Concrete (PCC) placed

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directly over the minimum of 12.0 inches of properly compacted sub-base material with an R-value of 30, is recommended for the project. The pavement recommendations are in general conformance with ACI 330R-01 *Guide for Design and Construction of Concrete Parking Lots.*

The PCC should have a minimum compressive strength of 4000 psi, be air entrained to between 4.5 and 7.0 percent, and have a maximum aggregate size of 2 inches. The concrete should be placed at a maximum slump of 4 inches. Admixtures may be used to increase the slump and workability provided that the compressive strength is not compromised.

The use of reinforcement within the PCC should be left to the discretion of the structural engineer; however, it is recommended that the pavement be constructed with load transfer joints designed for heavy traffic.

LEACH FIELD

The soils were classified using USDA methodology to determine application rates in accordance with NMAC 20.7.3. The upper 10.0 feet of the soils in leach field area classify as a Type II soils (Sandy Loam) and have an application rate of 2.0 square feet per gallon per day in accordance with NMAC 20.7.3.703.

SITE-GRADING

The following general guidelines should be included in the project construction specifications to provide a basis for quality control during site grading. It is recommended that all structural fill and backfill be placed and compacted under engineering observation and in accordance with the following:

1) The existing site soils throughout the building areas should be overexcavated to such an extent as to provide for at least 3.0 feet of properly compacted structural fill beneath all footings and floor slabs, or to a depth to remove all existing high plasticity clay soils or man-made fill soils associated with the existing septic tank, whichever is the greater depth of overexcavation. Where possible, the overexcavation limits should extend a minimum of 3.0 feet beyond the perimeter of footings. In addition, the soils throughout areas to be paved should be overexcavated to such an extent as to provide for at least 12-inches of sub-base with an R-value of 30 or greater beneath the pavement section. The soils exposed at the base of the

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overexcavations should be densified prior to placement of structural fill.

2) The exposed native soils at the base of the overexcavation within the building and pavement areas should be scarified to a depth of 8-inches and moisture conditioned to optimum moisture content or above. The area shall then be compacted to between 90 and 95 percent of maximum dry density as determined in accordance with ASTM D-698.

3) The results of this investigation indicate that some of the overexcavated granular soils may not be suitable for use as structural fill; however, may be blended on site with the clayey sand material to meet the specification below. If this cannot be achieved, imported material will be required. All imported fill must also meet the requirements for structural fill. All structural fill and backfill should be free of vegetation and debris and contain no rocks larger than 3 inches. The gradation of the fill and backfill material, as determined in accordance with ASTM D-422, should be as follows:

Size	Percent Passing
3-inch	100
No. 4	60 - 100
No. 200	25 - 50

4) The plasticity index of the structural fill should be no greater than 15 when tested in accordance with ASTM D-4318.

5) Fill or backfill, consisting of soil approved by the geotechnical engineer, shall be placed in 8-inch loose lifts and compacted with approved compaction equipment. Loose lifts should be reduced to 4-inches if hand held compaction equipment is used. All compaction of fill or backfill shall be accomplished to a minimum of 95 percent of the maximum dry density as determined in accordance with ASTM D-1557. The moisture content of the structural fill during compaction should be within 2 percent of the optimum moisture content.

6) Tests for degree of compaction should be determined by the ASTM D-1556 method or ASTM D-6938. Observation and field tests should be carried on during fill and backfill placement by the geotechnical engineer to assist the contractor in obtaining the required degree of

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compaction. If less than 95 percent is indicated, additional compaction effort should be made with adjustment of the moisture content as necessary until 95 percent compaction is obtained.

CONSTRUCTION CONSIDERATIONS

Overexcavation immediately adjacent to the existing structure could result in undermining the existing footings. If this occurs, the existing building should be shored and no loss of ground should be allowed. As an alternate to shoring, segmental excavation may be attempted. The procedure would be to excavate from the bottom of the existing footings to the bottom of the excavation at a 1.5 horizontal to 1 vertical slope. The excavation can then be completed to the existing footing in maximum 8-foot segments. Adjacent excavation should not be made until structural fill has been placed back up to the bottom of the existing footing.

MOISTURE PROTECTION

Precautions should be taken during and after construction to minimize moisture increase of foundation soils. Positive drainage should be established away from the exterior walls of the structure and for a distance of at least 10 feet beyond its perimeter. A typical adequate slope is 6 inches in the first 5 feet with positive drainage being provided from those points to streets or natural water courses. If necessary to provide positive drainage, the building area should be raised above adjacent grade with structural fill. Backfill should be well compacted and should meet the specifications outlined in the Site Grading section of this report.

Irrigation within 10 feet of foundations should either be avoided or carefully controlled. All utility trenches leading into the structure should be backfilled with compacted fill meeting the specifications for structural fill presented in the Site Grading section of this report. Special care should be taken during installation of the subfloor sewer and water lines to reduce the possibility of future subsurface moisture increases.

Proper landscaping and drainage maintenance is required to preclude accumulation of excessive moisture in the soils below the structure. Accumulations of excessive moisture could be harmful to some types of interior flooring, to HVAC ductwork beneath the slabs, and can weaken or cause other changes in the soils supporting the foundations. This can cause differential movement of the foundations and can result in cosmetic or structural damage to the structure.

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If any water line leaks or if irrigation system leaks are detected, they should be promptly repaired. And, if any depressions develop from the settlement of soils in utility trenches or other areas, they should be backfilled to maintain the grade so that surface water drains rapidly away from the structure.

The foregoing recommendations should only be considered minimum requirements for overall site development. It is recommended that a civil/drainage engineer be consulted for more detailed grading and drainage recommendations.

FOUNDATION REVIEW AND INSPECTION

This report has been prepared to aid in the evaluation of this site and to assist in the design of this project. It is recommended that the geotechnical engineer be provided the opportunity to review the final design drawings and specifications in order to determine whether the recommendations in this report are applicable to the final design. Review of the final design drawings and specifications should be noted in writing by the geotechnical engineer.
In order to permit correlation between the conditions encountered during construction and to confirm recommendations presented herein, it is recommended that the geotechnical engineer be retained to perform continuous observations and testing during the earthwork portion of this project. Observation and testing should be performed during construction to confirm that suitable fill soils are placed upon competent materials and properly compacted and foundation elements penetrate the recommended soils.

CLOSURE

Our conclusions, recommendations and opinions presented herein are:

1) Based upon our evaluation and interpretation of the findings of the field and laboratory program.

2) Based upon an interpolation of soil conditions between and beyond the explorations.

3) Subject to confirmation of the conditions encountered during construction.

4) Based upon the assumption that sufficient observation will be provided during construction.

5) Prepared in accordance with generally accepted professional

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geotechnical engineering principles and practice.

This report has been prepared for the sole use of Santa Fe County Public Works Project Division, specifically to aid in the design of the proposed addition located at 144 Avenida Vista Grande in El Dorado, New Mexico, and not for use by any third parties.

We make no other warranty, either express or implied. Any person using this report for bidding or construction purposes should perform such independent investigation as he deems necessary to satisfy himself as to the surface and subsurface conditions to be encountered and the procedures to be used in the performance of work on this project. If conditions encountered during construction appear to be different than indicated by this report, this office should be notified.

All soil samples will be discarded 60 days after the date of this report unless we receive a specific request to retain the samples for a longer period of time.

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BORING LOCATION MAP

Fire Station No. 1, Addition
El Dorado, New Mexico
Job No. 1-80908

Figure 1

N
W E
S

GEO-TEST
GEOTECHNICAL ENGINEERING
AND MATERIAL TESTING

Project: Fire Station No. 1 Addition
Date: 10/16/2018 Project No: 1-80908
Elevation: Type: 5.5" O.D. HSA

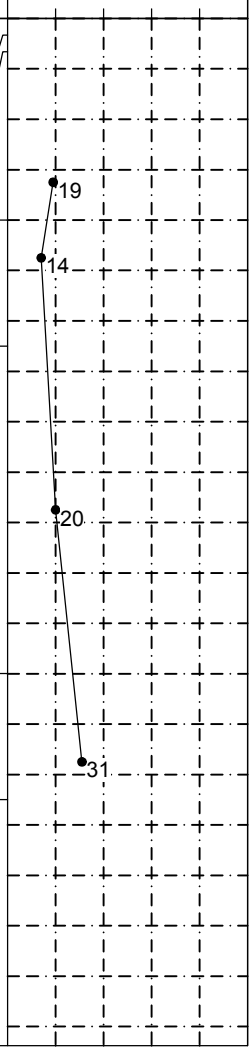
LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: 1

During Drilling: none After 24 Hours:

DEPTH (Ft)	LOG	SAMPLE INTERVAL	TYPE	N. BLOWS/FT	MOISTURE %	DRY DENSITY (pcf)	USC	DESCRIPTION
							AC	4" Asphalt
							BASE COURSE	4" Base Course
		X	SS	9-9-10 19	2		SW-SM	SAND with SILT, fine to medium grained, non-plastic, medium dense, dry, brown
5		X	SS	4-6-8 14	17		CH	SANDY CLAY, high plasticity, moderately firm, slightly moist, brown
10		X	SS	9-9-11 20	9		SC	CLAYEY SAND, low plasticity, medium dense, slightly moist, brown
15		X	SS	14-17-14 31	3		SW-SM	SAND with SILT and GRAVEL, fine to coarse grained, non-plastic, dense, dry, brown
20								STOPPED AUGER AT 14' STOPPED SAMPLER AT 15.5'



LEGEND

SS - Split Spoon
AC - Auger Cuttings
UD/SL - Undisturbed Sleeve
AMSL - Above Mean Sea Level
CS - Continuous Sampler
UD - Undisturbed
ST - Shelby Tube

Stratification lines represent approximate boundaries between soil types. Transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to factors other than those present at the time measurments were made.

LOG OF TEST BORING 1-80908 FIRE STATION NO 1 ADDITION, ELDORADO.GPJ GEO TEST.GDT 10/23/18

Project: Fire Station No. 1 Addition
Date: 10/16/2018 Project No: 1-80908
Elevation: Type: 5.5" O.D. HSA

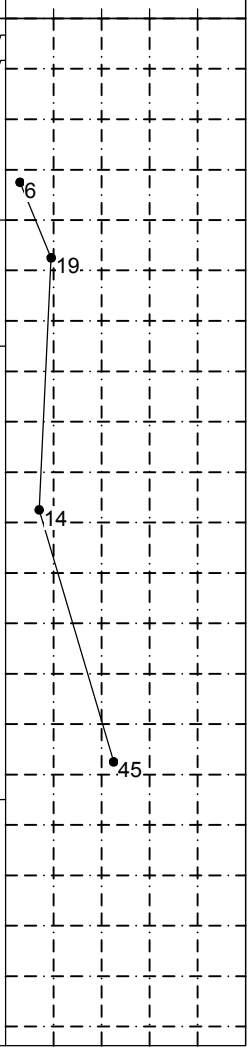
LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: 2

During Drilling: none After 24 Hours:

DEPTH (Ft)	LOG	SAMPLE INTERVAL	TYPE	N. BLOWS/FT	MOISTURE %	DRY DENSITY (pcf)	USC	DESCRIPTION
							AC BASE COURSE	4" Asphalt 6" Base Course
		X	SS	7-1-5 6	13		SC	CLAYEY SAND, fine grained, low plasticity, loose, moist, brown
5		X	SS	5-8-11 19	19		CH	SANDY CLAY, high plasticity, firm, slightly moist, brown
10		X	SS	7-6-8 14	11		SC	CLAYEY SAND, fine grained, low plasticity, medium dense to dense, slightly moist, brown
15		X	SS	17-24-21 45	10			
								STOPPED AUGER AT 14' STOPPED SAMPLER AT 15.5'
20								



LEGEND

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LOG OF TEST BORING 1-80908 FIRE STATION NO 1 ADDITION, ELDORADO.GPJ GEO TEST.GDT 10/23/18

Project: Fire Station No. 1 Addition
Date: 10/16/2018 Project No: 1-80908
Elevation: Type: 5.5" O.D. HSA

LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: 3

During Drilling: none After 24 Hours:

DEPTH (Ft)	LOG	SAMPLE INTERVAL	TYPE	N. BLOWS/FT	MOISTURE %	DRY DENSITY (pcf)	USC	DESCRIPTION	N blows/ft (20 40 60 80)
			AC				SC	CLAYEY SAND, fine grained, low plasticity, dry, brown	
5					2				
			AC				SC	CLAYEY SAND with GRAVEL, fine to coarse grained, low plasticity, dry, brown	
10								STOPPED AUGER AT 10'	
15									
20									

LOG OF TEST BORING 1-80908 FIRE STATION NO 1 ADDITION, ELDORADO.GPJ GEO TEST.GDT 10/27/18

LEGEND

SS - Split Spoon
AC - Auger Cuttings
UD/SL - Undisturbed Sleeve
AMSL - Above Mean Sea Level
CS - Continuous Sampler
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Stratification lines represent approximate boundaries between soil types. Transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to factors other than those present at the time measurments were made.

Project: Fire Station No. 1 Addition
Date: 10/16/2018 Project No: 1-80908
Elevation: Type: 5.5" O.D. HSA

LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: 4

During Drilling: none After 24 Hours:

DEPTH (Ft)	LOG	SAMPLE INTERVAL	TYPE	N. BLOWS/FT	MOISTURE %	DRY DENSITY (pcf)	USC	DESCRIPTION	N blows/ft (20 40 60 80)
			AC		3		SC	CLAYEY SAND, fine grained, low plasticity, dry, brown	
5			AC				SC	CLAYEY SAND with GRAVEL, fine to coarse grained, low plasticity, dry, brown	
10								STOPPED AUGER AT 10'	
15									
20									

LOG OF TEST BORING 1-80908 FIRE STATION NO 1 ADDITION, ELDORADO.GPJ GEO TEST.GDT 10/27/18

LEGEND

SS - Split Spoon
AC - Auger Cuttings
UD/SL - Undisturbed Sleeve
AMSL - Above Mean Sea Level
CS - Continuous Sampler
UD - Undisturbed
ST - Shelby Tube

Stratification lines represent approximate boundaries between soil types. Transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to factors other than those present at the time measurments were made.

SUMMARY OF LABORATORY RESULTS

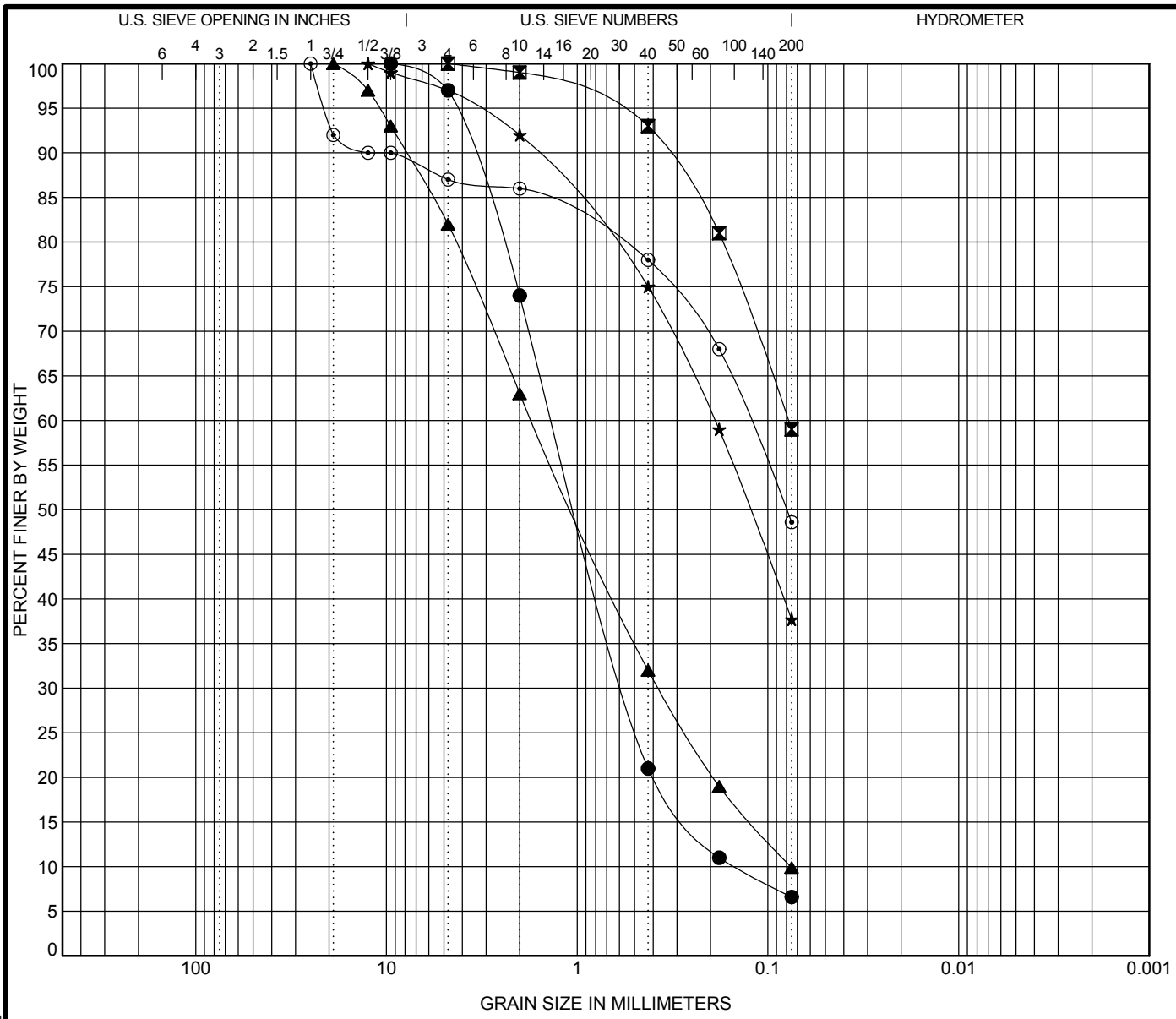
						SIEVE ANALYSIS PERCENT PASSING											
TEST HOLE	DEPTH (FEET)	UNIFIED CLASS	(%) MOIST	LL	PI	NO 200	NO 100	NO 40	NO 10	NO 4	3/8"	1/2"	3/4"	1"	1 1/2"	2"	4"
1	2.5	SW-SM	1.7	NP	NP	7	10	21	74	97	100						
1	5.0	CH	16.8	54	35	59	76	93	99	100							
1	10.0		8.9														
1	15.0	SW-SM	3.0	NP	NP	10	17	32	63	82	93	97	100				
2	2.5	SC	12.8	30	13	38	55	75	92	97	99	100					
2	5.0		18.5														
2	10.0	SC	11.4	27	10	49	64	78	86	87	90	90	92	100			
2	15.0		10.2														
3 & 4	0.0 - 10.0	SC	3.1	27	12	26	35	44	73	91	98	100					

LL = LIQUID LIMIT
PI = PLASTICITY INDEX
NP = NON PLASTIC or NO VALUE

Project: Fire Station No. 1 Addition

Location: Eldorado, New Mexico

Number: 1-80908



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification			Classification	LL	PL	PI	Cc	Cu
●	1	2.5		**WELL-GRADED SAND with SILT(SW-SM)**	**NP**	**NP**	**NP**	**1.56**	**9.01**
⊠	1	5.0		**SANDY FAT CLAY(CH)**	**54**	**19**	**35**		
▲	1	15.0		**WELL-GRADED SAND with SILT and GRAVEL(SW-SM)**	**NP**	**NP**	**NP**	**1.06**	**22.74**
★	2	2.5		**CLAYEY SAND(SC)**	**30**	**17**	**13**		
⊙	2	10.0		**CLAYEY SAND(SC)**	**27**	**17**	**10**		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	1	2.5	**9.5**	**1.328**	**0.553**	**0.148**	**3.0**	**90.4**	**6.6**	
⊠	1	5.0	**4.75**	**0.078**			**0.0**	**41.0**	**59.0**	
▲	1	15.0	**19**	**1.722**	**0.372**	**0.076**	**18.0**	**72.1**	**9.9**	
★	2	2.5	**12.5**	**0.19**			**3.0**	**59.3**	**37.7**	
⊙	2	10.0	**25**	**0.125**			**13.0**	**38.4**	**48.6**	

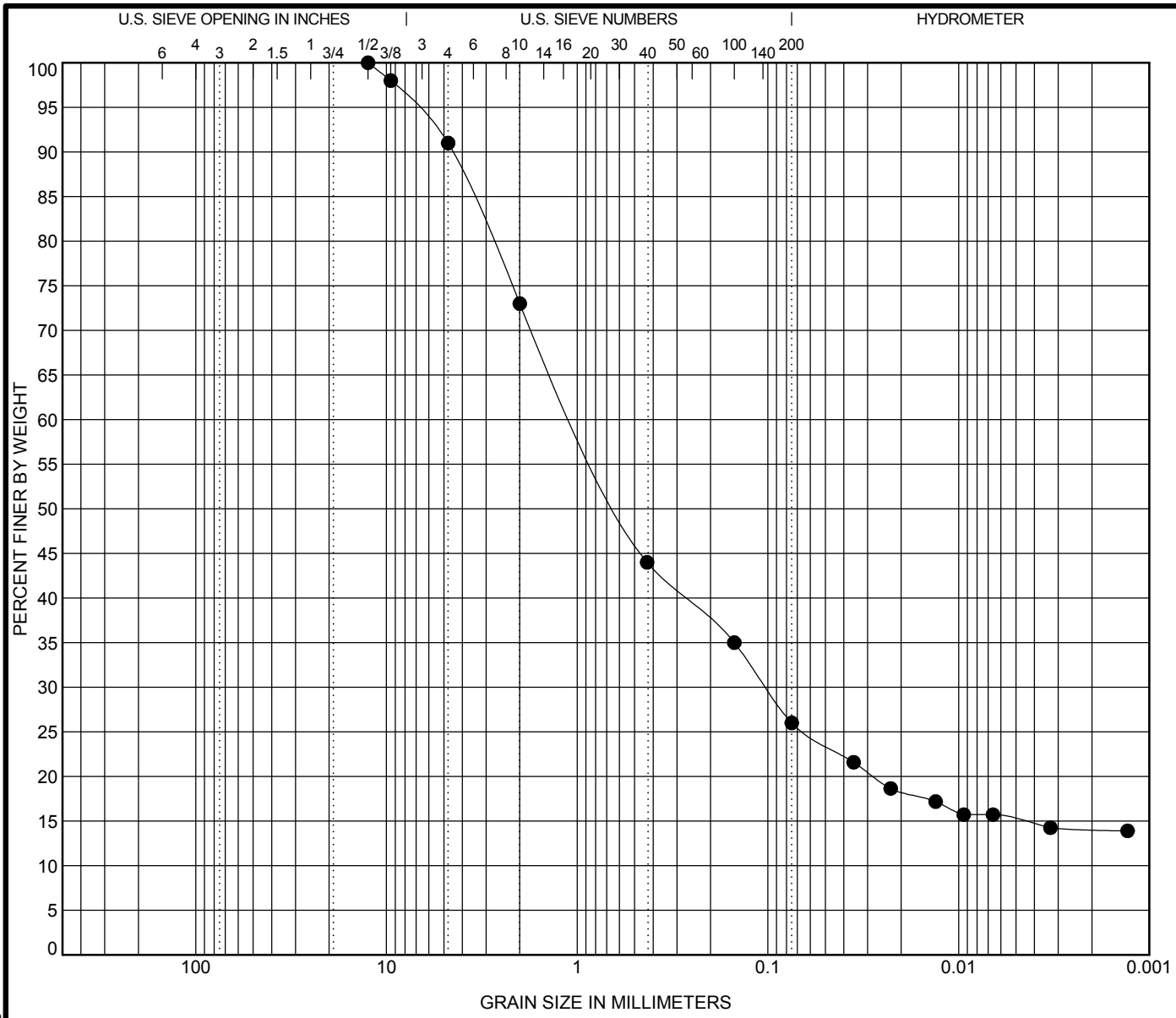
GRAIN SIZE DISTRIBUTION

Project: Fire Station No. 1 Addition

Location: Eldorado, New Mexico

Number: 1-80908

US GRAIN SIZE 1-80908 FIRE STATION NO 1 ADDITION, ELDORADO.GPJ GEO TEST.GDT 10/27/18



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	**3 & 4**	**0.0 - 10.0**	**CLAYEY SAND with GRAVEL(SC)**	**27**	**15**	**12**		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**3 & 4**	**0.0 - 10.0**	**12.5**	**1.004**	**0.102**		**9.0**	**65.0**	**10.9**	**15.1**

GRAIN SIZE DISTRIBUTION

Project: Fire Station No. 1 Addition

Location: Eldorado, New Mexico

Number: 1-80908

US GRAIN SIZE 1-80908 FIRE STATION NO 1 ADDITION, ELDORADO.GPJ GEO TEST.GDT 10/27/18

APPENDIX F

SAMPLE AGREEMENT

AGREEMENT BETWEEN SANTA FE COUNTY AND CONTRACTOR FOR CONSTRUCTION SERVICES

SANTA FE COUNTY
ADMINISTRATIVE SERVICES DEPARTMENT
PURCHASING DIVISION
2014 EDITION

[Changes, additions, deletions and/or any modifications other than those agreed upon by the parties upon execution of this contract, without the written consent of Santa Fe County shall render this document null and void.]

Hereafter "County":

Katherine Miller, County Manager
Santa Fe County
PO Box 276
Santa Fe, New Mexico 87504-0276
TELEPHONE: 505-986-6200
FAX: 505-995-2740

Hereafter "Contractor":

_____
_____
_____
_____
TELEPHONE: _____
E-MAIL ADDRESS: _____

ARCHITECT

NAME: _____
ADDRESS: _____
_____
TELEPHONE: _____
E-MAIL ADDRESS: _____

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RECITALS

WHEREAS, in accordance with Section 13-1-103 through Section 13-1-110 NMSA 1978, the County issued Invitation for Bid (IFB) No. _____ for construction services for _____; and

WHEREAS, the Contractor submitted its bid, dated _____ in response to IFB No. _____; and

WHEREAS, the County is authorized to enter into a construction contract for the Project pursuant to Sections 13-1-100, NMSA 1978; and

WHEREAS, the Contractor hereby represents that it is a licensed contractor of the State of New Mexico pursuant to Chapter 60, Article 13 NMSA 1978; and

WHEREAS, the Owner agrees to hire the Contractor, and the Contractor agrees to provide Construction Services as required herein for the Project in accordance with the terms and conditions set forth in this Agreement; and

WHEREAS, the County requires the services of the Contractor, and the Contractor is willing to provide these services and both parties wish to enter into this Agreement.

ARTICLE 1
THE CONTRACT DOCUMENTS

1.1 DOCUMENTS

The contract documents consist of the following:

-Agreement between County and Contractor	
-General Conditions of the Construction Contract	
-Conditions of the Work of the Construction Contract	
-Bid Sheet	Attachment A
-Addenda and Modifications issued before and after execution of this Contract	Attachment B

1.2 CERTIFICATES AND DOCUMENTATION

The following certificates and documentation are hereby attached as exhibits as follows:

Project Manual	Exhibit A
Technical Specifications as listed in Plan Set	Exhibit B
Labor and Material Payment Bond	Exhibit C
Performance Bond	Exhibit D
Assignment of Antitrust Claims	Exhibit E
Certificate of Insurance	Exhibit F

Notice of Award	Exhibit G
Notice to Proceed	Exhibit H
Change Order	Exhibit I
Certificate of Substantial Completion	Exhibit J

ARTICLE 2
THE WORK

2.1 THE WORK

The Contractor shall perform all the Work required by the Contract Documents for the following:

Insert description of work

ARTICLE 3
EFFECTIVE DATE, TIME OF COMMENCEMENT, SUBSTANTIAL COMPLETION AND AMENDMENTS

3.1 EFFECTIVE DATE

The Effective Date of this Agreement is the date of signature by the County.

3.2 TIME OF COMMENCEMENT

The work to be performed under this Contract shall be commenced no later than ten (10) consecutive calendar days after the date of written Notice to Proceed issued by the County, hereto attached as Exhibit H.

3.3 SUBSTANTIAL COMPLETION

The Contractor shall achieve Substantial Completion of the entire work no later than _____ ( ) calendar days from the date of the Notice to Proceed, except as hereafter extended by valid written Change Order. A Certificate of Substantial Completion, attached hereto as Exhibit J, will be issued by the County to the Contractor, as adjusted by any Change Order, attached hereto as Exhibit I.

3.4 TIME FOR COMPLETION AND LIQUIDATED DAMAGES

Should the Contractor neglect, refuse, or otherwise fail to complete the Work within the time specified in this Article, the Contractor agrees that Liquidated Damages in the amount of _____ dollars ($) shall be assessed per each calendar day that expires after the date of substantial completion, as adjusted by any change order, and until issuance by the County of a certificate of Substantial Completion in accordance with Paragraph 7 (Effective Date and Term) of the General Conditions.

A. It is hereby understood and mutually agreed, by and between the Contractor and the County, that the date of beginning and the time for completion as specified in the contract of the work to be done hereunder are *essential conditions* of this contract and it is further mutually understood and agreed that the work outlined in this contract shall be commenced on a date to be specified in the "Notice to Proceed."

B. The Contractor agrees that work shall be prosecuted regularly, diligently and uninterruptedly at such rate of progress as will insure full completion thereof within the time specified. It is expressly understood and agreed, by and between the Contractor and the County, that the time for the completion of the work described herein is a reasonable time for the completion of the same, taking into consideration the average climatic range and usual industrial conditions prevailing in this locality.

C. If the Contractor shall neglect, fail or refuse to complete the work within the time herein specified or any proper extension thereof granted by the County, then the Contractor does hereby agree, as a part consideration for the awarding of this contract, to pay to the County the amount specified in the contract, not as a penalty but as liquidated damages for such breach of contract as herein set forth, for each and every calendar day that the contract shall be in default after the time stipulated in the contract for completing the work.

D. The amount is fixed and agreed upon by and between the Contractor and the County because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the County would in such event sustain, and the amount is agreed to be the amount of damages which the County would sustain and the amount shall be retained from time to time by the County from current periodical estimates.

E. It is agreed that time is of the essence of each and every portion of this contract and of the specifications wherein a definite and certain length of time is fixed for the performance of any act whatsoever and where under the contract an additional time is allowed for the completion of any work, the new time limit fixed by such extension shall be of the essence of this contract. Provided that the Contractor shall not be charged with liquidated damages or any excess cost when the County determines that the Contractor is without fault and the Contractor's reasons for the time extension are acceptable to the County. Provided that the Contractor shall not be charged with liquidated damages or any excess cost when the delay in completion of the work is due:

1. To any preference, priority or allocation order duly issued by the County;
2. To unforeseeable cause beyond the control and without the fault or negligence of the Contractor, including but not restricted to, acts of God, or of the public enemy, acts of the County, acts of another contractor in the performance of a contract with the County, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and severe weather;
3. To any delays of subcontractors or suppliers occasioned by any of the causes specified in subsections above.

F. Provided further, that the Contractor shall, within ten days from the beginning of such delay, unless the County shall grant a further period of time prior to the date of final settlement of the contract, notify the County in writing of the causes of the delay, who shall ascertain the facts and extent of the delay and notify the Contractor within a reasonable time of its decision in the matter.

3.5 AMENDMENTS

This Agreement may be amended by mutual agreement by both parties upon issuance of a Change Order by the County to the Contractor. Any such amendment shall be in accordance with Paragraph 10 (Amendments – Change Orders) of the General Conditions. Unless otherwise agreed to by the parties, an amendment shall not affect any outstanding Purchase Order(s) issued by the County prior to the effective date of the amendment.

ARTICLE 4
CONTRACT SUM

4.1 LUMP SUM

The County shall pay the Contractor in current funds for the performance of the Work, subject to additions and deductions by Change Order as provided in the Contract Documents, an agreed upon Lump Sum of (enter dollar amount in words) Dollars ($0.00 enter dollar amount), exclusive of New Mexico gross receipts tax.

4.2 CONTRACT AMOUNT

The Contract sum is determined as follows:	(insert data from bid form concerning base bid, alternates, etc.)	
Base Bid	$	
List Alternates, if applicable	$	
	$	
	$	
Total Contract Amount	**$**	, exclusive of NM grt

ARTICLE 5
PROGRESS PAYMENTS

5.1 PROGRESS PAYMENTS

Based upon an Application for Payment submitted to the County by the Contractor and Certificates for Payment issued by the County, the County shall make progress payments on account of the

Contract sum to the Contractor as provided in the Contract documents for the period ending the last day of the month as follows:

A. No later than 21 working days following receipt by the County of an undisputed Application for Payment, one hundred percent (100%) of the portion of the Contract Sum properly allocable to labor, materials, and equipment incorporated in the Work and one hundred percent (100%) of the portion of the Contract Sum properly allocable to materials and equipment suitably stored at the site or some other location agreed upon in writing for the period covered by the Application for Payment, less the aggregate of previous payments made by the County; less such amounts as the Architect/ Engineer shall determine for all incomplete Work and unsettled claims as provided in the Contract Documents (Section 57-28-5, NMSA 1978).

B. When making payments, the County, Contractor or subcontractor shall not retain, withhold, hold back or in any other manner not pay amounts owed for work performed. For additional information regarding retainage and the Prompt Payment Act (refer to Section 57-28-5, NMSA 1978).

C. Contractors and subcontractors shall make prompt payment to their subcontractors and suppliers for amounts owed for work performed on the construction project within 21 days after receipt of payment from the County, contractor or subcontractor. If the contractor or subcontractor fails to pay its subcontractor and suppliers by first-class mail or hand delivery within twenty-one days after receipt of an undisputed request for payment, the contractor or subcontractor shall pay interest to its subcontractors and suppliers beginning on the 22nd day after payment was due, computed at one and one-half percent of the undisputed amount per month or fraction of a month until payment is issued. These payment provisions apply to all tiers of contractors, subcontractors and suppliers (Section 57-28-1 et. seq. NMSA 1978).

D. In preparing estimates the material delivered on the site and preparatory work done may be taken into consideration.

E. All material and work covered by partial payments made shall thereupon become the sole property of the County, but this provision shall not be construed as relieving the Contractor from the sole responsibility for the care and protection of materials and work upon which payments have been made or the restoration of any damaged work, or as a waiver of the right of the County to require the fulfillment of all of the terms of the contract.

F. County's right to withhold certain amounts and make application thereof. The Contractor agrees that it will indemnify and hold the County harmless from all claims growing out of the lawful demands of subcontractors, laborers, workmen, mechanics, material men, and furnisher of machinery and parts thereof, equipment, power tools, and all supplies, including commissary, incurred in the furtherance of the performance of this contract. The Contractor shall, at the County's request, furnish satisfactory evidence that all obligations of the nature hereinabove designated have been paid,

discharged, or waived. If the Contractor fails so to do, then the County may, after having served written notice on the said Contractor, either pay unpaid bills, of which the County has written notice, direct, or withhold from the Contractor's unpaid compensation a sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged whereupon payment to the Contractor shall be resumed, in accordance with the terms of this contract, but in no event shall the provisions of this sentence be construed to impose any obligations upon the County to either the Contractor or its Surety. In paying any unpaid bills of the Contractor, the County shall be deemed the agent of the Contractor, and any payment so made by the County shall be considered as a payment made under the contract by the County to the Contractor and the County shall not be liable to the Contractor for any such payments made in good faith.

ARTICLE 6
FINAL PAYMENT

6.1 FINAL PAYMENT

The entire unpaid balance of the Contract Sum, shall be paid by the County to the Contractor within 30 calendar days after notification of the County by the Architect/Engineer that all incomplete and unacceptable work that was noted during the Substantial Completion Inspection and listed on the attachment to the Certificate of Substantial Completion has been corrected, and provided the Contract has been fully performed and a final Certificate for Payment has been issued by the Architect/Engineer. In addition, the Contractor shall provide to the County a certified statement of Release of Liens and Consent of Surety.

6.2 ACCEPTANCE OF FINAL PAYMENT CONTITUTES RELEASE

The acceptance by the Contractor of final payment shall be and shall operate as a release to the County of all claims and all liability to the Contractor for all things done or furnished in connection with this work and for every act and neglect of the County and others relating to or arising out of this work. No payment, however, final or otherwise, shall operate to release the Contractor or its sureties from any obligations under this contract or the Performance and Payment Bond.

IN WITNESS WHEREOF, the parties have duly executed this Agreement as of the date first written above.

SANTA FE COUNTY

_____
Anna Hamilton, Chair
Santa Fe County Board of County Commissioners

ATTESTATION

_____
Geraldine Salazar
Santa Fe County Clerk

Approved as to form:

_____ _____
R. Bruce Frederick Date
Santa Fe County Attorney

Finance Department:

_____ _____
Gary L. J. Girón Date
Finance Director

CONTRACTOR:

_____ _____
Signature Date

_____
Print Name

_____
Print Title

GENERAL CONDITIONS
TO AGREEMENT BETWEEN SANTA FE COUNTY
AND CONTRACTOR
FOR CONSTRUCTION SERVICES

1.0 DEFINITIONS

The following terms as used in this contract are respectively defined as follows:

1.1 *Application for Payment* Contractor's written request for payment for completed portions of the work and, for materials delivered or stored and properly labeled for the respective project.

1.2 *Change Order* A written document between the County and the Contractor signed by the County and the Contractor authorizing a change in the work or an adjustment in the contract sum or the contract time. A change order may be signed by the Architect/Engineer, provided they have written authority from the County for such procedure and that a copy of such written authority is furnished to the Contractor upon request. The contract sum and the contract time may be changed only by change order. A change order may be in the form of additional compensation or time; or less compensation or time known as a Deduction (from the contract) the amount deducted from the contract sum by change order.

1.3 *Calendar Day* Each and every Day shown on the calendar, beginning and ending at midnight.

1.4 *Contract Period* The elapsed number of working days or calendar days from the specified date of commencing work to the specified date of completion, as specified in the contract.

1.5 *Contractor* is a person, firm or corporation with whom the contract is entered into with the County.

1.6 *Construction Documents* All drawings, specifications and addenda associated with a specific construction project.

1.7 *Construction Schedule* A schedule in form satisfactory to the County, showing the proposed dates of commencement and completion of each of the various subdivisions of work required under the contract documents and the anticipated amount of each monthly payment that will become due the Contractor in accordance with the progress schedule.

1.8 *Day* The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.

1.9 *Labor and Material Payment Bond* A written form of security from a surety (bonding) company to the County, on behalf of an acceptable prime Contractor or subcontractor,

guaranteeing payment to the County in the event the Contractor fails to pay for all labor, materials, equipment, or services in accordance with the contract. (see Performance Bond and Surety Bond).

1.10 *Lump Sum Agreement (See Stipulated Sum Agreement)*

1.11 *Lump Sum Bid* A single entry amount to cover all labor, equipment, materials, services, and overhead and profit for completing the construction of a variety of unspecified items of work without the benefit of a cost breakdown.

1.12 *Lump Sum Contract* A written contract between the County and Contractor wherein the County agrees the pay the contractor a specified sum of money for completing a scope of work consisting of a variety of unspecified items or work.

1.13 *Payment Bond* A written form of security from a surety company to the County, on behalf of an acceptable prime contractor or subcontractor, guaranteeing payment to all persons providing labor, materials, equipment, or services in accordance with the contract.

1.14 *Performance Bond* A written form of security from a surety company to the County, on behalf of an acceptable prime contractor or subcontractor, guaranteeing the completion of the work in accordance with the terms of the contract.

1.15 *Progress Payment* A payment from the County to the Contractor determined by calculating the difference between the completed work and materials stored and a predetermined schedule of values or unit costs. (see Schedule of Values, Unit Costs).

1.16 *Progress Schedule* A pictorial or written schedule (including a graph or diagram) that shows proposed and actual start and completion dates of the various work elements.

1.17 *Punch list* a list of items to be completed or corrected, prepared by the Architect/Engineer, checked and augmented as required by the Contractor or Construction Manager is appended hereto as Exhibit J. Note: The failure to include any item on such list does not relieve the Contractor of the responsibility to complete all work in accordance with the contract documents.

1.18 *Schedule of Values* A statement furnished by the Contractor to the Architect or Engineer and the County reflecting the portions of the contract sum allotted for the various parts of the work and used as the basis for reviewing the Contractor's Applications for Payment.

1.19 *Services* Includes services performed, workmanship, and material furnished or utilized in the performance of services.

1.20 *Stipulated Sum Agreement* A written agreement in which a specific amount is set forth as the total payment for completing the contract (See Lump Sum Contract).

1.21 *Subcontractor* is a person, firm or corporation supplying labor and materials or only labor for work at the site of the project for, and under separate contract or agreement with, the Contractor.

1.22 *Unit Price Contract* A written contract wherein the County agrees to pay the Contractor a specified amount of money for each unit of work successfully completed as set forth in the contract.

1.23 *Unit Prices* A predetermined price for a measurement or quantity of work to be performed within a specific contract. The designated unit price would include all labor materials, equipment or services associated with the measurement or quantity established.

1.24 *Working Day* means every day except Saturday, Sunday and holidays recognized by Santa Fe County. Based on a review of weather that may adversely affect the Contractor's ability to effectively prosecute the Work, and the actual Work performed by the Contractor, the Architect or Engineer will determine (between the end of the day and noon of the next day) if the County will charge a Working Day. If the Contractor was able to effectively prosecute Work on a critical path item for six (6) or more hours on a Saturday, Sunday or County-recognized Holiday, the Architect or Engineer may charge a Working Day.

1.25 *Work on (at) the project* is work to be performed at the location of the project, including the transportation of materials and supplies to or from the location of the project by employees of the Contractor and any subcontractor.

2. CONTRACT AND CONTRACT DOCUMENTS

2.1 Entire Agreement. This Agreement represents the entire contract between the parties and, except as otherwise provided herein, may not be amended, changed, modified, or altered without the written consent of the parties hereto. This Agreement incorporates all of the conditions, agreements, and understandings between the parties concerning the subject matter of this Agreement, and all such conditions, understandings, and agreements have been merged into this written Agreement. No prior condition, agreement, or understanding, verbal or otherwise, of the parties or their agents shall be valid or enforceable unless incorporated in this written Agreement.

2.2 Relationship of Contract Documents. The Contract Documents are complementary, and any requirement of one Contract Document shall be as binding as if required by all.

2.3 Conflicting Conditions. Any provisions in any of the Contract Documents which may be in conflict or inconsistent with any of the paragraphs in these General Conditions shall be void to the extent of such conflict or inconsistency.

3. PLANS, SPECIFICATIONS AND ADDENDA

3.1 The plans, specifications and addenda, hereinafter enumerated in Article 1 of the Agreement

Between County and Contractor for Construction shall form part of this Contract and the provisions thereof shall be as binding upon the parties hereto as if they were herein fully set forth. The table of contents, titles, headings, running headlines and marginal notes contained herein and in said documents are solely to facilitate reference to various provisions of the Contract Documents and in no way affect or limit the interpretation of the provisions to which they refer.

3.2 Certificates and Documents Incorporated. All certificates and documentation required by the provisions of the Agreement shall be attached to this Agreement at the time of execution, and are hereby incorporated by reference as though set forth in full in this Agreement to the extent they are consistent with its conditions and terms.

4. CONTRACT SECURITY – BONDS

4.1 Performance Bond. The Contractor shall furnish a performance bond in an amount at least equal to one hundred percent (100%) of the contract sum as security for the faithful performance of this contract. The performance bond and the payment bond may be in one or in separate instruments in accordance with local law.

4.2 Payment Bond. The Contractor shall provide payment bond in an amount not less than one hundred percent (100%) of the contract price or in a penal sum not less than that prescribed by state, territorial or local law, as security for the payment of all persons performing labor on the project under this contract, furnishing materials in connection with this contract and all of Contractor's requirements as specified in the contract documents. The Payment Bond shall remain in effect until one year after the date when final payment becomes due.

4.3 Additional or Substitute Bond. If at any time the County for justifiable cause shall be or become dissatisfied with any surety or sureties, then upon the Performance or Payment Bonds, the Contractor shall within five days after notice from the County so to do, substitute an acceptable bond (or bonds) in such form and sum and signed by such other surety or sureties as may be satisfactory to the County. The premiums on such bond shall be paid by the Contractor. No further payments shall be deemed due nor shall be made until the new surety or sureties shall have furnished such an acceptable bond to the County.

4.4 Labor and Material Bond. The Contractor shall provide to the County Labor and Material Bond in an amount equal to the required payments by the Contractor to pay specified subcontractors, laborers, and materials suppliers associated with the project.

5. TERMS AND MEANINGS

Terms used in this Agreement that are defined in the Conditions of the Contract shall have the meanings designated in those Conditions.

5.1 Words and Phrases. Words, phrases, and abbreviations which have well-known technical or trade meanings used in the Contract Documents shall be used according to such recognized meanings. In the event of a conflict, the more stringent meaning shall govern.

5.2 Gender, Singular/Plural. Words of any gender used in this Agreement shall be held and construed to include any other gender, and words in the singular number shall be held to include the plural, unless the context otherwise requires.

5.3 Captions and Section Headings. The captions and section headings contained in this Agreement are for convenience of reference only, and in no way limit, define, or enlarge the terms, scope and conditions of this Agreement.

5.4 Interchangeable Terms. For purposes of all provisions within this Agreement and all attachments hereto, the terms "Agreement" and "Contract" shall have the same meaning and shall be interchangeable.

6. COMPLIANCE WITH APPLICABLE LAW, CHOICE OF LAW

6.1 This Agreement shall be governed exclusively by the provisions hereof and by the laws of the State of New Mexico and applicable ordinances of Santa Fe County.

6.2 In performing its obligations hereunder, the Contractor shall comply with all applicable laws, ordinances, and regulations, including Santa Fe County Ordinance 2014-1 (Establishing a Living Wage).

6.3 Minimum Wage Rates. The Contractor, all subcontractors and sub-subcontractors warrants and agree to will comply with all applicable provisions of the New Mexico Public Works Minimum Wage Act as outlined in the Bid Documents. Wage rates are not applicable to projects costing less than $60,000.

6.4 This Agreement shall be construed in accordance with the substantive laws of the State of New Mexico, without regard to its choice of law rules. Contractor and the County agree that the exclusive forum for any litigation between them arising out of or related to this Agreement shall be federal and state district courts of New Mexico.

6.5 Pursuant to 13-1-191, NMSA 1978, reference is hereby made to the criminal laws of New Mexico, including §30-14-1, §30-24-2, and §30-41-1 through 3 NMSA 1978, which prohibit bribes, kickbacks, and gratuities, violation of which constitutes a felony. Further, the Procurement Code, 13-1-28 through 13-1-199 NMSA 1978, imposes civil and criminal penalties for its violation.

6.6 New Mexico Tort Claims Act. By entering into this Agreement, neither party shall be responsible for liability incurred as a result of the other party's acts or omissions in connection with this Agreement. Any liability incurred in connection with this Agreement is subject to the immunities and limitations of the New Mexico Tort Claims Act, Sections 41-4-1, et Seq. NMSA 1978, as amended. The County and its "public employees" as defined in the New Mexico Tort Claims Act, do not waive sovereign immunity, do not waive any defense and do not waive any limitation of liability pursuant to law. No provision in this Agreement modifies or waives any provision of the New Mexico Tort Claims Act.

6.7 Provision Required by Law Deemed Inserted. Each and every provision of law and clause required by law to be inserted in this contract shall be deemed to be inserted herein and the contract shall be read and enforced as though it were included herein, and if through mistake or otherwise any such provision is not inserted, or is not correctly inserted, then upon the application of either party the contract shall forthwith be physically amended to make such insertion or correction.

7. EFFECTIVE DATE AND TERM

7.1 This Agreement shall, upon due execution by all parties, become effective in accordance with the Agreement Between County and Contractor for Construction, Article 3 - Effective Date, Time of Commencement and Substantial Completion. This Agreement shall not become effective until: (1) approved by the Santa Fe County Commissioners and/or the County Manager or their designee; and (2) signed by all parties required to sign this Agreement.

7.2 This Contract shall achieve Substantial Completion in accordance with the Agreement Between County and Contractor, Article 3 - Effective Date, Time of Commencement and Substantial Completion, unless earlier terminated pursuant to Section 8 (Termination) or 9, (Appropriations and Authorizations) of these General Conditions.

8. TERMINATION

8.1 Termination of Agreement for Cause. Either party may terminate the Agreement based upon any material breach of this Agreement by the other party. The non-breaching party shall give the breaching party written notice of termination specifying the grounds for the termination. The termination shall be effective 30 days from the breaching party's receipt of the notice of termination, during which time the breaching party shall have the right to cure the breach. If, however, the breach cannot with due diligence be cured within 30 days, the breaching party shall have a reasonable time to cure the breach, provided that, within 30 days of its receipt of the written notice of termination, the breaching party began to cure the breach and advised the non-breaching party in writing that it intended to cure.

8.2 Termination for Convenience of the County. The County may, in its discretion, terminate this Agreement at any time for any reason by giving the Contractor written notice of termination. The notice shall specify the effective date of termination, which shall not be less than 15 days from the Contractor's receipt of the notice. The County shall pay the Contractor for acceptable work, determined in accordance with the specifications and standards set forth in this Agreement, performed before the effective date of termination but shall not be liable for any work performed after the effective date of termination.

8.3 Right of the County to Terminate Contract In the event that any of the provisions of this contract are violated by the Contractor, or by any of its subcontractors, the County may serve written notice upon the Contractor and the Surety of its intention to terminate the contract, such notices to contain the reasons for such intention to terminate the contract, and unless within ten days after the serving of such notice upon the Contractor, such violation or delay

shall cease and satisfactory arrangement of correction be made, the contract shall, upon the expiration of said ten days, cease and terminate. In the event of any such termination, the County shall immediately serve notice thereof upon the Surety and the Contractor and the Surety shall have the right to take over and perform the contract. Provided, however, that if the Surety does not commence performance thereof within ten days from the date of the mailing to such Surety of notice of termination, the County may take over the work and prosecute the same to completion by contract or by force account and at the expense of the Contractor and the Contractor and its Surety shall be liable to the County for any excess cost occasioned the County thereby, and in such event the County may take possession of and utilize in completing the work, such materials, appliances, and plant as may be on the site of the work and necessary therefore.

9. APPROPRIATIONS AND AUTHORIZATIONS

This Agreement is contingent upon sufficient appropriations and authorizations being made for performance of this Agreement by the Santa Fe County Board of County Commissioners and/or, if state funds are involved, the New Mexico State Legislature. If sufficient appropriations and authorizations are not made in this or future fiscal years, this Agreement shall terminate upon written notice by the County to the Contractor. Such termination shall be without penalty to the County, and the County shall have no duty to reimburse the Contractor for expenditures made in the performance of this Agreement. The County is expressly not committed to expenditure of any funds until such time as they are programmed, budgeted, encumbered and approved for expenditure by the County. The County's decision as to whether sufficient appropriations and authorizations have been made for the fulfillment of this Agreement shall be final and not subject to challenge by the Contractor in any way or forum, including a lawsuit.

10. AMENDMENTS – CHANGE ORDERS

Contract Documents may be amended by a Change Order, hereto attached as Exhibit I to allow for additions, deletions, and revision as specified in Article 2 "The Work" of the Agreement between Santa Fe County and the Contractor or to amend the terms and conditions by a Change Order.

11. INDEMNIFICATION

11.1 The Contractor shall defend, indemnify, and hold harmless the County and its elected officials, agents, and employees from any losses, liabilities, damages, demands, suits, causes of action, judgments, costs or expenses (including but not limited to court costs and attorneys' fees) resulting from or directly or indirectly arising out of the Contractor's performance or non-performance of its obligations under this Agreement, including but not limited to the Contractor's breach of any representation or warranty made herein.

11.2 The Contractor agrees that the County shall have the right to control and participate in the defense of any such demand, suit, or cause of action concerning matters that relate to the County and that such suit will not be settled without the County's consent, such consent can not to be unreasonably withheld. If a conflict exists between the interests of the County and

the Contractor in such demand, suit, or cause of action, the County may retain its own counsel to represent the County's interest.

11.3 The Contractor's obligations under this section shall not be limited by the provisions of any insurance policy the Contractor is required to maintain under this Agreement.

12. AGGRIEVEMENT PROCEDURE DURING CONTRACT ADMINISTRATION

12.1 Any claims, disputes, or other matters in question between the Contractor and the County, except those which have been waived by the making or acceptance of final payment as provided in Paragraph 6.2 of the Agreement Between Santa Fe County and Contractor for Construction, shall be presented in the form of a written request accompanied by supporting data to the Architect/Engineer for formal decision, with a copy to the other party. Such formal decision of the Architect/Engineer is binding upon the Contractor and the Owner unless either or both notify each other and the Architect/Engineer in writing within 15 days of their receipt of the decision that they are unwilling to abide by the Architect's/Engineer's decision, are thereby aggrieved in connection with the decision, and are separately exercising such rights as either may have under the Contract Documents or by law and regulation. If the Architect/Engineer fails to provide a written decision or a reasonable schedule to issue a written decision within ten days after the County or the Contractor has presented its request, that party may consider itself aggrieved and may proceed to exercise its rights.

12.2 A settlement agreement signed by the County and the Contractor shall supersede and cancel any other dispute resolution proceedings regarding the same matter.

12.3 Unless work is stopped or payment withheld in accordance with the conditions of the Contract, or unless otherwise agreed in writing, the Contractor shall carry on the Work and maintain its progress during any dispute resolution proceedings, and the Owner shall continue to make payments to the Contractor in accordance with the Contract Documents.

13. DISPUTE RESOLUTION

13.1 Either County or Contractor may request mediation pursuant to the New Mexico Public Works Mediation Act, 13-4C-1 NMSA 1978, of any claim before such decision become final and binding. The request for mediation shall be submitted in writing to the other party. Timely submission of the request shall stay the effect of Paragraph 12.1.

13.2 County and Contractor shall participate in the mediation process in good faith. The process shall be completed within 60 days of filing of the request. The mediation shall be governed by the rules for mediation pursuant to the New Mexico Public Works Mediation Act.

13.3 If the dispute is not resolved by mediation, the dispute shall be resolved through litigation in the district court. The parties agree that the exclusive forum for such litigation shall be the State of New Mexico District Court for the First Judicial District at Santa Fe, New Mexico. Contractor irrevocably consents to the jurisdiction of said Court and agrees to accept service of a summons and complaint by mail or commercial courier service in accordance with Rule

1-004(E) (3) NMRA.

14. INSURANCE

14.1 The Contractor shall not commence work under this contract until they have obtained all the insurance required under this paragraph and such insurance has been approved by the County, nor shall the Contractor allow any subcontractor to commence work on its subcontract until the insurance required of the subcontractor has been so obtained and approved.

14.2 Proof of Carriage of Insurance. The Contractor shall furnish the County with certificates showing the type, amount, class of operations covered, effective dates and date of expiration of policies. Such certificates shall also contain substantially the following statement: "Should any of the above described policies be cancelled before the expiration date thereof, notice will be delivered in accordance with the policy provisions".

14.3 General Conditions. The Contractor shall submit evidence of insurance as is required herein. Policies of insurance shall be written by companies authorized to write such insurance in New Mexico.

14.4 General Liability Insurance, Including Automobile. The Contractor shall procure and maintain during the life of this Agreement a comprehensive general liability and automobile insurance policy with liability limits in amounts not less than $1,000,000.00 combined single limits of liability for bodily injury, including death, and property damage for any one occurrence. Said policies of insurance shall include coverage for all operations performed for the County by the Contractor; coverage for the use of all owned, non-owned, hired automobiles, vehicles and other equipment, both on and off work; and contractual liability coverage under which this Agreement is an insured contract. The Santa Fe County shall be a named additional insured on the policy.

14.5 Subcontractor's Public Liability and Property Damage Insurance and Vehicle Liability Insurance. The Contractor shall require each of its subcontractors to procure and to maintain during the life of its subcontract, Subcontractor's Public Liability and Property Damage Insurance and Vehicle Liability Insurance of the type and in the amounts specified in 14.4 above.

14.6 Workers' Compensation Insurance. The Contractor shall comply with the provisions of the Workers' Compensation Act, 52-1-1 to 52-1-70 NMSA 1978. The Contractor shall procure and shall maintain during the life of this contract Workmen's Compensation Insurance as required by applicable State law for all of its employees to be engaged in work at the site of the project under this Contract and, in case of any such work sublet, the Contractor shall require the subcontractor similarly to provide Workmen's Compensation Insurance for all of the latter's employees to be engaged in such work unless such employees are covered by the protection afforded by the Contractor's Workmen's Compensation Insurance. In case any class of employees engaged in hazardous work on the project under this contract is not protected under the Workmen's Compensation law, the Contractor shall provide and shall

cause each subcontractor to provide adequate employer's liability insurance for the protection of such of its employees as are not otherwise protected.

14.7 Scope of Insurance and Special Hazards. The insurance require under subparagraphs 14.4 and 14.5 hereof shall provide adequate protection for the Contractor and his subcontractors, respectively, against damage claims which may arise from operations under this Contract, whether such operations be by the insured or by anyone directly or indirectly employed by him and, also against any of the special hazards which may be encountered in the performance of this Contract.

14.8 Builder's Risk Insurance (Fire and Extended Coverage). Until the project is completed and accepted by the County, the County, or Contractor at the County's option is required to maintain Builder's Risk Insurance (fire and extended coverage) on a 100 percent completed value basis on the insurable portion of the project for the benefit of the County, the Contractor, subcontractors as their interests may appear. The Contractor shall not include any costs for Builder's Risk Insurance (fire and extended coverage) premiums during construction unless the Contractor is required to provide such insurance; however, this provision shall not release the Contractor from its obligation to complete, according to plans and specifications, the project covered by the contract, and the Contractor and his Surety shall be obligated to full performance of the Contractor's undertaking.

14.9 Increased Limits. If, during the life of this Agreement, the New Mexico State Legislature increases the maximum limits of liability under the Tort Claims Act (NMSA 1978, Sections 41-4-1 through 41-4-29, as amended), the Contractor shall increase the maximum limits of any insurance required herein.

14.10 Additional insured. Santa Fe County will be listed as an additional insured on all policies, and proof of coverage must be provided before work begins. Contractor shall maintain adequate insurance in at least the maximum amounts which the County could be liable under the New Mexico Tort Claims Act. It is the sole responsibility of the Contractor to be in compliance with the law.

15. INDEPENDENT CONTRACTOR

15.1 The Contractor and the Contractor’s agents and employees are independent contractors performing professional and technical services for the County and are not employees of the County. The Contractor and the Contractor’s agents and employees shall not accrue leave, retirement, insurance, bonding, use of County’s vehicles, or any other benefits afforded to employees of the County as a result of this Agreement.

15.2 The Contractor shall not subcontract any portion of the services to be performed under this Agreement without prior written approval of the County.

15.3 The Contractor shall maintain detailed time records which indicate the date, time and nature of services rendered. These records shall be subject to inspection by the County and the State Auditor. The County shall have the right to audit billings both before and after payment.

Payment under this Agreement shall not foreclose the right of the County to recover excessive illegal payments.

16. CONFLICT OF INTEREST OF OFFICERS OR EMPLOYEES OF THE LOCAL JURISDICTION, MEMBERS OF THE LOCAL GOVERNING BODY, OR OTHER PUBLIC OFFICIALS

16.1 No officer or employee of the local jurisdiction or its designees or agents, no member of the governing body, and no other public official of the locality who exercises any function or responsibility with respect to this contract, during its tenure or for one year thereafter, shall have any interest, direct or indirect, in any contract or subcontract, or the proceeds thereof, for work to be performed. Further, the Contractor shall cause to be incorporated in all subcontracts the language set forth in this paragraph prohibiting conflict of interest.

16.2 No official of the County who is authorized in such capacity and on behalf of the County to negotiate, make, accept or approve, or to take part in negotiating, making accepting or approving any architectural, engineering, inspection, construction or material supply contract or any subcontract in connection with the construction of the project, shall become directly or indirectly interested personally in this contract or in any part hereof. No officer, employee, architect, attorney, engineer or inspector of or for the County who is authorized in such capacity and on behalf of the County to exercise any legislative, executive, supervisory or other similar functions in connection with the construction of the project, shall become directly or indirectly interested personally in this contract or in any part thereof, any material supply contract, subcontract, insurance contract, or any other contract pertaining to the project.

16.3 The Contractor warrants that the Contractor presently has no interest and shall not acquire any interest, direct or indirect, which would conflict in any manner or degree with the performance or services required under this Agreement.

17. ASSIGNMENT

17.1 The Contractor shall not assign or transfer any interest in this Agreement or assign any claims for money due or to become due under this Agreement without the advance written approval of the County. Any attempted assignment or transfer without the County's advance written approval shall be null and void and without any legal effect.

18. SUBCONTRACTING

18.1 The Contractor shall not subcontract or delegate any portion of the services to be performed under this Agreement without the advance written approval of the County. Any attempted subcontracting or delegating without the County's advance written approval shall be null and void and without any legal effect.

18.2 Contractor shall provide to the County a listing of subcontractors within ten (10) days of the Contract award.

18.3 Contractor shall adhere to all provisions of the Subcontractor's Fair Practices Act 13-4-31 to 13-4-42, NMSA 1978.

18.4 Contractor shall provide to the County completed Non-Collusion Affidavit of Subcontractor form and Certification of Subcontractor Regarding Equal Employment Opportunity form for all subcontractors listed.

18.5 The Contractor shall not award any work to any subcontractor without prior written approval of the County, which approval will not be given until the Contractor submits to the County a written statement concerning the proposed award to the subcontractor, which statement shall contain such information as the County may require.

18.6 The Contractor shall be as fully responsible to the County for the acts and omissions of its subcontractors, and of persons either directly or indirectly employed by them, as they are for the acts and omissions of persons directly employed by them.

18.7 The Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the work to bind subcontractors to the Contractor by the terms of the General Conditions and other contract documents insofar as applicable to the work of subcontractors and to give the Contractor the same power as regards terminating any subcontract that the County may exercise over the Contractor under any provision of the contract documents.

18.8 Nothing contained in this contract shall create any contractual relation between any subcontractor and the County.

18.9 All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate written agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of County. Any contract between Contractor and a Subcontractor or Supplier shall provide that any remedy or claim for nonpayment of sums due or owing to Subcontractor or Supplier or services performed or materials provided is against Contractor and not County, subject to any remedy or rights Subcontractor or Supplier may have under the terms of the Contractor's Performance Bond and Section 13-4-19 NMSA 1978, the New Mexico Little Miller Act.

19. PERSONNEL

19.1 All work performed under this Agreement shall be performed by the Contractor or under its supervision.

19.2 The Contractor represents that it has, or will secure at its own expense, all personnel required to discharge its obligations under this Agreement. Such personnel (i) shall not be employees of or have any contractual relationships with the County and (ii) shall be fully qualified and licensed or otherwise authorized or permitted under federal, state, and local law to perform such work.

20. NOTICES

20.1 Any notice required to be given to either party by this Agreement shall be in writing and shall be delivered in person, by courier service or by U.S. mail, either first class or certified, return receipt requested, postage prepaid, as follows:

To the County: Santa Fe County
Office of the County Attorney
102 Grant Avenue
Santa Fe, New Mexico 87501

To the Contractor: _____
_____
_____

20.2 Nothing herein contained shall preclude the giving of any such written notice by personal service. The address to which notices shall be mailed to either party may be changed by written notice given by such party to the other as hereinabove provided.

21. RELEASE

The Contractor, upon final payment of the amounts due under this Agreement, releases the County, the County's officers and employees from all liabilities and obligations arising from or under this Agreement, including, without limitation, all damages, losses, costs, liability, and expenses, including, without limitation, attorney's fees and costs of litigation that the Contractor may have.

22. WAIVER

No provision of this Agreement shall be deemed to have been waived by either party unless such waiver be in writing signed by the party making the waiver and addressed to the other party; nor shall any custom or practice which may evolve between the parties in the administration of the terms hereof be construed to waive or lessen the right of either party to insist upon performance by the other party in strict accordance with the terms hereof. Further, the waiver by any party of a breach by the other party of any term, covenant, or condition hereof shall not operate as a waiver of any subsequent breach of the same or any other term, covenant, or condition thereof.

CONDITIONS OF THE WORK

1. ADDITIONAL INSTRUCTIONS AND DETAIL DRAWINGS

1.1 The Contractor will be furnished additional instructions and detail drawings as necessary to carry out the work included in the Contract. The additional drawings and instructions

supplied to the Contractor will coordinate with the Contract Documents and will be so prepared that they can be reasonably interpreted as part thereof. The Contractor shall carry out the work in accordance with the additional detail drawings and instructions. The Contractor and the Architect/Engineer/County will prepare jointly (a) a schedule, fixing the dates at which special detail drawings will be required, such drawings, if any, to be furnished by the Architect/ Engineer/County in accordance with the schedule, and (b) a schedule fixing the respective dates for the submission of shop drawings, the beginning of manufacture, testing and installation of materials, supplies and equipment, and the completion of the various parts of the work; each schedule to be subject to change from time to time in accordance with progress of the work.

2. SHOP OR SETTING DRAWINGS

2.1 The Contractor shall submit promptly to the Architect/Engineer/County two (2) copies of each shop or setting drawing prepared in accordance with the schedule predetermined as aforesaid. After examination of such drawings by the Architect/Engineer/County and the return thereof, the Contractor shall make such corrections to the drawings as have been indicated and shall furnish the Architect/ Engineer/County with two corrected copies. If requested by the Architect/Engineer/County the Contractor must furnish additional copies. Regardless of corrections made in or approval given to such drawings by the Architect/Engineer/County, the Contractor will be responsible for the accuracy of such drawings and for their conformity to the Plans and Specifications, unless the Contractor notifies the Architect/Engineer/County in writing of any deviations at the time the Contractor furnishes such drawings.

3. MATERIALS, SERVICES AND FACILITIES

3.1 It is understood that except as otherwise specifically stated in the Contract Documents, the Contractor shall provide and pay for all materials, labor, tools, equipment, water, light, power, transportation, superintendence, temporary construction of every nature, and all other services and facilities of every nature whatsoever necessary to execute, complete, and deliver the work within the specified time.

3.2 Any work necessary to be performed after regular working hours, on Sundays or legal holidays, shall be performed without additional expense to the County.

4. CONTRACTOR'S TITLE TO MATERIALS

4.1 No materials or supplies for the work shall be purchased by the Contractor or by any subcontractor subject to any chattel mortgage or under a conditional sale contract or other agreement by which an interest is retained by the seller. The Contractor warrants that he/she has good title to all materials and supplies used by him/her in the work, free from all liens, claims or encumbrances.

5. INSPECTION AND TESTING OF MATERIALS

5.1 All materials and equipment used in the construction of the project shall be subject to adequate inspection and testing in accordance with accepted standards. The laboratory or inspection agency shall be selected by the County. The County will pay for all laboratory inspection service direct, and not as a part of the Contract.

5.2 Materials of construction, particularly those upon which the strength and durability of the structure may depend, shall be subject to inspection and testing to establish conformance with specifications and suitability for uses intended.

6. "OR EQUAL" CLAUSE

6.1 Whenever a material, article or piece of equipment is identified on the plans or in the specifications by reference to manufacturers' or vendors' names, trade names, catalogue numbers, etc., it is intended merely to establish a standard; and, any material, article, or equipment or other manufacturers and vendors which will perform adequately the duties imposed by the general design will be considered equally acceptable provided the material, article, or equipment so proposed, is, in the opinion of the Architect/Engineer/County, of equal substance and function. It shall not be purchased or installed by the Contractor without the Architect/Engineer/County's written approval.

7. PATENTS

7.1 The Contractor shall hold and save the County and its officers, agents, servants, and employees harmless from liability of any nature or kind, including cost and expenses for, or on account of, any patented or unpatented invention, process, article, or appliance manufactured or used in the performance of the Contract, including its use by the County, unless otherwise specifically stipulated in the Contract Documents.

7.2 License and/or Royalty Fees for the use of a process which is authorized by the County of the project must be reasonable, and paid to the holder of the patent, or its authorized licensee, direct by the County and not by or through the Contractor.

7.3 If the Contractor uses any design, device or materials covered by letters, patent or copyright, the Contractor shall provide for such use by suitable agreement with the County of such patented or copyrighted design, device or material. It is mutually agreed and understood, that, without exception, the Contract prices shall include all royalties or costs arising from the use of such design, device or materials, in any way involved in the work. The Contractor and/or its Sureties shall indemnify and save harmless the County of the project from any and all claims for infringement by reason of the use of such patented or copyrighted design, device or materials, or any trademark or copyright in connection with work agreed to be performed under this Contract, and shall indemnify the County for any cost, expense or damage which it may be obliged to pay by reason of such infringement at any time during the prosecution of the work or after, completion of the work.

8. SURVEYS, PERMITS AND REGULATIONS

8.1 Unless otherwise expressly provided for in the Specifications, the County will furnish to the Contractor all surveys necessary for the execution of the work.

8.2 Unless otherwise expressly provided for in the Specifications, the Contractor shall procure and pay all permits, licenses and approvals necessary for the execution of this Contract.

8.3 The Contractor shall comply with all laws, ordinances, rules, orders, and regulations relating to performance of the work, the protection of adjacent property, and the maintenance of passageways, guard fences or other protective facilities.

9. CONTRACTOR'S OBLIGATIONS

9.1 The Contractor shall and will, in good workmanlike manner, do and perform all work and furnish all supplies and materials, machinery, equipment, facilities and means, except as herein otherwise expressly specified, necessary or proper to perform and complete all the work required by this Contract, within the time herein specified. The Contractor will perform the Work in accordance with the provisions of this Contract and said specifications and in accordance with the plans and drawings covered by this Contract any and all supplemental plans and drawings, and in accordance with the directions of the Architect/Engineer/County as given from time to time during the progress of the work. The Contractor shall furnish, erect, maintain, and remove such construction plans and such temporary works as may be required.

9.2 The Contractor shall observe, comply with, and be subject to all terms, conditions, requirements, and limitations of the Contract and specifications, and shall do, carry on, and complete the entire work to the satisfaction of the Architect/Engineer and the County.

10. WEATHER CONDITIONS

10.1 In the event of temporary suspension of work, or during inclement weather, or whenever the Architect/Engineer/County shall direct, the Contractor will, and will cause its subcontractors to protect carefully its and their work and materials against damage or injury from the weather. If, in the opinion of the Architect/Engineer/County, any work or materials shall have been damaged or injured by reason of failure on the part of the Contractor or any of its Subcontractors so to protect its work, such materials shall be removed and replaced at the expense of the Contractor.

11. PROTECTION OF WORK AND PROPERTY-EMERGENCY

11.1 The Contractor shall at all times safely guard the County's property from injury or loss in connection with this Contract. The Contractor shall at all times safely guard and protect its own work, and that of adjacent property from damage. The Contractor shall replace or make good any such damage, loss or injury unless such is caused directly by errors contained in the Contract or by the County, or its duly authorized representatives.

11.2 In case of an emergency which threatens loss or injury of property, and/or safety of life, the

Contractor will be allowed to act, without previous instructions from the Architect/Engineer/County, in a diligent manner. The Contractor shall notify the Architect/Engineer/County immediately thereafter. Any claim for compensation by the Contractor due to such extra work shall be promptly submitted to the Architect/Engineer/County for approval.

11.3 Where the Contractor has not taken action but has notified the Architect/Engineer/County of an emergency threatening injury to persons or to damage to the work or any adjoining property, the Contractor shall act as instructed or authorized by the Architect/Engineer/County.

11.4 The amount of reimbursement claimed by the Contractor on account of any emergency action shall be determined in the manner provided in Paragraph 15 of these Conditions of the Work.

12. INSPECTION

12.1 The authorized representatives and agents of the County shall be permitted to inspect all work, materials, payrolls, records of personnel, invoices of materials, and other relevant data and records.

13. REPORTS, RECORDS AND DATA

13.1 The Contractor shall submit to the County such schedule of quantities and costs, progress schedules, payrolls, reports, estimates, records and other data as the County may request concerning work performed or to be performed under this Contract.

14. SUPERINTENDENT BY CONTRACTOR

14.1 At the site of the work the Contractor shall employ a construction superintendent or foreman who shall have full authority to act for the Contractor. It is understood that such representative shall be acceptable to the Architect/ Engineer/County and shall be one who can be continued in that capacity for the particular job involved unless he/she ceases to be on the Contractor's payroll.

15. CHANGES IN WORK

15.1 No changes in the work covered by the approved Contract Documents shall be made without having prior written approval of the County. Charges or credits for the work covered by the approved change shall be determined by one or more, or a combination of the following methods:

A. Unit bid prices previously approved.
B. An agreed lump sum.
C. The actual cost of:
    1) Labor, including foremen;
    2) Materials entering permanently into the work;

3) The County's or rental cost of construction equipment during the time of use on the extra work;
4) Power and consumable supplies for the operation of power equipment;
5) Insurance;
6) Social Security and old age and unemployment contributions.

D. To the costs for changes in work a fixed fee will be added to be agreed upon but not to exceed ten percent (10%) of the actual cost of the work. The fee shall be compensation to cover the cost of supervision, overhead, bond, profit and any other general expenses.

16. EXTRAS

16.1 Without invalidating the contract, the County may order extra work or make changes by altering, adding to or deducting from the work, the contract sum being adjusted accordingly, and the consent of the Surety being first obtained where necessary or desirable. All the work of the kind bid upon shall be paid for at the price stipulated in the proposal, and no claims for any extra work or materials shall be allowed unless the work is ordered in writing by the County or the Architect/Engineer, acting officially for the County, and the price is stated in such order.

17. INSPECTION OF SERVICES

17.1 The Contractor shall provide and maintain an inspection system acceptable to the County covering the services under this Contract. Complete records of all inspection work performed by the Contractor shall be maintained and made available to the County during contract performance and for as long afterwards as the Contract requires.

17.2 The County has the right to inspect and test all services called for by the Contract, to the extent practicable at all times and places during the term of the Contract. The County shall perform inspections and tests in a manner that will not unduly delay the work.

17.3 If the County performs inspections or tests on the premises of the Contractor or a subcontractor, the Contractor shall furnish, and shall require subcontractors to furnish, at no increase in contract price, all reasonable facilities and assistance for the safe and convenient performance of these duties.

17.4 If any of the services do not conform with the Contract requirements, the County may require the Contractor to perform the services again in conformity with Contract requirements, at no increase in contract amount. When the defects in services cannot be corrected by re-performance, the County may require the Contractor to take necessary action to ensure that future performance conforms to contract requirements; and reduce the Contract sum to reflect the reduced value of the services performed.

17.5 If the Contractor fails to promptly perform the services again or to take the necessary action to ensure future performance in conformity with Contract requirements, the County may by contract or otherwise, perform the services and charge to the Contractor any cost incurred by the County that is directly related to the performance of such service, or terminate the

Contract for default.

18. CORRECTION OF WORK

18.1 All work, all materials, whether incorporated in the work or not, all processes of manufacture, and all methods of construction shall be at all times and places subject to the inspection of the Architect/ Engineer/County who shall be the final judge of the quality and suitability of the work, materials, processes of manufacture, and methods of construction for the purposes for which they are used. Should they fail to meet their approval they shall be forthwith reconstructed, made good, replaced and/or corrected, as the case may be, by the Contractor at its own expense. Rejected material shall immediately be removed from the site. If, in the opinion of the Architect/Engineer/County, it is undesirable to replace any defective or damaged materials or to reconstruct or correct any portion of the work injured or not performed in accordance with the Contract Documents, the compensation to be paid to the Contractor hereunder shall be reduced by such amount as in the judgment of the Architect/Engineer/County shall be equitable.

19. WARRANTY OF CONSTRUCTION

19.1 In addition to any other warranties in this Contract, the Contractor warrants that work performed under this Contract conforms to the Contract requirements and is free of any defect in equipment, material, or design furnished, or workmanship performed by the Contractor or any subcontractor or supplier at any tier.

19.2 This warranty shall continue for a period of one (1) year from the date of final acceptance of the work. If the County takes possession of any part of the work before final acceptance, this warranty shall continue for a period of one (1) year from the date the County takes possession.

19.3 The Contractor shall remedy at the Contractor's expense any failure to conform, or any defect. In addition, the Contractor shall remedy at the Contractor's expense any damage to County-owned or controlled real or personal property, when that damage is the result of the Contractor's failure to conform to contract requirements or any defect of equipment, material, workmanship, or design furnished.

19.4 The Contractor shall restore any work damaged in fulfilling the terms and conditions of this clause. The Contractor's warranty with respect to work repaired or replaced will run for one (1) year from the date of repair or replacement.

19.5 The County shall notify the Contractor, in writing, within a reasonable time after the discovery of any failure, defect, or damage.

19.6 If the Contractor fails to remedy any failure, defect, or damage within a reasonable time after receipt of notice, the County shall have the right to replace, repair, or otherwise remedy the failure, defect, or damage at the Contractor's expense.

19.7 With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and materials furnished under this Contract, the Contractor shall obtain all warranties that would be given in normal commercial practice; require all warranties to be executed, in writing, for the benefit of the County, if directed by the County; and, enforce all warranties for the benefit of the County, if directed by the County.

19.8 In the event the Contractor's warranty under subparagraph 19.4 of this clause has expired, the County may bring suit at its expense to enforce a subcontractor's, manufacturer's, or supplier's warranty.

19.9 Unless a defect is caused by the negligence of the Contractor or subcontractor or supplier at any tier, the Contractor shall not be liable for the repair of any defects of material or design furnished by the County nor for the repair of any damage that results from any defect in County-furnished material or design.

19.10 This warranty shall not limit the County's rights under the Inspection and Acceptance clause of this Contract with respect to latent defects, gross mistakes, or fraud.

20. SUBSURFACE CONDITIONS FOUND DIFFERENT

20.1 Should the Contractor encounter sub-surface and/or latent conditions at the site materially differing from those shown on the Plans or indicated in the Specifications, the Contractor shall immediately give notice to the Architect/Engineer/County of such conditions before they are disturbed. The Architect/Engineer/County will thereupon promptly investigate the conditions, and if they find that they materially differ from those shown on the Plans or indicated in the Specifications, they will at once make such changes in the Plans and/or Specifications as they may find necessary, any increase or decrease of cost resulting from such changes to be adjusted in the manner provided in Paragraph 15 above.

21. CLAIMS FOR EXTRA COST

21.1 No claim for extra work or cost shall be allowed unless the same was done in pursuance of a written order of the Architect/Engineer approved by the County, as aforesaid, and the claim presented with the first estimate after the changed or extra work is done. When work is performed under the terms of General Conditions, the Contractor shall furnish satisfactory bills, payrolls and vouchers covering all items of cost and when requested by the County, giving the County access to accounts relating thereto.

22. CONSTRUCTION SCHEDULE AND PERIODIC ESTIMATES

22.1 Immediately after execution and delivery of the Contract, and before the first partial payment is made, the Contractor shall deliver to the County an estimated construction progress schedule in a form satisfactory to the County, showing the proposed dates of commencement and completion of each of the various subdivisions of work required under the Contract Documents and the anticipated amount of each monthly payment that will become due to the Contractor in accordance with the progress schedule. The Contractor shall also furnish on

forms to be supplied by the County (a) a detailed estimate giving a complete breakdown of the Contract sum and (b) periodic itemized estimates of work done for the purpose of making partial payments thereof. The costs employed in making up any of these schedules will be used only for determining the basis of partial payments and will not be considered as fixing a basis for additions to or deductions from the Contract price.

22.2 Schedule

The Contractor shall, within five (5) days after the effective date of Notice to Proceed, prepare and submit five (5) copies of a progress schedule covering project operations for the Contract period. This progress schedule shall be of the type generally referred to as a Critical Path Method (CPM), Critical Path Schedule (CPS), and Critical Path Analysis (CPA), and other similar designations. The CPM shall be used to control the timing and sequences of the project. All work shall be done in accordance with the CPM Planning and Scheduling. A written statement of explanation shall be submitted with the progress schedule. All costs incurred by the contractor to implement the CPM shall be borne by the Contractor **.**

23. ASSIGNMENTS

23.1 The Contractor shall not assign the whole or any part of this Contract or any monies due or to become due hereunder without written consent of the County. In case the Contractor assigns all or any part of any monies due or to become due under this Contract, the instrument of assignment shall contain a clause substantially to the effect that it is agreed that the right of the assignee in and to any monies due or to become due to the Contractor shall be subject to prior claims of all persons, firms and corporations of services rendered or materials supplied for the performance of the work called for in this Contract.

24. MUTUAL RESPONSIBILITY OF CONTRACTORS

24.1 If, through acts of neglect on the part of the Contractor, any other Contractor or any subcontractor shall suffer loss or damage on the work, the Contractor agrees to settle with such other Contractor or subcontractor by agreement or arbitration if such other Contractor or subcontractors will so settle. If such other Contractor or subcontractor shall assert any claim against the County on account of any damage alleged to have been sustained, the County shall notify the Contractor, who shall indemnify and save harmless the County against any such claim.

25. SEPARATE CONTRACT

25.1 The Contractor shall coordinate its operations with those of other contractors. Cooperation will be required in the arrangement for the storage of materials and in the detailed execution of the work. The Contractor, including its subcontractors, shall keep informed of the progress and the detail work of other contractors and shall notify the Architect/ Engineer/County immediately of lack of progress or defective workmanship on the part of other contractors. Failure of a contractor to keep informed of the work progressing on the site and failure to give notice of lack of progress or defective workmanship by others shall be construed as

acceptance by the Contractor of the status of the work as being satisfactory for proper coordination with its own work.

26. ARCHITECT/ENGINEER'S AUTHORITY

26.1 The Architect/Engineer/County shall give all orders and directions contemplated under this Contract and specifications, relative to the execution of the work. The Architect/Engineer/County shall determine the amount, quality, acceptability, and fitness of the several kinds of work and materials which are to be paid for under this Contract and shall decide all questions which may arise in relation to said work and the construction thereof. The Architect/Engineer/County's estimates and decisions shall be final and conclusive, except as herein otherwise expressly provided. In case any question shall arise between the parties hereto relative to said contract or specifications, the determination or decision of the Architect/Engineer/County shall be a condition precedent to the right of the Contractor to receive any money or payment for work under this Contract affected in any manner or to any extent by such question.

26.2 The Architect/Engineer/County shall decide the meaning and intent of any portion of the specifications and of any plans or drawings where the same may be found obscure or be in dispute. Any differences or conflicts in regard to their work which may arise between the Contractor under this Contract and other Contractors performing work for the County shall be adjusted and determined by the Architect/Engineer/County.

27. STATED ALLOWANCES

27.1 It is understood that Contractor has included in its proposal for the Contract sum all allowances including "Allowed Materials" The Contractor shall purchase the "Allowed Materials" as directed by the County on the basis of the lowest and best bid of at least three competitive bids. If the actual sum for purchasing the "Allowed Materials" is more or less than the "Cash Allowance," the Contract sum shall be adjusted accordingly. The adjustment in contract price shall be made on the basis of the purchase price without additional charges for overhead, profit, insurance or any other incidental expenses. The cost of installation of the "Allowed Materials" shall be included in the applicable sections of the Contract Specifications covering this work.

28. USE OF PREMISES AND REMOVAL OF DEBRIS

28.1 The Contractor expressly undertakes at its own expense:

A. to take every precaution against injuries to persons or damage to property;
B. to store its apparatus, materials, supplies and equipment in such orderly fashion at the site of the work as will not unduly interfere with the progress of its work or the work of any other subcontractors;
C. to place upon the work or any part thereof only such loads as are consistent with the safety of the portion of the work;
D. to clean up frequently all refuse, rubbish, scrap materials, and debris caused by its

operations, to the end that at all times the site of the work shall present a neat, orderly and workmanlike appearance;

E. before final payment to remove all surplus material, false-work, temporary structures, including foundations thereof, plant of any description and debris of every nature resulting from its operations, and to put the site in a neat, orderly condition.

F. to effect all cutting, fitting or patching of its work required to make the same to conform to the plans and specifications and, except with the consent of the Architect/Engineer/County, not to cut or otherwise alter the work of any other Contractor.

29. QUANTITES OF ESTIMATE

29.1 Wherever the estimated quantities of work to be done and materials to be furnished under this Contract are shown in any of the documents including the proposal, they are given for use in comparing bids and the right is especially reserved except as herein otherwise specifically limited, to increase or diminish them as may be deemed reasonably necessary or desirable by the County to complete the work contemplated by this Contract, and such increase or diminution shall in no way void this Contract, nor shall any such increase or diminution give cause for claims or liability for damages.

30. LANDS AND RIGHTS-OF-WAY

30.1 Prior to the start of construction, the County shall obtain all lands and rights-of-way necessary for the carrying out and completions of work to be performed under this Contract.

31. GENERAL GUARANTY

31.1 Neither the final certificate of payment nor any provision in the Contract Documents, nor partial or entire occupancy of the premises by the County, shall constitute an acceptance of work not done in accordance with the Contract Documents or relieve the Contractor of liability in respect to any express warranties or responsibility for faulty materials or workmanship. The Contractor shall remedy any defects in the work and pay for any damage to other work resulting therefrom, which shall appear within a period of one (1) year from the date of final acceptance of the work unless a longer period is specified. The County will give notice of observed defects with reasonable promptness.

32. PROTECTION OF LIVES AND HEALTH

32.1 The Contractor shall exercise proper precaution at all times for the protection of persons and property and shall be responsible for all damages to persons or property, either on or off the site, which occur as a result of its prosecution of the work. The safety provisions of applicable laws and building and construction codes shall be observed and the Contractor shall take or cause to be taken, such additional safety and health measures as the County may determine to be reasonably necessary.

33. INTEREST OF MEMBER

33.1 No member of Santa Fe Board of County Commissioners shall be admitted to any share or part of this Contract or to any benefit that may arise therefrom.

34. OTHER PROHIBITED INTERESTS

34.1 No official of the County who is authorized in such capacity and on behalf of the County to negotiate, make, accept or approve, or to take part in negotiating, making accepting or approving any architectural, engineering, inspection, construction or material supply contract or any subcontract in connection with the construction of the project, shall become directly or indirectly interested personally in this Contract or in any part hereof. No officer, employee, architect, attorney, engineer or inspector of or for the County who is authorized in such capacity and on behalf of the County to exercise any legislative, executive, supervisory or other similar functions in connection with the construction of the project, shall become directly or indirectly interested personally in this Contract or in any part thereof, any material supply contract, subcontract, insurance contract, or any other contract pertaining to the project.

35. USE AND OCCUPANCY PRIOR TO ACCEPTANCE BY COUNTY

35.1 The Contractor agrees to the use and/or occupancy of a portion or unit of the project before formal acceptance by the County, provided the County:

A. Secures written consent of the Contractor except in the event, in the opinion of the Architect/ Engineer, the Contractor is chargeable with unwarranted delay in final cleanup of punch list items or other contract requirements.
B. Secures endorsement from the insurance carrier and consent of the surety permitting occupancy of the building or use of the project during the remaining period of construction.
C. When the project consists of more than one building, and one of the buildings is occupied, secures permanent fire and extended coverage insurance, including a permit to complete construction. Consent of the surety must also be obtained.

ATTACHMENT A

BID SHEETS

ATTACHMENT B

ADDENDA & MODIFICATIONS

EXHIBIT A

PROJECT MANUAL

EXHIBIT B

TECHNICAL SPECIFICATIONS AS LISTED IN PLAN SET

EXHIBIT C

LABOR AND MATERIAL PAYMENT BOND

KNOW ALL MEN BY THESE PRESENT, THAT WE_____ _____as PRINCIPAL hereinafter called the "PRINCIPAL and _____as SURETY hereinafter called the "SURETY", are held and firmly bound unto Santa Fe County, a Political Subdivision of the State of New Mexico as OBLIGEE hereinafter called the "COUNTY", for the use and benefit of any claimants as herein below defined, in the amount of _____($.) dollars for the payment whereof PRINCIPAL and SURETY bind themselves, their heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, the PRINCIPAL has a written contract dated _____, 20__, with the COUNTY for the construction services for the (insert project description) __in Santa Fe County, New Mexico, which must be constructed in accordance with drawings and specifications which contract is referenced and made a part hereof, and is hereinafter referred to as the "Contract."

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if PRINCIPAL shall promptly make payment to all claimants as hereinafter defined, for all labor and material used or reasonably required for use in the performance of the Contract, then this obligation shall be void; otherwise, it shall remain in full force and effect, subject to the following conditions:

1. A claimant is defined as one having a direct contract with the PRINCIPAL or with a subcontractor of the PRINCIPAL for labor, material, or both, used or reasonably required for use in the performance of the Contract, labor and material being construed to include but not be limited to that part of water, gas, power, light, heat, oil, gasoline, telephone services or rental of equipment directly applicable to the Contract.

2. The above named PRINCIPAL and SURETY hereby jointly and severally agree with the COUNTY that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such claimant's work or labor was done or performed, or materials were furnished by such claimant, prosecute a suit to final judgment for such sum or sums as may be justly due claimant, and have execution thereof. The COUNTY shall not be liable for payment of any cost or expenses of any such suit.

3. No suit or action shall be commenced hereunder by any claimant:

    a. Unless claimant, or other than one having a direct contract with the PRINCIPAL, shall have written notice in the form of an sworn statement to the COUNTY and any one or both of the following: the PRINCIPAL or SURETY above named, within ninety (90) days after such said claim is made or suit filed, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed.

    b. Such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid, in an envelope addressed to the COUNTY, PRINCIPAL or SURETY, at any place where an office is regularly maintained by said COUNTY, PRINCIPAL or SURETY for the transaction of business, or served in any manner in which legal

process may be served in the State in which the aforesaid project is located, save that such service need not be made by a public officer.

4. Any suit under this Labor and Material Bond must be instituted in accordance with the statute of limitation under Section 37-1-3 NMSA 1978.

5. No right of action shall accrue on this Bond to or for the use of any person or corporation other than subcontractors or sub-subcontractors of the said Contract between PRINCIPAL and Santa Fe County named herein.

SIGNED AND SEALED THIS_____DAY OF _____, 2015.

_____
CONTRACTOR – PRINCIPAL (signature)

By: _____
(Printed name and title)

_____ (seal)
NOTARY PUBLIC

My Commission expires: _____

_____
SURETY (signature)

_____
(Printed name and title)

_____ (seal)
NOTARY PUBLIC

My Commission expires: _____

_____
SURETY'S Authorized New Mexico Agent

EXHIBIT D

PERFORMANCE BOND

(SAMPLE)

A. KNOW ALL MEN BY THESE PRESENT, THAT WE _____ _____, as PRINCIPAL hereinafter called the "CONTRACTOR" and _____ _____, as SURETY hereinafter called the "SURETY", are held and firmly bound unto OBLIGEE Santa Fe County, a Political Subdivision of the State of New Mexico, hereinafter called the "COUNTY", in the sum of_____($_____) dollars for the payment whereof CONTRACTOR and SURETY bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

B. WHEREAS, the CONTRACTOR has a written contract dated _____, 2015, with the COUNTY for the construction services for the (insert project description) Santa Fe County, New Mexico, in accordance with drawings and specifications which contract is referenced made part hereof, and is hereinafter referred to as the "Contract."

C. NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if CONTRACTOR shall promptly and faithfully perform said Contract (including any amendment thereto), then this obligation shall be null and void; otherwise it shall remain in full force and effect until the COUNTY shall by written instrument notify the SURETY that the obligation is discharged, except that the obligation shall continue for at least three (3) months following the expiration of the term of the Contract.

1. The SURETY hereby waives notice of any alteration or extension of the Contract time made by the COUNTY.

2. Whenever CONTRACTOR shall be, and is declared by the COUNTY to be in default under the Contract, the COUNTY having performed the COUNTY'S obligations thereunder, the SURETY must promptly remedy the default and shall promptly:

   (1) Complete the Contract in accordance with its terms and conditions, or

   (2) Obtain a bid or bids for submission to the COUNTY for completing the Contract in accordance with its terms and conditions, and upon determination by the COUNTY and SURETY of the lowest responsible bidder, arrange for a contract between such bidder and Santa Fe County, and make available as work progresses (even though there should be a default or a secession of defaults under the Contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the Contract price, but not exceeding, including other costs and damages for which the SURETY may be liable hereunder, the amount set forth in the first paragraph hereof. The term "balance of the Contract price" as used in this paragraph, shall mean the total amount payable by the COUNTY to CONTRACTOR under the Contract and any amendments thereto, less the amount properly paid by the COUNTY to CONTRACTOR.

D. No right of action shall accrue on this Performance Bond to or for the use of any person or corporation other than Santa Fe County named herein or the heirs, executors, administrators, or successors of Santa Fe County.

E. This Bond shall be enforceable without the need to have recourse to any judicial or arbitral proceedings.

SIGNED AND SEALED THIS_____DAY OF _____, 2015.

_____
CONTRACTOR – PRINCIPAL (signature)

By: _____
(Printed name and title)

_____ (seal)
NOTARY PUBLIC

My Commission expires: _____

_____
SURETY (signature)

_____
(Printed name and title)

_____ (seal)
NOTARY PUBLIC

My Commission expires: _____

_____
SURETY'S Authorized New Mexico Agent

EXHIBIT E

ASSIGNMENT OF ANTITRUST CLAIMS

TO BE EXECUTED BY GENERAL CONTRACTORS, SUBCONTRACTORS, SUPPLIERS, AND SUBSUBCONTRACTORS OF CONTRACTORS ON COUNTY CONTRACTS.

FIRM NAME: PROJECT:
ADDRESS:

PROJECT NO:

PHONE NO.:

_____ agrees that any and all claims which it may have or may inure to it for overcharges resulting from antitrust violations as to goods, services, and materials purchased in connection with the above-referenced project are hereby assigned to Santa Fe County, but only to the extent that such overcharges are passed on to the County. It is agreed that the undersigned retains all rights to any such antitrust claims to the extent of any overcharges not passed on to the County, including the right to any treble damages attributable thereto.

FIRM: _____

BY: _____
Signed by Individual empowered to obligate Suppliers, Subcontractors or Subsubcontractors

TITLE: _____

EXHIBIT F

CERTIFICATE OF LIABILITY INSURANCE

EXHIBIT G

NOTICE OF CONTRACT AWARD

TO:

FROM: _____, Public Works Department

CONTRACT NO. _____

This is to inform that you that you have been awarded the Contract for:

Project Name: _____

Date of Award _____ Amount of Award _____

Contractor Information:

Firm Name: _____ License# _____

Address: _____ Phone #_____

It is anticipated that construction will take place:

Approximate Starting Date: _____ Approximate Completion Date: _____

Santa Fe County hereby accepts your offer on the solicitation No. _____ as reflected in this award document. The rights and obligations of the parties shall be subject to and governed by this document and any documents attached or incorporated by reference.

SANTA FE COUNTY

Name of Public Works Director or designee: _____
(Print Name)

_____
Signature

EXHIBIT H

NOTICE TO PROCEED

TO:

DATE:
PROJECT:

ATTN:

PROJECT NO.
CONTRACT NO.
IFB NO.

Enclosed is your copy of the Contract, which has been approved. Please consider this letter as official NOTICE TO PROCEED on the above-referenced project.

Your firm shall commence work within ten (10) calendar days of the above date and shall achieve Substantial Completion _____ calendar days thereafter, which shall be _____, 2015, unless modified by Change Order.

It is essential that you make reference to the above-stated project number on all documents sent to the Architect/Engineer from your office. These documents shall include correspondence, change order proposals, change orders, payment request statements, and all other project-related material which you forward to the Architect/Engineer for information and processing.

Also, before you may start any Work at the site, you must (add any other requirements):

OWNER: Santa Fe County
SFC _____DEPARTMENT

By: _____
_____
Director, SFC Department

EXHIBIT I

CHANGE ORDER

PROJECT:

CONTRACTOR
CHANGE ORDER NO:

ARCHITECT/ENGINEER

PROJECT NO:

Contractor Telephone:
Contractor e-mail:
ENGINEER'S/ARCHITECT'S PROJECT NO:

CHANGE ORDER JUSTIFICATION (Provide definitive reason for proposed change order.)

You are directed to make the following changes in this Contract: (Provide a detailed description of the Scope of the Work.)

NOT VALID UNTIL SIGNED BY BOTH THE COUNTY AND THE ARCHITECT/ENGINEER. Signature of the Contractor indicates his agreement herewith, including any adjustment in the Contract Sum or Contract Time.

The Original Contract Sum was	
Net change by previously authorized Change Orders	$0.00
The Contract Sum prior to this Change Order was he Contract Sum will be increased/decreased/unchanged	
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/decreased/unchanged by ___ days.
The date of Substantial Completion as of the date of this Change Order therefore is: _____

CHANGE ORDER SIGNATURE PAGE

APPROVED

SANTA FE COUNTY By: _____ Date: _____

Approved as to form:

By: _____ Date: _____

Gregory S. Shaffer
County Attorney

Finance Department:

By: _____ Date: _____

Carole H. Jaramillo
Finance Director

CONTRACTOR By: _____ Date: _____

Title: _____

ARCHITECT/ENGINEER By: _____ Date: _____

Title: _____

EXHIBIT J

CERTIFICATE OF SUBSTANTIAL COMPLETION

SANTA FE COUNTY – (INSERT DEPARTMENT)

Public Works Director or designee (name): _____

CONTRACTOR: _____

Contractor Purchase Order Number: _____

ARCHITECT/ENGINEER: _____

Project Name: _____

Contract Date: _____

Project Description - Article 2 to Agreement Between Santa Fe County and Contractor (include address and project location description):

_____

_____

_____

_____

The contractor hereby certifies the Work of this project to be in complete conformance to the Contract Documents and is substantially complete, enabling the County to make use of the Work as intended.

By its signature below the Contractor further requests Architect/Engineer and County to inspect the Work and to concur in the Work's substantial completion by their signature and/or to provide in a timely manner to Contractor a listing of work items adjudged by them as remaining to be completed or corrected. Contractor agrees to complete and correct all work items (Punch List) representative of such listing within ___ days from date of receipt from Architect/Engineer.

Contractor

_____	_____	_____
Signature	Print Name	Date

Accepted by Santa Fe County

_____	_____	_____
Signature (Public Works Director or Designee)	Print Name	Date

Inspected/Concurrence Architect/Engineer

_____	_____	_____
Signature	Print Name	Date

PUNCH LIST

A list of items (Punch List) to be completed or corrected, verified by the Architect/Engineer and County, is appended hereto. Failure to include any incomplete items on such list does not alter the responsibility of the Contractor to provide all Work in complete conformance with the Contract Documents.

The Contractor shall complete or correct the work on the punch list appended hereto by _____
(Date)

The punch list consists of _____(indicate number of items) items.

The Work performed under this Contract has been reviewed and found to be substantially complete by the Director of Public Works who has hereby established the Date of Substantial Completion as _____ (date) which is also the date of commencement of all warranties and guarantees required by the Contract Documents. The Date of Substantial Completion of the Work or designated portion thereof is the date established by the Director of Public Works (or designee) when construction is sufficiently complete, in accordance with the Contract Documents, so the County may occupy the Work, or designated portion thereof, for the use for which it is intended.

The County accepts the Work or designated portion thereof as substantially complete and assumes full possession thereof, in accordance with the contract documents.

Punch List Items: (Use additional sheets if necessary)