

PROJECT MANUAL

For

GARBERVILLE DHHS ADA MODIFICATIONS

at

727 CEDAR STREET
GARBERVILLE, CALIFORNIA

COUNTY PROJECT NUMBER: 2020-602



Prepared by:

ALAMEIDA ARCHITECTURE
555 S. MAIN STREET, SUITE 2
SEBASTOPOL, CA 95472
(707) 824-1210
WWW.ALAMEIDA.COM

For:

The County of Humboldt

Issued on:

September 1, 2021

PROJECT SPECIFICATIONS FOR
GARBERVILLE DHHS ADA MODIFICATIONS

TABLE OF CONTENTS

DIVISION 00 PROCURING & CONTRACTING REQUIREMENTS:

00 01 10	TABLE OF CONTENTS
00 11 16	INVITATION TO BIDDERS
00 21 13	INSTRUCTIONS TO BIDDERS
00 22 13	SUPPLEMENTARY INSTRUCTIONS TO BIDDERS
00 41 00	BID FORM
00 43 13	BID SECURITY FORM (BID BOND)
00 43 23	ALTERNATES
00 43 25	PRE-BID SUBSTITUTION REQUEST FORM
00 43 36	SUBCONTRACTOR LIST
00 43 93	BID SUBMITTAL CHECK LIST
00 45 19	NON-COLLUSION AFFIDAVIT
00 45 26	WORKERS' COMPENSATION CERTIFICATION
00 45 46	EVIDENCE OF RESPONSIBILITY/NON-RESPONSIBILITY
00 45 47	PUBLIC CONTRACT CODE 10232 STATEMENT
00 45 48	DEBARMENT AND SUSPENSION CERTIFICATION
00 52 00	AGREEMENT
00 61 13	PERFORMANCE BOND
00 61 14	PAYMENT BOND
00 72 00	GENERAL CONDITIONS
00 73 00	SUPPLEMENTARY GENERAL CONDITIONS

DIVISION 01 GENERAL REQUIREMENTS:

01 11 00	SUMMARY OF WORK
01 26 00	MODIFICATION PROCEDURES
01 30 00	ADMINISTRATIVE REQUIREMENTS
01 33 00	SUBMITTAL PROCEDURES
01 40 00	QUALITY REQUIREMENTS
01 77 00	CONTRACT CLOSEOUT
01-3510	Alteration PROJECT PROCEDURES
01-4000	REGULATORY REQUIREMENTS & REFERENCE STANDARDS
01-4200	QUALITY CONTROL
01-4523	TESTING LABORATORY SERVICES
01-4525	TESTING CONCRETE FLOOR MOISTURE AND PH
01-5000	TEMPORARY FACILITIES AND CONTROL
01-6000	PRODUCT HANDLING
01-6100	PRODUCT SUBSTITUTIONS
01-6110	CAL-GREEN STANDARDS
01-6116	VOLATILE ORGANIC COMPOUND (VOC) RESTRICTIONS
01-7000	CONTRACT CLOSE-OUT
01-7419	CONSTRUCTION WASTE MANAGEMENT

DIVISION 2 - EXISTING CONDITIONS

02-4119	SELECTIVE DEMOLITION
---------	----------------------

DIVISION 3 - CONCRETE

03-1000	FORMWORK
03-2000	CONCRETE REINFORCEMENT
03-3000	CAST-IN-PLACE CONCRETE

DIVISION 5 - METALS

05-5000 METAL FABRICATIONS

DIVISION 6 - WOOD AND PLASTICS

06-1000 ROUGH CARPENTRY
06-1600 FRAMING AND SHEATHING
06-4000 EXTERIOR ARCHITECTURAL WOODWORK
06-4100 INTERIOR ARCHITECTURAL WOODWORK

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

07-2100 BUILDING INSULATION
07-2500 VAPOR RETARDER
07-2633 WATER EMISSIONS BARRIER FOR FLOORS
07-6200 MISC. SHEET METAL
07-9200 JOINT SEALANTS

DIVISION 8 - OPENINGS

08-1113 STANDARD STEEL DOORS AND FRAMES
08-1416 FLUSH WOOD DOORS
08-1418 FLUSH F.R.P. DOORS
08-3113 ACCESS DOORS AND PANELS
08-7100 DOOR HARDWARE
08-9119 FORMED METAL LOUVERS

DIVISION 9 - FINISHES

09-0511 PREPARATION OF CONCRETE FOR FINISH FLOOR
09-2900 GYPSUM WALLBOARD SYSTEM
09-6543 LINOLEUM TILE FLOORING
09-6800 CARPETING
09-7713 WALL COVERING - TACKWALL
09-9000 PAINTING
09-9600 COATING SYSTEM FOR STEEL

DIVISION 10 - SPECIALITIES

10-1400 SIGNAGE
10-2800 TOILET ROOM ACCESSORIES
10-4416 FIRE EXTINGUISHERS, CABINETS, AND ACCESSORIES

DIVISION 11 - EQUIPMENT

NOT USED

DIVISION 12 - FURNISHINGS

NOT USED

DIVISION 13 - SPECIAL CONSTRUCTION

NOT USED

DIVISION 14 - CONVEYING SYSTEMS

NOT USED

DIVISION 22 - PLUMBING

22-0000 GENERAL PLUMBING REQUIREMENTS
22-0100 BASIC PLUMBING MATERIALS, METHODS AND IDENTIFICATION
22-0500 PLUMBING SPECIALTIES
22-0523 VALVES
22-0529 HANGERS, SUPPORTS, MECHANICAL VIBRATION AND SEISMIC
CONTROLS - PLUMBING
22-0700 PIPING AND EQUIPMENT INSULATION
22-1100 POTABLE WATER PIPING
22-2200 DRAINAGE AND VENT PIPING
22-4000 PLUMBING FIXTURES

DIVISION 23 - heating ventilating and cooling

NOT USED

DIVISION 26 - ELECTRICAL

26-0000 ELECTRICAL GENERAL REQUIREMENTS AND BASIC MATERIALS AND
METHODS
26-0800 LIGHTING

DIVISION 27 -communications

NOT USED

DIVISION 28 -electronic safety and security

NOT USED

DIVISION 31 - SITE EARTHWORK

31-0165 CONSTRUCTION SITE BEST MANAGEMENT PRACTICES PLAN
31-1000 CLEARING
31-2000 ROUGH GRADING
31-3000 TRENCHING, BACKFILLING AND COMPACTION
31-5000 EXCAVATION
31-5500 FILL AND BACKFILLING
31-5600 ROCK BASE AT SLABS
31-5700 AGGREGATE BASE COURSE
31-6000 FINISH GRADING

DIVISION 32 - EXTERIOR IMPROVEMENTS

32-1216 HOT-MIXED ASPHALT PAVING
32-1223 SEALER AND PAVEMENT MARKING
32-1600 SITE CONCRETE WORK AND WALKS
32-1726 TACTILE WARNING SURFACES

DIVISION 33 - Utilities

33-4000	SITE DRAINAGE
33-4500	SANITARY SEWER SYSTEM
33-5000	SITE WATER LINES
33-6000	DISINFECTION OF WATER DISTRIBUTION LINES

END OF SECTION 00 01 10

SECTION 00 11 16 – INVITATION TO BIDDERS

NOTICE IS HEREBY GIVEN that sealed bids are invited by the Department of Public Works of Humboldt County, a public body, corporate and politic, for the performance of all the work and the furnishing of all the labor, materials, supplies, tools, and equipment for the following project:

CONSTRUCTION OF
GARBERVILLE DHHS ADA MODIFICATIONS
COUNTY OF HUMBOLDT
PROJECT NUMBER: 2020-602

Pursuant to the Contract Documents on file with the Department of Public Works of Humboldt County.

A pre-bid meeting is scheduled for 2:00 pm Pacific Time, November 2, 2021, at the Garberville Department of Health Services Facility, 727 Cedar Street, Garberville, California.

Each Bid must be contained in a sealed envelope addressed as set forth in said Bid Documents, and filed at the office of the Clerk of the Board of Supervisors of Humboldt County, 825 5th Street, Room 111, Eureka, California at or before 2:00 P.M., Pacific Daylight Time, on November 16, 2021. All Bids will be publicly opened and summary amounts read aloud. The officer whose duty it is to open the Bids will decide when the specified time for the opening of Bids has arrived.

Plans and Specifications and other Contract Document forms will be available for examination at Clerk of the Board, 825 5th Street, Room 111, Eureka, CA, 95501, Phone: (707)445-7266. Plans will also be available for viewing at area plan centers and on the County's website at: <http://humboldt.gov/Bids.aspx>. Complete sets may be obtained through the office of Alameida Architecture, 555 South Main Street Suite 2, Sebastopol CA, Phone: (707) 824-1219. Complete sets may be obtained upon advanced payment of \$100.00 each, 100 % of which shall be refunded upon the return of such sets unmarked and in good condition within ten (10) days after the bids are opened. Checks should be made payable to County of Humboldt.

Each Bid shall be submitted on the forms furnished by the County within the Bid Documents. All forms must be completed.

Each Bid shall be accompanied by one of the following forms of Bidder's Security with a certified check or a cashier's check payable to the County, U.S. Government Bonds, or a Bid Bond executed by an admitted insurer authorized to issue surety bonds in the State of California (in the form set forth in said Contract Documents). The Bidder's security shall be in the amount equal to at least ten percent (10%) of the Bid.

The successful Bidder will be required to furnish and pay for a satisfactory faithful performance bond and a satisfactory payment bond in the forms set forth in said Bid Documents.

The County reserves the right to reject any or all Bids or to waive any informalities in any Bid. No Bid shall be withdrawn for a period of ninety (90) calendar days subsequent to the opening of Bids without the consent of the County.

All Bidders will be required to certify that they are eligible to submit a Bid on this project and that they are not listed either (1) on the Controller General's List of Ineligible Bidders/Contractors, or (2) on the debarred list of the Labor Commissioner of the State of California.

The successful Bidder shall possess a valid Contractor's license in good standing, with a classification of "B" (General Building Contractor) at the time the contract is awarded.

The successful Bidder will be required to comply with all equal employment opportunity laws and regulations both at the time of award and throughout the duration of the Project.

This project is subject to compliance monitoring and enforcement by the Department of Industrial Relations. Pursuant to Section 1771.1(a) of the California Labor Code, a contractor or subcontractor shall not be qualified to bid on, be listed in a bid proposal, subject to the requirements of Section 4104 of the Public Contract Code, or engage in the performance of any contract for public work, as defined in Sections 1770 et seq. of the Labor Code, unless currently registered and qualified to perform public work pursuant to Section 1725.5 of the Labor Code. It is not a violation of Section 1771.1(a) for an unregistered contractor to submit a bid that is authorized by Section 7029.1 of the Business and Professions Code or by Section 10164 or 20103.5 of the Public Contract Code, provided the contractor is registered to perform public work pursuant to Section 1725.5 at the time the contract is awarded.

The Contractor, and each subcontractor participating in the Project, shall be required to pay the prevailing wages as established by the Department of Industrial Relations, Division of Labor Statistics and Research, P.O. Box 420603, San Francisco, CA, Phone: (415) 703-4780.

The attention of Bidders is directed to the fact that the work proposed herein to be done will be financed in whole or in part with State and County funds, and therefore all of the applicable State and County statutes, rulings and regulations will apply to such work.

In the performance of this contract, the Contractor will not discriminate against any employee or applicant for employment in accordance with the provisions of the California Fair Employment and Housing Act. (Government Code section 12900et seq)

In accordance with the provisions of Section 22300 of the Public Contract Code, the Contractor may elect to receive 100% of payments due under the contract from time to time, without retention of any portion of the payment, by entering into an Escrow Agreement for Security Deposits In Lieu of Retention.

DATED:

ATTEST:

By: _____
Kathy Hayes
Clerk of the Board of Supervisors,
County of Humboldt, State of California

SECTION 00 21 13 - INSTRUCTIONS TO BIDDERS

Sealed Bids will be received by the Clerk of the Board of Supervisors of the County of Humboldt, Humboldt County Courthouse, 825 5th Street, Room 111, Eureka, California 95501, until 2:00 p.m. Pacific Time, on November 16, 2021, at which time they will be publicly opened by the Clerk of the Board of the County of Humboldt at a public meeting in the Office of the Clerk of the Board, for performance of the following work:

CONSTRUCTION OF
GARBERVILLE DHHS ADA MODIFICATIONS
COUNTY OF HUMBOLDT
PROJECT NUMBER: 2020-602

A. SECURING DOCUMENTS

Plans and Specifications and other Contract Document forms will be available for examination at Humboldt County Clerk of the Board, 825 5th Street, Room 111 Eureka, CA, 95501, Phone: (707)445-7266. Plans will also be available for viewing at area plan centers and on the County's website at: <http://humboldt.gov/Bids.aspx>. Complete sets may be obtained through the office of Alameida Architecture, 555 South Main Street Suite 2, Sebastopol CA, Phone: (707) 824-1219. Complete sets may be obtained upon advanced payment of \$100.00 each, 100 % of which shall be refunded upon the return of such sets unmarked and in good condition within ten (10) days after the bids are opened. Checks should be made payable to County of Humboldt.

B. BASIC INFORMATION

These instructions pertain to the work (as hereinafter defined) to be performed under Agreement with the County of Humboldt (hereinafter sometimes called "Owner"):

Owner Humboldt County Board of Supervisors
825 Fifth Street
Eureka, CA 95501

Owner's Lead Agency: County Administrative Office
ADA Compliance Team
Travis I Smith, Project Manger
825 Fifth Street, Room 112
Eureka, California 95501
Phone: (707) 445-7266
Fax: (707) 445-7299

Project Location: Garberville Public Health
727 Cedar Street
Garberville, California 95542

Architect: Alameida Architecture
555 South Main Street, Suite 2
Sebastopol, CA 95472
Phone: (707) 824-1219

C. RECEIPT OF BIDS

Each bidder should mark its bid as "Bid for the Construction of GARBERVILLE DHHS ADA MODIFICATIONS" Bids shall be deemed to include the written responses to the bidder to any questions or requests for information of County made as part of bid evaluation process after submission of bid. Telephone and telefax proposals will not be accepted. County will reject all bids received after the specified time and will return such bids to bidders unopened.

D. DETERMINATION OF APPARENT LOW BIDDER

Apparent low bid will be based on the amount of the bids listed of the Bid Form with the following criteria:

- a. The apparent low bid will be based on the Base Bid.

E. REQUIRED BID FORM

All bidders must submit bids on the Section 00 41 00, the "Bid Form." County will reject as non-responsive any bid not submitted on the required form. Bids must be full and complete. Bidders must complete all bid items and supply all information required by the bidding documents and specifications. County reserves the right in its sole discretion to reject any bid as non-responsive as a result of any error or omission in the bid. Bidders may not modify the Bid Form or qualify their bids. Bidders must submit clearly and distinctly written bids. Bidders must clearly make any changes in their bids by crossing out original entries, entering new entries and initialing new entries. County reserves the right to reject any bid not clearly written. The Bid Form shall be signed by the bidder's legal representative as indicated on the Bid Form. If the bid is made by an individual, it shall be signed and his/her full name and his/her address shall be given; if it is made by a partnership, it shall be signed with the co-partnership name by a member of the firm, who shall sign his/her own name and provide the name and address of each member; and if it is by a corporation, the bid shall show the name of the corporation and the state under the laws of which the corporation was chartered. When the bid is signed by the duly authorized officer or officers of the corporation, it shall be attested by the corporate seal, and the names and titles of the principal officers of the corporation shall be given. When a bid is signed by an agent, other than the officer or officers of a corporation authorized to sign contracts on its behalf or a member of a partnership, a "Power of Attorney" must be filed with the County prior to opening bids or shall be submitted with the bid; otherwise, the bid may be rejected as irregular and unauthorized. Bids submitted as joint ventures must so state and be signed by each venturer.

F. CONTENTS OF BID ENVELOPE

The bid envelope shall contain all of the following:

- Section 00 41 00 - Bid Form
- Section 00 43 13 - Bid Security Form (Bid Bond)
- Section 00 43 36 - Subcontractor List
- Section 00 45 19 - Non-collusion Affidavit
- Section 00 45 26 - Workers' Compensation Certification
- Section 00 45 46 - Evidence of Responsibility/Non-responsibility
- Section 00 45 47 - Public Contract Code 10232 Statement
- Section 00 45 48 - Debarment and Suspension Certification

G. BID OPENING

The County will stamp bids with the date and time of receipt. Bids will be opened and read publicly at the time and place indicated in Section 1 above. Bidders or their authorized agents may be present. After opening of bids, the County will review all bids for accuracy and reserves the right to correct obvious errors. Upon completion of review, the bids will be ranked by the bid amount and the apparent low bidder will be determined and notified.

H. FAILURE TO EXECUTE AND DELIVER DOCUMENTS

IF the bidder to whom the Contract is awarded shall fail or neglect, with ten (10) calendar days from the date of the receipt of a notice of award, to execute and deliver all required Contract Documents and file all required bonds, insurance certificates and other documents, County may, in its sole discretion, deposit bidder's surety bond, cashier's check or certified check for collection, and retain the proceeds thereof as liquidated damages for bidder's failure to enter into the Contract Documents. Bidder agrees that

calculating the damages County may suffer as a result of bidder's failure to execute and deliver all required Contract Documents would be extremely difficult and impractical and that the amount of bidder's required bid security shall be the agreed and presumed amount of County's damages.

I. BIDDER'S BOND, PERFORMANCE BOND AND PAYMENT BOND

Bid security must be submitted with the bid. The successful bidder, prior to execution of the Contract, must submit a Performance Bond in the full amount of the Contract. The successful bidder, prior to execution of the Contract, must submit a Payment Bond in the full amount of the Contract.

J. INSURANCE

It is highly recommended that bidders confer with their respective insurance carriers or brokers to determine in advance of bid submission the availability of the insurance certificates and endorsements required. A bidder, who executes the Contract and thereafter fails to comply strictly with the insurance requirements, will be deemed to be in breach of Contract.

K. RESERVATION OF RIGHTS

County specifically reserves the right, in its sole discretion, to reject any or all bids, or re-bid, or to waive minor irregularities from bid requirements. If no bids are received, the County reserves the right to identify interested contractor(s) and negotiate directly without re-bidding.

L. SECURITIES IN LIEU OF RETENTION

Public Contract Code Section 22300 gives the Contractor for option to deposit securities with an escrow agent as a substitute for retention earnings to be withheld by the County.

M. PRE-BID MEETING

The Pre-Bid Meeting is scheduled for 2:00 p.m. Pacific Time, November 2, 2021, at the Garberville Public Health Branch, Garberville, California. The Pre-Bid meeting is not mandatory. See Paragraph "R" below.

N. WITHDRAWAL OF BIDS

Any bidder may withdraw his/her bid, either personally or by written request, any time prior to the scheduled closing time for receipt of bids.

O. QUESTIONS AND CLARIFICATIONS

In order to avoid any misinterpretation or misrepresentation between the Bidder, the Architect and the County as regards the plans and specifications for the Project, neither the County nor Architect will respond to any verbal or telephone inquiries, however Bidders may submit written inquiries for clarifications or questions by email, mail or fax to the attention of County Administrative Office ADA Compliance Team, Attn: Travis I Smith, 825 5th Street, Room 112, Eureka, CA 95501, or email: ADA@co.humboldt.ca.us. Any responses to written Bidder inquiries will be at the full discretion of the County, and any responses will be in writing in the form of an Addendum to these Contract Documents, which will be sent to all Bidders.

P. ADDENDA OR BULLETINS

Any Addenda or Bulletins issued during the time of bidding or forming a part of the Documents loaned to the Bidder, for the preparation of his Bid, shall be covered in the Bid, and shall be made a part of the Contract.

Q. BIDDERS INTERESTED IN MORE THAN ONE BID

No person, firm, or corporation shall be allowed to make or file, or be interested in more than one bid for the same work, unless alternate bids are called for. A person, firm, or corporation, who has submitted a subproposal to a bidder, is not thereby disqualified from submitting a subproposal or quoting prices to the other bidders.

R. VISITING THE SITE & KNOWLEDGE OF PLANS & SPECIFICATIONS

Before submitting a bid for the work, it is recommended that the Bidder inspect the sites and inform himself as to the conditions under which he will be obligated to execute the work. A Pre-Bid meeting and walk-through are scheduled for this project. See Paragraph "C" above.

No allowance will be subsequently made for failure to inspect, and the Bidder will be solely responsible for the consequences of his negligence or lack of diligence. Before submitting any proposal, each Bidder shall examine the General Conditions, Plans, Specifications, as well as these Instructions to Bidders, and the forms appended hereto and made a part hereof.

END OF SECTION 00 21 13

SECTION 00 22 13 - SUPPLEMENTARY INSTRUCTIONS TO BIDDERS

1. PROJECT DESCRIPTION

ADA improvements to the Department of Health and Human Services Facility located in Garberville CA. work includes but not limited to interior lobby and restroom ADA improvements and exterior construction including parking and path of travel improvements.

A. Project Location:
Garberville Public Health
727 Cedar Street
Garberville, California 95542

2. TIME FOR COMPLETION

The Contractor shall complete the entire project within **120** calendar days from the County's issuance of the "Notice to Proceed".

3. LIQUIDATED DAMAGES

As actual damages for any delay in completion are impossible of determination, the Contractor and their sureties shall be liable for and shall pay to the County of Humboldt the sum of \$750 as fixed, agreed and liquidated damages for each calendar day of delay beyond the contract completion date until the work is completed and accepted.

4. SUBSTITUTIONS

A. All pre-bid substitution requests for "equal" products or systems shall be submitted to the Owners Representative 10 days prior to the contract bid opening date. All pre-bid substitution requests shall be submitted on the PRE-BID SUBSTITUTION REQUEST FORM - SECTION 00 43 25, see Section 00 72 00, GC 27, B.

B. Product substitution requests for products that are "equal" to specified products but not produced by an "Acceptable Manufacturer", per each technical specification shall be submitted within 35 days after the contract is awarded. All product substitution requests shall be submitted on the PRODUCT SUBSTITUTION REQUEST FORM; see Section 01 60 00, "Product Requirements."

5. ADDENDA

No addenda shall be issued within 48 hours of the designated Bid opening time. Any addenda resulting in material changes, addition, or deletion shall be issued at least 72 hours before the designated Bid opening time; otherwise the Bid time shall be extended by not less than 72 hours.

6. COMMUNICATIONS

A. All notices, demands, requests, instructions, approvals, proposals, and claims must be in writing.

B. Any notice to or demand upon the Contractor shall be sufficiently given if delivered at the office of the Contractor stated on the signature page of the Contract or at such other office as Contractor may from time to time designate in writing to the County of Humboldt or deposited in the United States mail in a sealed postage-prepaid envelope, or if delivered with charges prepaid to any delivery company for transmission, in each case addressed to such office.

- C. All papers required to be delivered to the County shall, unless otherwise specified in writing to the Contractor, be delivered to the County and any notice to or demand upon the County of Humboldt shall be mailed in a sealed, postage-prepaid envelope, or delivered with charges prepaid to any delivery company for transmission to the County of Humboldt at such address, or to such other representatives of the County of Humboldt or to such other address as the County may subsequently specify in writing to the Contractor for such purpose.
 - D. Any such notice shall be deemed to have been given as of the time of actual delivery; or, in the case of mailing, when the same should have been received in due course of post; or, in case of any delivery company, at the time of actual receipt.
7. MINIMUM RATES OF PAY
- The Contractor, and each subcontractor participating in the Project, shall be required to pay the prevailing wages as established by the Department of Industrial Relations, Division of Labor Statistics and Research, P.O. Box 420603, San Francisco, CA, Phone: (415) 703-4780. A schedule of the minimum rates of pay applicable to this Contract is on file at the principal office of Humboldt County Public Works at 1106 Second Street, Eureka, California, and shall be made available to any interested party on request.
8. JOB OFFICES
- A. The Contractor must designate an area to serve the posting requirements of this contract. A board (4' x 8') must be in plain view in a well-trafficked area on site. On this board will be posted EEO and wage information in compliance with the General Conditions of this contract.
 - B. The Contractor and their subcontractors may maintain such office and storage facilities on the site as may be necessary for the proper conduct of the work. These shall be located so as to cause no interference with any work to be performed on the site. The Owner's Representative shall be consulted with regard to locations.
 - C. Upon completion of the project, or as directed by the County of Humboldt, Owner's Representative, the Contractor shall remove all such temporary structures and facilities from the site, same to become their property, and leave the premises in the condition required by the County.
 - D. The Contractor shall furnish and maintain, during construction of the project, adequate facilities at the site to be designated by the County of Humboldt for the use of the County of Humboldt and the Architect.
9. PERFORMANCE AND PAYMENT BONDS
- The company providing the required performance and payment bonds must be listed in U.S. Treasury Circular No. 570 as a surety approved to issue bonds securing Government contracts in the State of California.
10. NOISE ABATEMENT PROVISIONS
- A. Noise Affecting Sites and Adjacent Neighborhoods:
 - 1. Limit noise and vibration to a reasonable level as related to specific items of equipment used and their hours of use and as indicated herein. This does not preclude use of mechanical equipment, i.e. jack hammers or power driven fasteners.
 - 2. The Owner's Representative and the Owner shall be the sole judges of permissible noise and vibration levels and they have the right to designate times when they may be used. Comply also with requirements of Section 01 11 00 – Summary Of Work.

- B. External Noise:
 - 1. Locate stationary noise sources away from noise sensitive land uses and buildings to the extent possible. Obtain approval from the Owner's Representative before locating stationary noise sources.
 - 2. Use truck haul routes through surrounding communities which minimize impacts on noise sensitive land uses. On the site, use routes as directed and approved by Owner's Representative.
- C. Vibration Control: Provide ten (10) working days notice before conducting construction activities that might cause vibration, such as, but not limited to, drilling, excavation, compaction, pile driving, etc.
- D. Noise Levels: Do not exceed an average continuous sound level of 72 dBA, measured at the perimeter of the work area, and do not exceed an impact noise level of 100 dBA measured at the perimeter of the work area, and only two impact occurrences between 72 dBA and 100 dBA are permitted in a one-hour period.

END OF SECTION 00 22 13

SECTION 00 41 00 - BID FORM

TO
THE COUNTY OF HUMBOLDT
GARBERVILLE DHHS ADA MODIFICATIONS
PROJECT NUMBER: 2020-602

Name of Bidder: _____
(Note: Name must be exactly as it appears on Contractor's License.)

Business Address: _____

Telephone Number: _____

Residence Address: _____

The work to be done shall be constructed in accordance with the Contract Documents, prepared by Alameida Architecture, Dated 9-2-2021, the Agreement annexed hereto and the General Prevailing Wage provisions as specified in the "Invitation To Bidders".

Bids are submitted for the entire work. The amount of "The Bid" for comparison purposes will be the determination of the apparent low bid as specified in Section 00 21 13, "Instructions to Bidders". The Bidder shall set forth for the Base Bid and each Alternate, if any, in clearly legible figures, a written lump sum price and a numeric lump sum price.

In case of a discrepancy between the two notated prices, the written price shall prevail, unless, however, if the amount set forth in writing is ambiguous, unintelligible or uncertain for any cause, or is omitted, then the amount set forth in the numeric column for the item shall prevail.

If this proposal shall be accepted and the undersigned shall fail to enter into the Contract and to give the two required bonds in the sums to be determined as aforesaid, with surety satisfactory to the Department of Public Works, within seven (7) days, not including Sundays and legal Holidays, after the Bidder has received notice from the Department that the contract has been awarded, the County may, at its option, determine that the Bidder has abandoned the Contract, and thereupon this Proposal and the acceptance thereof shall be null and void and the forfeiture of such security accompanying this Proposal shall operate and the same shall be the property of the County of Humboldt.

The undersigned, as Bidder, declares that the only persons or parties interested in this proposal as principals are those named herein; that this proposal is made without collusion with any other person, firm, or corporation; that Bidder has carefully examined the location of the proposed work, the annexed proposed form of contract, and the plans therein referred to; and proposes and agrees if this proposal is accepted, that Bidder will contract with the County of Humboldt, in the form of the copy of the contract annexed hereto, to provide all necessary machinery, tools, apparatus and other means of construction, and to do all the work and furnish all the material specified in the contract, in the manner and time therein prescribed, and according to the requirements of the Architect as therein set forth, and that he will take in full payment therefor the following item prices to wit:

Receipt and compliance with the following Addenda to the Contract Documents is acknowledged:

1. Addendum No. ____ Dated _____
2. Addendum No. ____ Dated _____
3. Addendum No. ____ Dated _____
4. Addendum No. ____ Dated _____
5. Addendum No. ____ Dated _____

I, _____, as an agent for

_____, declare under penalty of perjury under the laws of the State of California, that the information contained in this Bid is true and correct.

Executed at _____, California, on _____, 2021

The project shall be complete within the time limits specified in Section 00 22 13, "Supplementary Instructions To Bidders." The undersigned is aware the Contract includes provisions for liquidated damages as specified in Section 00 21 13, "Supplementary Instructions To Bidders," if the Project is not completed within the agreed time of completion.

THE UNDERSIGNED, as Bidder, proposes the following:

BASE BID:

To furnish and complete the entire work as shown on the drawings and listed in the specifications, including required contract bonds and insurance, without additions or subtractions on account of specified alternates, for the sum of:

Base Bid (Lump Sum):	
_____	\$ _____
Total Amount in Words	Total

BID ALTERNATES

None

UNIT PRICES

For changing quantities of work items from those indicated on the contract drawings and specifications, upon written instructions from the Architect, the following prices shall prevail:

The above unit prices shall include all labor, materials, bailing, shoring, removal, overhead, profit, insurance etc., to cover the finished work of the several kinds called for. Changes shall be processed in accordance with the General Conditions.

Proposal Signature Page

Accompanying this proposal is _____
(Insert the words "Cash (\$)", "Cashier's Check", "Certified Check", or "Bidder's Bond", as the case may be) in the amount of at least ten percent (10%) of the total Bid Price submitted. The names of all persons interested in the foregoing proposal as Principals are as follows:

(NOTE: If a Bidder or other interested person is a Corporation, state the legal name of the corporation, also names of the president, secretary, treasurer, and manager thereof; if a Co-partnership, state the true name of the firm, also state the names of all individual co-partners composing the firm; if the Bidder or other interested person is an Individual, state the first and last names in full.)

Licensed in accordance with an Act providing for the registration of Contractors:

License No.: _____ Expiration Date: _____

By my signature on this proposal I certify, under penalty of perjury under the laws of the State of California, that the foregoing questionnaire and statements of Public Contract Code Section 10162, and 10232, are true and correct and that the bidder has complied with the requirements of Section 8102 of the Fair Employment and Housing Commission Regulations (Chapter 5, Title 2 of the California Administrative Code). By my signature on this proposal I further certify, under penalty of perjury under the laws of the State of California and the United States of America, that the Noncollusion Affidavit required by Title 23 United States Code, Section 112 and Public Contract Code Section 7106; and the Title 49 Code of Federal Regulation, Part 29 Debarment and Suspension Certification are true and correct.

Signature of Bidder _____ Date

If a Bidder is a Corporation or a Co-partnership:

Name of Corporation or Firm Name of Co-partnership

Signatures of officer(s) or partners authorized to sign contracts on behalf of the Corporation or Co-partnership, Corporations require signature by 2 (two) corporate officers:

_____	_____
Name	Title
_____	_____
Name	Title

If Signature is by an agent, other than an officer of a corporation or a member of a partnership, a Power of Attorney must be on file with the Department prior to opening Bids or may be submitted with the Bid; otherwise the Bid will be disregarded as irregular and unauthorized.

Bidder's Business Address: _____

Place of Residence: _____

Date: _____

END OF SECTION 00 41 00

SECTION 00 43 13 - BID SECURITY FORM

KNOW ALL MEN BY THESE PRESENTS:

That _____, as Principal, and _____, a corporation, organized and existing under and by virtue of the laws of the State of _____ and authorized to do surety business in the State of California, as Surety, are held and firmly bound unto the _____, State of California, as Oblige, in the sum of _____, Dollars (\$ _____), for the payment of which sum well and truly to be made, we, and each of us, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH that whereas the Principal has submitted a bid to the County of Humboldt, State of California, for all work specifically described in the accompanying bid;

NOW, THEREFORE, if the aforesaid Principal is awarded the contract, and within the time and manner required under the specifications, after the prescribed forms are presented to Principal for signature, enters into a written contract in the prescribed form, in accordance with the bid, and files the two bonds, one guaranteeing faithful performance and the other guaranteeing payment for labor and materials as required by law, or if the said Principal shall fully reimburse and save harmless the Oblige from any damage sustained by the Oblige through failure of the Principal to enter into the written contract and to file the required performance and labor and material bonds, then this obligation shall be null and void; otherwise, it shall be and remain in full force and effect.

In the event suit is brought upon this bond by the Oblige and judgment is recovered, the Surety shall pay all costs incurred by the Oblige in such suit, including a reasonable attorney's fee to be fixed by the Court.

IN WITNESS WHEREOF, we have hereunto set our hands and seals this _____ day of _____, 20____.

By: _____

Principal (Seal)

By: _____

Surety (Seal)

- NOTE: (1) Signature of those executing for the surety must be properly acknowledged.
(2) This bond must be in an amount equal to as least ten (10%) percent of the amount bid.
(3) Bidders must use this form unless the surety company form is substantially the same.

END OF SECTION 00 43 13

SECTION 00 43 23 - ALTERNATES

PART 1 - GENERAL

1.1 SUMMARY

- A. Related Documents:
 - 1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
- B. Section Includes:
 - 1. Administrative and procedural requirements for alternates.

1.2 DEFINITIONS

- A. Alternate: An alternate is an amount proposed by bidders and stated on the Bid Form that will be added to or deducted from Base Bid amount if the Owner decides to accept a corresponding change in either scope of work or in products, materials, equipment, systems or installation methods described in Contract Documents.

1.3 PROCEDURES

- A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
 - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.
- C. Execute accepted alternates under the same conditions as other work of the Contract.
- D. Schedule: A listing of Bid Alternates is included on the Bid Form. Specification sections referenced in the Schedule contain requirements for materials necessary to achieve the Work described under each alternate.
 - 1. Include as part of each alternate, miscellaneous devices, appurtenances and similar items incidental to or required for a complete installation whether or not mentioned as part of the alternate.
 - 2. State on the Bid Form amounts that will be ADDED to or DEDUCTED from the Base Bid amount for the work described in the listing of Bid Alternates included on the Bid Form

END OF SECTION 00 43 23

SECTION 00 43 25 - PRE-BID SUBSTITUTION REQUEST FORM

PROJECT: GARBERVILLE DHHS ADA MODIFICATIONS
Project Number: 2020-602

DATE: _____

Note to Contractor: All substitution requests for "equal" products or systems shall be submitted to the Owner's Representative, (10) ten days prior to the contract bid date. See specification section 00 22 13 - SUPPLEMENTARY INSTRUCTIONS TO BIDDERS, sub-section 4.

We hereby submit for your consideration the following product in lieu of the specified item for the above project.

SECTION: _____ Paragraph: _____

Specified Item: _____

Proposed Substitution: _____

1. Attach completed technical data, including laboratory tests, color and material samples, if applicable
2. Include complete information on changes to Drawings and/or Specifications which proposed substitution will require for its proper installation. (Plan layout changes, electrical hookup locations)
3. Does the substitution affect dimensions shown on Drawings? Yes No
4. Will the undersigned pay for changes to the building design, including detailing costs caused by the requested substitution? Yes No
5. What effect does substitution have on other trades?
6. Differences between proposed substitution and specified item?
7. Cost of proposed substitution in comparison with product, system, or method specified?
8. Availability of maintenance and repair services, and sources of repair or replacement items?
9. Manufacturer's guarantees of the proposed and specified items are:
 Same Different (Explain on attachment)

The undersigned states that the function, appearance and quality are equivalent or superior to the specified item.

Submitted By: _____

Signature: _____

Firm: _____

Address: _____

Telephone: _____

FOR USE BY ARCHITECT:

Accepted Accepted as Noted

Not Accepted Received Too Late

By: Date:

Remarks: _____

END OF SECTION 00 43 25

SECTION 00 43 93 - BID SUBMITTAL CHECKLIST

The following documents shall be submitted by each Bidder, as part of their complete Bid:

1. Section 00 41 00 - Bid Form
2. Section 00 43 13 - Bid Security Form (Bid Bond)
3. Section 00 43 36 - Subcontractor List
4. Section 00 45 19 - Non-collusion Affidavit
5. Section 00 45 26 - Workers' Compensation Certification
6. Section 00 45 46 – Evidence of Responsibility/Non-responsibility
7. Section 00 45 47 - Public Contract Code 10232 Statement
8. Section 00 45 48 - Debarment and Suspension Certification

END OF SECTION 00 43 93

SECTION 00 45 19 - NONCOLLUSION AFFIDAVIT

TO THE COUNTY OF HUMBOLDT, DEPARTMENT OF PUBLIC WORKS

Non-Collusion Affidavit

(Title 23 United States Code Section 112 and Public Contract Code Section 7106)

In accordance with Title 23 United States Code Section 112 and Public Contract Code 7106 the Bidder declares that the Bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the Bid is genuine and not collusive or sham; that the Bidder has not directly or indirectly induced or solicited any other Bidder to put in a false or sham bid, and they have not directly or indirectly colluded, conspired, connived, or agreed with any Bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding; that the Bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the Bidder or any other Bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other Bidder, or to secure any advantage against the public body awarding the contract of anyone interested in the proposed contract; that all statements contained in the bid are true; and further, that the Bidder has not directly or indirectly, submitted their bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any corporation, partnership, company association, organization, bid depository, or to any member of agent thereof to effectuate a collusive or sham bid.

Signature of Bidder

Date

Bidders are cautioned that making a false certification may subject the certifier to criminal prosecution.

END OF SECTION 00 45 19

SECTION 00 45 26 – WORKERS' COMPENSATION CERTIFICATE

Labor Code Section 3700.

"Every employer except the State shall secure the payment of compensation in one or more of the foregoing ways:

- (a) By being insured against liability to pay compensation in one or more insurers duly authorized to write compensation insurance in this state.
- (b) By securing from the Director of Industrial Relations a certificate of consent to self-insure either as an individual employer, or as one employer in a group of employers, which may be given upon furnishing proof satisfactory to the Director of Industrial Relations of ability to self-insure and to pay any compensation that may become due to their employees."

I am aware of the provisions of Section 3700 of the Labor Code which requires every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and that I will comply with such provisions before commencing the performance of the work of this contract.

Signature of Contractor

Date

In accordance with Article 5 [commencing at Section 1860], Chapter 1, Part 7, Division 2, of the Labor Code, the above certificate must be signed and filed with the awarding body prior to commencing any work under this contract.

END OF SECTION 00 45 26

SECTION 00 45 46 – RESPONSIBILITY / NONRESPONSIBILITY

1. DETERMINATION OF BIDDER RESPONSIBILITY

- A. A responsible bidder is a bidder who has demonstrated the attribute of trustworthiness, as well as quality, fitness, capacity and experience to satisfactorily perform the contract. It is the County's policy to conduct business only with responsible contractors. (Ord. 2291, § 1, 01/07/2003)
- B. Bidders are hereby notified that the County may determine whether the bidder is responsible based on a review of the bidder's performance on any contracts, including but not limited to County contracts. Particular attention will be given to violations of labor laws related to employee compensation and benefits, and evidence of false claims made by the bidder against public entities. This will include subcontractors and their employees as well.(Ord. 2291, § 1, 01/07/2003)
- C. The County may declare a bidder to be non-responsible for the purpose of this contract, if the Board of Supervisors, in its discretion, finds that the bidder has done any of the following: (1) committed any act or omission which negatively reflects on the bidder's quality, fitness or capacity to perform this contract with the County or a contract with any other public entity, or engaged in a pattern or practice which negatively reflects on same; (2) committed an act or omission which indicates a lack of business integrity or business honesty; or (3) made or submitted a false claim against the County or any other public entity. (Ord. 2291, § 1, 01/07/2003)
- D. If there is evidence that the apparent low bidder may not be responsible, the department shall notify the bidder in writing of the evidence relating to the bidder's responsibility, and its intention to recommend to the Board of Supervisors that the bidder be found not responsible. The department shall provide the bidder and/or the bidder's representative with an opportunity to present evidence as to why the bidder should be found to be responsible and to rebut evidence which is the basis for the department's recommendation. If the bidder fails to avail itself of the opportunity to rebut the department's evidence, the bidder may be deemed to have waived all rights of appeal. (Ord. 2291, § 1, 01/07/2003)
- E. If the bidder presents evidence in rebuttal to the department, the department shall evaluate the merits of such evidence, and based on that evaluation, make a recommendation to the Board of Supervisors. The final decision concerning the responsibility of the bidder shall reside with the Board of Supervisors. (Ord. 2291, § 1, 01/07/2003)
- F. These terms shall also apply to proposed [subcontracts/ subconsultants] of bidders on County contracts. (Ord. 2291, § 1, 01/07/2003)

2. DETERMINATION OF BIDDER DEBARMENT

- A. The bidder is hereby notified that the County may debar the bidder from bidding on other County contracts for a specified period of time, not to exceed three (3) years, and the County may terminate any or all of the bidder's existing contracts with the County, if the Board of Supervisors finds, in its discretion, that the bidder has done any of the following: (1) violated any term of a contract with the County; (2) committed any act or omission which negatively reflects on the bidder's quality, fitness, or capacity to perform a contract with the County or any other public entity, or engaged in a pattern or practice which negatively reflects on same; (3) committed an act or offense which indicates a lack of business integrity or business honesty; or (4) made or submitted a false claim against the County or any other public entity. (Ord. 2291, § 1, 01/07/2003)
- B. If there is evidence that the apparent low bidder may be subject to debarment, the department shall notify the bidder in writing of the evidence which is the basis for the proposed debarment, and shall advise the bidder of the scheduled date for a debarment hearing before the Contractor Hearing Board (CHB). (Ord. 2291, § 1, 01/07/2003)
- C. The CHB shall conduct a hearing where evidence on the proposed debarment is presented. The bidder and/or the bidder's representative shall be given an opportunity to submit evidence at that hearing. After the hearing, the CHB shall prepare a proposed decision, which shall contain a recommendation regarding whether the bidder should be debarred, and, if so, the appropriate length of time of the debarment. If the bidder fails to avail itself of the opportunity to submit evidence to the CHB, the bidder may be deemed to have waived all rights of appeal. (Ord. 2291, § 1, 01/07/2003)

- D. A record of the hearing, the proposed decision and any other recommendation of the CHB shall be presented to the Board of Supervisors, by the department head. The Board of Supervisors shall have the right to modify, deny or adopt the proposed decision and recommendation of the hearing board.(Ord. 2291, § 1, 01/07/2003)
- E. These terms shall also apply to proposed [subcontractors/ subconsultants] of bidder's on County contracts.(Ord. 2291, § 1, 01/07/2003)

EVIDENCE OF RESPONSIBILITY / NONRESPONSIBILITY

(Humboldt County Code Sections 2141 et seq.)

The bidder shall, under penalty of perjury, answer each of the questions below and provide supporting documentation. The term "bidder" shall include any person associated with the bidder in the capacity of owner, partner, director, officer or manager.

1. Is the bidder under suspension, debarment, or determination of ineligibility by any federal, state or local agency? No Yes (explain)

2. Has the bidder been suspended, debarred, or determined ineligible by any federal, state or local agency within the preceding 5 years: No Yes (explain)

3. Is there pending against the bidder any proposed debarment or suspension proceeding? No Yes (explain)

4. Has the bidder been indicted, charged with, or convicted, or assessed civil or administrative penalties, or had a civil judgment rendered against it, in any matter involving:

- (a) fraud, false claims, or dishonesty;
- (b) any serious or wilful violation of the California Occupational Safety and Health Act of 1973 (Labor Code Sections 6300 et seq) or the Federal Occupational Safety and Health Act of 1970;
- (c) violation of the state workers' compensation laws;
- (d) violation of the Contractor's State License Law (Bus & Prof Code Sections 7000 et seq.)
- (e) violation of prevailing wage laws;
- (f) violation of state or federal environmental laws;
- (g) violation of local laws related to permits, land use, or waste disposal?

No Yes (explain)

5. Has the bidder defaulted on a construction contract within the preceding 10 years?

No Yes (explain)

6. Provide information concerning any bankruptcy or receivership of bidder, and information regarding all legal claims, disputes, or lawsuits (including administrative matters) arising from any construction project performed within the preceding 5 years, including information regarding any work completed by a surety.

NOTE: This information will not necessarily result in denial of award, but will be considered in determining bidder responsibility. Bidders are cautioned that making a false certification may subject the bidder to criminal prosecution.

END OF SECTION 00 45 46

SECTION 00 45 47 - PUBLIC CONTRACT CODE SECTION 10232 STATEMENT

In accordance with Public Contract Code Section 10232, the Contractor, hereby states under penalty of perjury, that no more than one final unappealable finding of contempt of court by a Federal court has been issued against the Contractor within the immediately preceding two year period because of the Contractor's failure to comply with an order of a Federal court which orders the Contractor to comply with an order of the National Labor Relations Board.

Signature of Bidder

Date

Bidders are cautioned that making a false certification may subject the certifier to criminal prosecution.

END OF SECTION 00 45 47

SECTION 00 45 48 - DEBARMENT AND SUSPENSION CERTIFICATION

TITLE 49, CODE OF FEDERAL REGULATIONS, PART 29

The CONTRACTOR, under penalty of perjury, certifies that, except as noted below, he/she or any other person associated therewith in the capacity of owner, partner, director, officer, manager:

1. is not currently under suspension, debarment, voluntary exclusion, or determination of ineligibility by any Federal, State or local agency;
2. has not been suspended, debarred, voluntarily excluded or determined ineligible by any Federal, State or local agency within the past 3 years;
3. does not have a proposed debarment pending; and
4. has not been indicted, convicted, or had a civil judgment rendered against it by a court of competent jurisdiction in any matter involving fraud or official misconduct within the past 3 years.

If there are any exceptions to this certification, insert the exceptions in the following space.

Exceptions will not necessarily result in denial of award, but will be considered in determining bidder responsibility. For any exception noted above, indicate below to whom it applies, initiating agency, and dates of action.

Notes: Providing false information may result in criminal prosecution or administrative sanctions. The above certification is part of the Proposal. Signing this Proposal on the signature portion thereof shall also constitute signature of this Certification.

Signature of Contractor

Date: _____

END OF SECTION 00 45 48

SECTION 00 52 00 – AGREEMENT

This is an AGREEMENT made and entered into this _____ day of _____, 2021 by and between the County of Humboldt, a political subdivision of the State of California (hereinafter referred to as COUNTY) and _____, a corporation organized and existing under the laws of the State of _____, a partnership consisting of _____;
an individual doing business as _____ in the State of California, (hereinafter referred to as "CONTRACTOR").

County and Contractor for the consideration hereinafter named agree as follows:

SECTION 1 - SCOPE OF WORK

Contractor shall furnish all labor, tools and materials and perform all the work for the construction of:

**HUMBOLDT COUNTY
GARBERVILLE DHHS ADA MODIFICATIONS
PROJECT NUMBER: 2020-602**

in accordance with the Contract Documents referred to in Section 3 of this Agreement.

The scope of work includes the work included in the "Base Bid" for the project and the following bid alternatives: _____

SECTION 2 - CONTRACT PRICE

County shall pay, and Contractor shall accept Contractor's Price, as follows:

_____ Dollars and _____ /100 (\$ _____)

as full compensation for furnishing all materials and for doing all the work contemplated and embraced in this Agreement; also for all loss or damage, arising out of the work aforesaid, or from the actions of the elements, or from any unforeseen difficulties or obstructions which may arise or be encountered in the prosecution of the work until its acceptance by County, and for all risks of every description connected with the work; also for all expenses incurred by or in consequence of the suspension or discontinuance of the work and for well and faithfully completing the work, and the whole thereof, in the manner and according to the Plans and Specifications, and the requirements of the Owner.

SECTION 3 - CONTRACT DOCUMENTS

The complete contract between the parties hereto shall consist of the following, hereinafter referred to as the CONTRACT DOCUMENTS:

- Notice to Contractors
- Bid Form
- Bid Security Form
- This Agreement
- Payment Bond
- Performance Bond
- Insurance Certificates
- Public contract code Statement
- Special Conditions
- General Conditions
- Supplementary General Conditions
- General Requirements
- Technical Specifications
- Plans and Drawings
- Subcontractor List
- Non collusion Affidavit
- Evidence of Responsibility/Nonresponsibility
- Debarment suspension certification

And, as published by the California Department of Industrial Relations:

- General Prevailing Wage Rates

And any addenda to any of the above documents, all of which are on file in the office of the Director of Public Works of the County of Humboldt. Each of said CONTRACT DOCUMENTS is incorporated and made a part of this Agreement by the reference contained in this Section.

All rights and obligations of the County and the Contractor are fully set forth and described in the Contract Documents. All of the above named documents are intended to be complementary, so that any work called for in one, and mentioned in the other is to be performed and executed the same as if mentioned in all said documents.

SECTION 4 - BEGINNING OF WORK

Following receipt and full execution and approval of the Contract Documents, and posting of the requisite Bonds as called for therein, the COUNTY will issue a "Notice to Proceed". Under no circumstances shall the CONTRACTOR enter upon the site of work until receipt of the "Notice to Proceed", unless so authorized in writing by the COUNTY.

SECTION 5 - TIME OF COMPLETION

The work called for in this Agreement shall be commenced within ten (10) calendar days of the date of receipt by Contractor of the Notice to Proceed and shall be fully completed within 120 calendar days following receipt of the Notice to Proceed by the Contractor.

SECTION 6 - PREVAILING WAGE

Pursuant to Section 1770 of the Labor Code, the County has determined the Prevailing Wage Rate to be as listed by the Department of Industrial Relations, Division of Labor Statistics and Research, P.O. Box 420603, San Francisco, CA, 94101, Phone: (415) 703-4780. Complete Certified Payrolls must be submitted to the OWNER together with each application for progress payment. Electronic submittal directly to DIR shall be required.

SECTION 7 - WORKERS' COMPENSATION

By my signature hereunder, as CONTRACTOR, I certify that I am aware of the provisions of Section 3700 of the Labor Code which requires every employer to be insured against liability for Workers'

Compensation or to undertake self insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the work of this contract.

SECTION 8 - NOTICES

All notices shall be in writing and delivered in person or transmitted by mail. Notices required to be given to the COUNTY shall be addressed as follows:

County Administrative Office
ADA Compliance Team
Attn: Travis I Smith, CAO Project Manager
825 Fifth Street, Room 112
Eureka, California, 95501

Notices required to be given to CONTRACTOR shall be addressed as follows:

<NAME & ADDRESS OF CONTRACTOR>

SECTION 9 - NUCLEAR FREE HUMBOLDT COUNTY ORDINANCE COMPLIANCE

Neither the Contractor, his Subcontractors or their suppliers are Nuclear Weapons Contractors, and are not knowingly or intentionally engaged in the research, development, production, or testing of nuclear warheads, nuclear weapons systems, or nuclear weapons components, as defined by the Nuclear Free Humboldt County Ordinance. Contractor, his Subcontractors and/or their suppliers agree to notify Owner immediately if they become a nuclear weapons contractor as defined above.

//

//

//

//

//

//

//

//

//

//

IN WITNESS WHEREOF, The parties hereto have entered into this Agreement as of the date first above set forth.

COUNTY OF HUMBOLDT

By: _____
Purchasing Agent, County of Humboldt

CONTRACTOR: Corporations require signature by 2 (two) corporate officers

By: _____

Title: _____

By: _____

Title: _____

INSURANCE CERTIFICATES REVIEWED AND APPROVED:

By: _____
Risk Manager

END OF SECTION

SECTION 00 61 13 - PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS:

That _____
(Name of Contractor)

(Address of Contractor)

a _____, hereinafter called Principal, and:
(Corporation, Partnership or Individual)

(Name of Surety)

(Address of Surety)

hereinafter called Surety, are held and firmly bound unto

HUMBOLDT COUNTY
825 5th Street
Eureka, California 95501

hereinafter called OWNER, in the penal sum of

_____ Dollars (\$ _____)

in lawful money of the United States, for the payment of which sum well and truly to be made, we bond ourselves, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain contract with the OWNER, dated the _____ day of _____, 20__, a copy of which is hereto attached and made a part hereof for the construction of:

NOW, THEREFORE, if the Principal shall well, truly and faithfully perform its duties, all of the undertakings, covenants, terms, conditions, and agreements of said contract during the original term thereof, and any extensions thereof which may be granted by the OWNER, with or without notice to the Surety and during the one year guaranty period, and if Principal shall satisfy all claims and demands incurred under such contract, and shall fully indemnify and save harmless the OWNER from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the OWNER all outlay and expense which the OWNER may incur in making good any default, then this obligation shall be void; otherwise to remain in full force and effect.

Signed and sealed this _____ day of _____, 20____.

By: _____
Principal

By: _____
Surety

SURETY

(Power of Attorney for person signing for Surety Company, or a certified copy thereof, must be attached. Signatures of person or persons executing for the Surety must be acknowledged.)

END OF SECTION 00 61 13

SECTION 00 61 14 - PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS, THAT WHEREAS, the County of Humboldt, by its order made _____, 20____, has awarded to _____, hereinafter designated as the "Principal," a contract for the work described as follows:

NOW, THEREFORE, we the Principal and _____, Surety, are held and firmly bound unto the County of Humboldt in the penal sum of _____ Dollars (\$ _____), lawful money of the United States of America for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH that is said Principal, his/her or its heirs, executors, administrators, successors or assigns, shall fail to pay any of the persons named in Section 9100 of the Civil Code, or amounts due under the Unemployment Insurance Code with respect to work or labor performed by any such claimant, or for any amounts required to be deducted, withheld, and paid over to the Franchise Tax Board from the wages of employees of the Contractor and their subcontractors pursuant to Section 18806 of the Revenue and Taxation Code with respect to such work and labor as required by Sections 9550 et seq. of the Civil Code of California, then said Surety will pay for the same, in or to an amount not exceeding the amount hereinafter set forth, and also will pay in case suit is brought upon this bond, such reasonable attorney's fees, as shall be fixed by the court, awarded and taxed as in the above-mentioned statutes provided.

AND, the said Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to the work to be performed thereunder or the specifications accompanying the same shall in any wise affect its obligations on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract, or to the work, or to the specifications.

IN WITNESS WHEREOF, this instrument has been duly executed by the Principal and Surety above named, on the _____ day of _____, 20 ____.

PRINCIPAL

SURETY

BY: _____

BY _____
ATTORNEY-IN-FACT

END OF SECTION 00 61 14

SECTION 00 72 00 - GENERAL CONDITIONS

INDEX TO GENERAL CONDITIONS

GC	1.	DEFINITIONS	3
GC	2.	CONTRACT	3
GC	3.	BONDS	4
GC	4.	INSURANCE REQUIREMENTS	4
GC	5.	TERMINATION OF CONTRACT	5
GC	6.	NON-CONTINUANCE OF WORK	6
GC	7.	ASSIGNMENT OF CONTRACT	6
GC	8.	SEPARATE CONTRACTS	6
GC	9.	CONFERENCES	6
GC	10.	TERMS OF PAYMENT	6
GC	11.	CONFLICTS OR ERRORS	7
GC	12.	CHANGES TO PLAN AND SPECIFICATIONS	7
GC	13.	GUARANTEE	8
GC	14.	INTERPRETATIONS	8
GC	15.	DECISIONS BY ARCHITECT AND / OR OWNER'S REPRESENTATIVE	9
GC	16.	ADMINISTRATION OF THE CONTRACT	9
GC	17.	NON-CONFORMING WORK	10
GC	18.	OWNERSHIP OF DOCUMENTS	11
GC	19.	DOCUMENTS FURNISHED	11
GC	20.	DRAWING DIMENSIONS	11
GC	21.	DETAILED DRAWINGS	11
GC	22.	SUBMITTALS	11
GC	23.	SURVEY AND LAYOUT	12
GC	24.	UNITY OF DOCUMENTS	13
GC	25.	INSPECTION BY CONTRACTOR	13
GC	26.	DEVIATION FROM PLANS OR SPECIFICATIONS	14
GC	27.	STANDARDS OF MATERIALS	14
GC	28.	QUALITY OF MATERIALS AND LABOR	14
GC	29.	SUFFICIENT LABOR OR MATERIALS	14
GC	30.	OLD MATERIAL	14
GC	31.	TESTS	15
GC	32.	PATENT RIGHTS, COPYRIGHTS, TRADE NAMES AND ROYALTIES	15
GC	33.	COMPLIANCE WITH BUILDING LAWS	15
GC	34.	PERMITS AND LICENSES	15
GC	35.	TEMPORARY FACILITIES	16
GC	36.	LIABILITY FOR ACCIDENTS	16

GC	37.	ACCIDENT PREVENTION	17
GC	38.	EXISTING PREMISES AND IMPROVEMENTS	17
GC	39.	USE OF PREMISES AND CLEAN-UP	18
GC	40.	DIRECTION OF THE WORK	18
GC	41.	CUTTING, FITTING AND PATCHING	21
GC	42.	RIGHT TO OCCUPY OR USE	21
GC	43.	CHANGE OF CONTRACT TIME LIMIT & LIQUIDATED DAMAGES	22
GC	44.	HOURS OF WORK	23
GC	45.	PREVAILING WAGE RATES & PAYROLL RECORDS	24
GC	46.	TAXES	25
GC	47.	SUBCONTRACTORS	25
GC	48.	RECORDS, ACCOUNTS AND SEGREGATED PRICES	26
GC	49.	LIABILITY FOR TREES	27
GC	50.	LIABILITY FOR SURVEY MARKS	27
GC	51.	CLAIMS PROCEDURES	27
GC	52.	ATTORNEY'S FEES	28

GC 1. DEFINITIONS

- A. COUNTY: The term "County, or pronouns in place of same where used herein, shall mean Humboldt County acting through its Board of Supervisors.
- B. BOARD: The term "Board", or pronouns in place of same where used herein, shall mean the Humboldt County Board of Supervisors.
- C. OWNER: The "Owner" is the person or entity identified as such in the Owner-Contractor Agreement; the term Owner means the Owner or their authorized representative.
- D. ARCHITECT: The term "Architect" shall mean the licensed professional architect employed by the Humboldt County Department of Public Works as the authorized representative of the Owner.
- E. CONTRACTOR: The term "Contractor", where used herein, shall mean the Contractor to whom the contract for the work described and specified herein has been awarded by the Board.
- F. PLANS AND SPECIFICATIONS: The term "Plans and Specifications", where used herein, shall mean and include all specifications and provisions of every kind, whether general, detailed or otherwise, relating to the equipment, material of work, and the installation thereof, and the plans and drawings accompanying same which are made a part thereof. Such Plans and Specifications are recognized as instruments of professional service.
- G. OWNER'S REPRESENTATIVE: The term "Owner's Representative" shall mean agent assigned to the Project by Humboldt County Department of Public Works.
- H. PROJECT INSPECTOR: The term "Project Inspector" shall mean agent assigned to the Project by Humboldt County Department of Public Works.

GC 2. CONTRACT

- A. The Contract Documents include all documents identified as such in the Agreement (Section 00 52 13), any amendments and Change Orders thereto
- B. In the execution of the work or any portion thereof, Contractor shall operate as an independent contractor and not as the agent of Owner or Architect.
- C. No verbal agreement or conversation with any officer, agent, or employee of Owner or Architect, either before or after execution of the Agreement, shall affect or modify any terms or obligations of the Contract unless duly incorporated into the Contract by written Change Order or amendment of the Contract.
- D. The Contract Documents shall not be construed to create any contractual relationship of any kind between the Architect and the Contractor, but the Architect shall be entitled to performance of obligations intended for their benefit, and to enforcement thereof. Nothing contained in the Contract Documents shall create any contractual relationship between the Owner or the Architect and any subcontractor or sub-subcontractor.

GC 3. BONDS

- A. The successful bidder, simultaneously with the execution of the Agreement, will be required to furnish a Payment Bond in an amount equal to one hundred (100%) percent of the contract price, and a faithful Performance Bond in an amount equal to one hundred (100%) percent of the contract price. The Contractor must submit a certificate from the Humboldt County Clerk's Office with all payment bonds. The Clerk's certificate must indicate that the surety is admitted to transact business in the State of California, and certify that the surety's certificate of authority, issued by the Insurance Commissioner, has not been suspended, revoked, canceled, or annulled.
- B. The bonds shall comply with Section 9554 of the Civil Code of the State of California. The payment Bond and the faithful Performance Bond shall each be in a form that is satisfactory to the County Counsel, or Risk Management of the County of Humboldt. A copy of an acceptable format is attached to the Agreement forms of these specifications.

GC 4. INSURANCE REQUIREMENTS

- A. THIS CONTRACT/AGREEMENT SHALL NOT BE EXECUTED BY COUNTY and the CONTRACTOR is not entitled to any rights, unless certificates of insurance, or other sufficient proof that the following provisions have been complied with, and such certificate(s) are filed with the Clerk of the Humboldt County Board of Supervisors.
- B. Without limiting Contractor's indemnification provided herein, Contractor shall and shall require any of its subcontractors to take out and maintain, throughout the period of this Agreement, the following policies of insurance placed with insurers with a current A.M. Bests rating of no less than A:VII or its equivalent against injury/death to persons or damage to property which may arise from or in connection with the activities hereunder of Contractor, its agents, employees or subcontractors:
- C. Comprehensive or Commercial General Liability Insurance at least as broad as Insurance Services Office Commercial General Liability coverage (occurrence from CG 0001), in an amount of \$2,000,000 per occurrence. If work involves explosive, underground or collapse risks, XCU must be included. If a general aggregate limit is used, either the general aggregate limit shall apply separately to this project or the general aggregate shall be \$5,000,000. Said policy shall contain, or be endorsed with, the following provisions:
1. The County, its officers, employees and agents, are covered as additional insured for liability arising out of the operations performed by or on behalf of Contractor. The coverage shall contain no special limitations on the scope of protection afforded to the County, its officers, agents, and employees.
 2. The policy shall not be canceled or materially reduced in coverage without thirty (30) days prior written notice (10 days for non-payment of the premium) to County by certified mail.
 3. The inclusion of more than one insured shall not operate to impair the rights of one insured against another insured, and the coverage afforded shall apply as though separate policies had been issued to each insured, but the inclusion of more than one insured shall not operate to increase the limits of the insurer's liability.
 4. For claims related to this project, the Contractor's insurance is primary coverage to the County, and any insurance or self-insurance programs maintained by the County are excess to Contractor's insurance and will not be called upon to contribute with it.
 5. Any failure to comply with reporting or other provisions of the parties, including breach of warranties, shall not affect coverage provided to County, its officers, employees, and agents.
- D. Automobile liability insurance with coverage at least as broad as Insurance Services Office form CA 0001 06092, Code 1 (any auto), for vehicles used in the performance of this Agreement with minimum coverage of not less than \$1,000,000 per accident combined single limit (CSL). Such policy shall contain or be endorsed with the provision that coverage shall not be canceled or materially reduced in coverage without thirty (30) days prior written notice (10 days for non-payment of premium) to County by certified mail.

- E. Workers' Compensation insurance meeting statutory limits of the California Labor Code which policy shall contain or be endorsed to contain a waiver of subrogation against County, its officers, agents, and employees and provide for thirty (30) days prior written notice in the event of cancellation.
- F. If applicable, Builder's Risk or Course of Construction, written on an "All-Risk" form, for 100% of the completed value of the insurable part of the project. The Builder's Risk policy shall provide for losses to be payable to County and the Contractor as their interests may appear, and that in the event of payment for any loss under the coverage provided, the insurer shall have no rights of recovery against County and Contractor.
- G. Contractor shall furnish County with certificates and original endorsements effecting the required coverage prior to execution of this Agreement by County. The endorsements shall be on forms as approved by the County's Risk Manager or County Counsel. Any deductible or self-insured retention over \$100,000 shall be disclosed to and approved by County. If Contractor does not keep all required policies in full force and effect, County may, in addition to other remedies under this Agreement, take out the necessary insurance, and Contractor agrees to pay the cost of said insurance.
- H. SUBCONTRACTORS: Should contractor subcontract any portion of the work to be performed under this Agreement, said subcontractors shall be required by contractor to:
 - 1. Enter into a written contract with contractor acknowledging that no employee/employer relationship exists between contractor and subcontractor and that no Workers' Compensation, unemployment benefits, or other personnel benefits are required by or available to subcontractor through contractor or County.
 - 2. Hold harmless and to indemnify, defend and save harmless contractor and County, its Board of Supervisors, officers, agents, employees and volunteers, from any and all claims and losses accruing or resulting to any and all contractors, subcontractors, material suppliers, laborers, and any other person, firm or corporation who may be injured or damaged by subcontractor in the performance of this Agreement.

I. HOLD HARMLESS/INDEMNIFICATION CLAUSE

Pursuant to Government Code section 895.4, the parties to this Agreement shall indemnify, defend and hold harmless the other parties hereto and their officers, agents, and employees, from any and all claims, demands, losses, damages, and liabilities of any kind or nature, including attorney's fees, which arise by the virtue of its own acts or omissions (either directly or through or by its officers, agents or employees) in connection with its duties and obligations under this Agreement and any amendments hereto.

Acceptance of insurance, if required by this Agreement, does not relieve Contractor from liability under this indemnification clause. This indemnification clause shall apply to all damages or claims for damages suffered by Contractor's operations regardless if any insurance is applicable or not.

GC 5. TERMINATION OF CONTRACT

- A. Each of these general conditions, whether preceding or following this paragraph, is to be considered material and failure to comply with any of such conditions by the Contractor will be deemed a breach of contract.
- B. Should the Contractor fail to perform any of the provisions of the Contract, the Owner shall have the right, whether or not an alternative right is provided, to declare the Contract terminated. A written notice by the Owner to the Contractor that the Contract is terminated shall be deemed a complete termination of same.

C. On the Contract being so terminated, the Contractor shall, provided Contractor is ordered to do so by the Owner, immediately remove from the premises all or any materials and personal property belonging to Contractor which have not been used in the construction of the Work or which is not in place in the Work; and both Contractor and their surety shall be liable upon their bond for all damages caused to the Owner by reason of failure to complete the Contract.

D. See GC Article 29, SUFFICIENT LABOR OR MATERIAL.

GC 6. NON-CONTINUANCE OF WORK

A. Should the Contractor at any time during the progress of the Work refuse, neglect or be unable for any reason, except the documented inability to supply a sufficiency of materials or workmen necessary, to complete the Work within the time specified in the Contract, the Owner shall have the power to terminate the Contract as prescribed.

GC 7. ASSIGNMENT OF CONTRACT

A. The Contractor shall not assign or sublet the Contract in whole or in part without the prior written consent of the Owner. The Contractor shall not assign any monies due or to become due to them under the Contract without the prior written consent of the Owner.

B. Any assignments permitted under these documents or approved by the Owner shall, in addition, have prior written approval of all sureties of the Contractor executing bonds or insurance in the interest of this Contract.

C. If the Contractor seeks to assign any portions or monies as permitted, Contractor shall pay to the Owner \$1,000 to cover Owner's costs each time an assignment occurs.

GC 8. SEPARATE CONTRACTS

A. The Owner reserves the right to let other contracts in connection with this Project. The Contractor shall afford all other such contractors reasonable opportunity for storage of their materials; shall provide that the execution of their work properly connects and coordinates with theirs; and shall cooperate with them to the end of facilitating the Work.

B. The work performed or executed under other contracts in advance of work under this Contract shall be inspected and determined to be in proper condition by the Contractor before permitting related or connecting work to proceed under this Contract.

C. Contractor shall immediately notify Architect of any discrepancies, defects or other conditions found unsuitable for proper execution of the work.

GC 9. CONFERENCES

A. At any time during the progress of the Work, the Owner, Owner's Representative, or Architect shall have authority to require the Contractor to attend a conference of any or all of the contractors engaged in the Work; and any notice of such conference shall be duly observed and complied with by the Contractor.

GC 10. TERMS OF PAYMENT

A. At the end of each calendar month, the Contractor shall submit to the Owner's Representative a statement of all materials actually placed in the building during the month, the labor expended thereon, and the cost thereof; whereupon after verification by the Owner's Representative it is found to be acceptable, a certificate for the amount less five percent (5%) thereof will be issued by the Owner's Representative except that no certificate will be issued for defective work and materials until they have been removed, replaced and made good. The Owner will also pay the costs of material on

hand under the following conditions: Written approval is given by the Owner's Representative prior to requesting payment. Approved items have been inventoried by the Owner's Representative and they are stored in a safe and weather protected manner, and are major items that delay in receiving will adversely affect the construction time schedules. The Owner's Representative will issue a certificate for the certified invoice amount, less five percent (5%) thereof. The Contractor shall be paid monthly as the work progresses, the amount of each such certificate. Final payment shall be made in accordance with E. below.

- B. As a basis for determining the amount of monthly payments, the Contractor shall, before commencing the work, submit to the Owner's Representative for approval a detailed statement of all materials and labor included in their original estimate. This statement shall be so arranged that the value of the work as it progresses may be readily determined. Payment for change order work will be made if the change order work is complete and is approved prior to the Owner's Representative issuing the monthly certification of payment. The regular initial schedule of values shall be prepared and submitted by Contractor twenty (20) calendar days in advance of the time the first request for payment is due, allowing sufficient time for review, approval and modifications as may be required prior to use for said first payment. The total sum of the schedule of values shall equal the Contract Price.
- C. Acceptance of any work and payments therefore shall be made upon written recommendation of the Owner's Representative and Architect.
- D. Payments to the Contractor will be made within 30 days of an approved pay estimate in accordance with Owner's regular approval and accounting procedures, based upon statements or certificates received as issued or approved by the Owner's Representative, including written certification that complete certified payroll records have been, or will be, submitted to the Labor Commissioner as required by the California Labor Code.
- E. Thirty-five (35) days after the acceptance of the work by the Owner's Representative and Architect (provided the project has been accepted by the Board of Supervisors), the Contractor shall be entitled to the balance due for the completion and acceptance of the work, provided that all claims for labor and materials have been paid, and that no claims shall have been filed with the County based upon acts or omissions of the Contractor and that no stop notices have been filed.

GC 11. CONFLICTS OR ERRORS

- A. During construction, if any conflicts are discovered in the plans or specifications, they shall be immediately submitted to the Owner's Representative who will render an interpretation on what was intended and the Contractor agrees to furnish all things necessary by such interpretation to the satisfaction of the Owner's Representative without additional expense to the Owner.
- B. The Contractor shall not contend that any error, delay or default in their work is due to omission or ambiguity in said plans or specifications.
- C. If errors are found in the Construction Documents that can not be termed conflicts (shown, sized or called out differently in different places) the Contractor shall immediately notify the Owner's Representative within 15 calendar days following the discovery of any error so that a change order can be prepared and the item corrected prior to construction.
- D. Refer to G.C. 24, Unity of Documents.

GC 12. CHANGES TO PLANS AND SPECIFICATIONS

- A. No modification or deviation from plans and specifications will be permitted by the Contractor without prior written consent of Owner. However, within the limits allowed by law, the Contractor agrees that Owner, without invalidating the Contract, may order extra work or make changes by altering, adding to, or deducting from the Work, the contract sum being adjusted accordingly, and that Contractor will

enter into a modification of the original contract to make such changes by means of a written Change Order.

- B. Change Orders shall be signed by the Contractor, Architect and authorized representative of the Owner.
- C. All such work shall be executed under the conditions of the original contract except that any claim for extension of time caused thereby shall be adjusted at the time of ordering such change. Both parties agree that the credit to, or charge against the Owner shall be determined as follows:
 - 1. In the event that a modification results in a reduction of the amount of labor and material to be supplied by the Contractor, the Owner shall be given a credit equal to the actual value of such labor and materials plus a reasonable amount for the use of tools, materials and overhead and profit; or, in the event that a modification results in an increase in the amount of labor and materials to be supplied by the Contractor, the Owner shall pay the Contractor the actual value of such labor materials and equipment plus not more than 15% which shall cover the use of Contractor's overhead and profit. In no case shall the total of any subcontractor(s) together with the Contractor's overhead, profit, bonds and insurance exceed 15%. All costs shall be included as a lump sum price on change orders.
 - 2. Cost Estimates for all changes shall be submitted by the Contractor to the Owner's Representative for checking by the Owner's Representative and Architect. The Contractor shall submit all Cost Estimates within 15 calendar days following the discovery of any potential change. The Owner's Representative shall render a written decision as to reasonable costs within 15 calendar days of receiving cost estimate unless more time is agreed to by both Contractor and Owner's Representative.
 - 3. Any increases in cost or extension of time shall be approved by the Owner's Representative, Architect and Owner, on a signed change order.
 - 4. In the event that the Contractor, for whatever reason, does not accept the dollar amount of increase or decrease or extension of time to the contract amount in the decisions rendered by the Owner, Contractor shall, upon receiving written order from the Owner, proceed with the work called for in the Change Order on a force account basis. Any claim for dollar increases or extension of time shall be made in writing to the Owner's Representative in accordance with the provisions of GC 51, Claims Procedures.
- D. In response to a request for a proposed modification, Contractor shall promptly furnish within 15 calendar days, relevant cost breakdowns, time estimates and other information as may be required to the Owner's Representative.

GC 13. GUARANTEE

- A. The Contractor shall be held responsible to make-good any defects due to faulty, improper or inferior workmanship or materials arising or discovered in any part of the Work within one (1) year after the completion and final acceptance of the same by the Owner's Representative, Architect and Owner unless a longer period is called for in the Technical Specification Sections.
- B. Acceptance of the Work by the Owner's Representative, Architect or Owner shall in no way absolve the Contractor from the responsibility of complying with the provisions of the plans and specifications and other contract documents, even though deviations may not be discovered within the aforementioned one year period.
- C. The bond for faithful performance furnished by the Contractor shall cover such defects and protect the Owner against them and remain in force during the one year guarantee period.

GC 14. INTERPRETATIONS

- A. The Contractor shall comply with the obvious intent and meaning of the plans and specifications which shall be construed to include all material, measures and modes or work necessary to complete the work required in a workmanlike manner, in strict accordance with these plans and specifications, and to the satisfaction of the Owner.
- B. Should any question arise as to the intent and interpretation of the plans or specifications, the Contractor shall promptly, upon discovery thereof, refer the same in writing to the Owner's Representative, whose decision thereon shall be final.

GC 15. DECISIONS BY ARCHITECT AND/OR OWNER'S REPRESENTATIVE

- A. The Owner's Representative shall, in all cases, determine whether the amount and quality of the several kinds of work which are to be paid for under the Contract are in accordance with the plans and specifications.
- B. The Owner's Representative shall have power to cause all or any part of the work to be expedited with greater diligence when delayed or stopped.
- C. When requested by the Owner's Representative, the Architect's decisions in matters relating to artistic effect will be final if consistent with the intent of the Contract Documents.
- D. Where not involving a change in the agreed Contract Price or Completion Time, and not inconsistent with the intent of the Contract Documents, the Owner's Representative shall have authority to:
 - 1. Correct any errors or inconsistencies in, and make any deletions from or additions to the drawings and specifications;
 - 2. Order minor changes or adjustments in the work, whether by field order, notations on Contractor's submittals, or other instructions;
 - 3. Order certain portions of the work delayed when particularly involved with or affected by any Change Order in process or being considered by Owner.
- E. The Owner's Representative will be the interpreter of the requirements of the Contract Documents and the judge of the performance thereunder by both the Owner and Contractor.
- F. The Architect through the Owner's Representative will render interpretations necessary for the proper execution or progress of the Work, with reasonable promptness and within fifteen (15) calendar days.
- G. Claims, disputes and other matters in question between the Contractor and the Owner relating to the execution or progress of the Work or the interpretation of the Contract Documents shall be referred to the Owner's Representative for decision which the Owner's Representative will render in writing with a reasonable promptness and within fifteen (15) calendar days.

GC 16. ADMINISTRATION OF THE CONTRACT

- A. The Owner's Representative will provide administration of the Contract. Maintenance of the Project records for the contract shall be as prescribed by the Owner's Representative and as hereinafter described.
- B. The Owner's Representative will be the representative of the Owner during construction and until final payment is due. The Architect will advise and consult with the Owner's Representative and Owner. The Owner's instruction to the Contractor shall be forwarded through the Owner's Representative. The Owner's Representative will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents, unless otherwise modified by written instrument.

- C. The Owner's Representative or Architect will not be responsible for and will not have control or charge of construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, and will not be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents. The Owner's Representative or Architect will not be responsible for or have control acts or omissions of the Contractor, Subcontractors, or any of their agents or employees, or any other persons performing any of the Work.
- D. The Owner's Representative and Architect shall at all times have access to the Work wherever it is in preparation and progress. The Contractor shall provide facilities for such access so the Owner's Representative and Architect may perform their functions under the Contract Documents.
- E. Based on the Owner's Representative and Architect's observations and an evaluation of the Contractor's Applications for Payment, the Owner's Representative will determine the amounts owing to the Contractor and will issue Certificates for Payment in such amounts as provided in GC Article 10.
- F. The Owner's Representative shall, upon receipt of a complete submittal from the Contractor, make the submission to the Architect. The Architect shall review and take appropriate action on shop drawings, product data, samples, and other submittals required by the Contract Documents. Such review shall be only for general conformance with the design concept and general compliance with the information given in the Contract Documents. It shall not include review of quantities, dimensions, weights or gauges, fabrication processes, construction methods, coordination with the work of other trades, or construction safety precautions, all of which are the sole responsibility of the Contractor. The Architect's review shall be conducted with reasonable promptness, and within 21 calendar days unless otherwise noted, consistent with sound professional practice. Review of a specific item shall not indicate acceptance of an assembly of which the item is a component. The Architect shall not be required to review and shall not be responsible for any deviations from the Contract Documents not clearly noted by the Contractor, nor shall the Architect be required to review partial submissions or those for which submissions for correlated items have not been received.
- G. The Owner's Representative will prepare Change Orders in accordance with GC Article 12.
- H. The Contractor shall provide sufficient, safe and proper facilities at all times for the full inspection of the Work by the Architect or other representatives of the Owner, at the project site and at the various other locations where project is being performed.
- I. The Owner's Representative and Architect will have authority to reject Work which does not conform to the Contract Documents. Whenever, in their opinion, the Owner's Representative and Architect considers it necessary or advisable for the implementation of the intent of the Contract Documents, the Owner's Representative or Architect will have authority to require special inspection or testing of the Work in accordance with GC Article 31, whether or not such Work be then fabricated, installed or completed. However, the Owner's Representative and Architect's authority to act under this Subparagraph and any decision made by them in good faith to exercise or not to exercise such authority, shall not give rise to any duty or responsibility of the Owner's Representative or Architect to the Contractor, and Subcontractor, any of their agents or employees, or any other person performing any the Work.
- J. The duties, responsibilities and limitations of authority of the Owner's Representative as the representative of the Owner during construction as set forth in the Contract Documents will not be modified or extended without written consent of the Owner.

GC 17. NON-CONFORMING WORK

- A. The fact that the work and materials have been inspected from time to time and payments on account have been made, shall not relieve the Contractor from the responsibility of replacing and making good any defective work or materials that may be discovered within one year from the date of completion of

the Work by the Contractor and its approval by the Owner's Representative, Architect, and its acceptance by the Owner.

- B. Failure of Owner's Representative, Architect or Owner to object to any defects in work or material or variances from the plans and specifications during or after construction shall not be deemed a waiver by Owner, Owner's Representative or Architect of such defects or variances; nor by such failure shall Owner, Owner's Representative or Architect be deemed stopped from requiring Contractor to correct such defects or variances.
- C. At Owner's sole option, if Owner prefers to accept non-conforming work, Owner may do so instead of requiring its removal and correction, in which case a Change Order will be issued to reflect an appropriate reduction in the Contract Sum, or if the amount is determined after final payment it shall be paid by the Contractor.
- D. Uncovering of Work:
 - 1. If any portion of the Work should be covered contrary to the request of the Owner's Representative, Architect or to requirements specifically expressed in the Contract Documents, it must, if required in writing by the Owner's Representative, be uncovered for their observation and shall be replaced at the Contractor's expense.
 - 2. If any other portion of the Work has been covered which the Owner's Representative or Architect has not specifically requested to observe prior to being covered, the Owner's Representative or Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work be found in accordance with the Contract Documents, the cost of uncovering and replacement shall, by appropriate Change Order, be charged to the Owner. If such Work be found not in accordance with the Contract Documents, the Contractor shall pay such costs unless it be found that this condition was caused by the Owner or a separate contractor as provided in GC 8 above, in which event the Owner shall be responsible for the payment of such costs.

GC 18. OWNERSHIP OF DOCUMENTS

- A. All plans and specifications shall remain the property of the Owner and shall be returned to the Owner's Representative or shall be accounted for by the Contractor before the final acceptance of building by the Owner.
- B. Documents for this project shall not be used on or for any other work or purposes without express written consent of Owner's Representative, Architect and Owner.

GC 19. DOCUMENTS FURNISHED

- A. The Contractor will be supplied ten (10) sets of Contract Documents for use in the Work.
- B. Additional sets of Contract Documents may be obtained from the County, at cost, at Contractor's expense.

GC 20. DRAWING DIMENSIONS

- A. The general dimensions are shown in figures on the drawings furnished to the Contractor. These figured dimensions shall invariably have preference to scaled measurements; but the Contractor shall exercise proper caution and care to verify the figures before laying out the Work, and shall be held responsible for any omissions or errors therein that might have been avoided.

GC 21. DETAILED DRAWINGS

- A. Drawings and details may be furnished to the Contractor as work progresses, showing in more elaboration the work intended to be done and the Contractor shall conform to them as being a part of the Contract.
- B. No work shall be performed in advance of the receipt by the Contractor of such detailed drawings, except such work as the Owner's Representative shall order in writing to be done without details. Any complaint as to the character and extent of the details shall be made to the Owner's Representative within ten days after the Contractor has received the same. The Contractor shall notify the Owner's Representative in ample time as to when the Contractor will require these drawings so they may be prepared without causing any delay to the Work.

GC 22. SUBMITTALS

- A. Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or any Subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.
- B. Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate a material, product or system for some portion of the Work.
- C. Samples are physical examples which illustrate materials equipment or workmanship and establish standards by which the Work will be judged.
- D. The Contractor shall review, approve and submit, with such promptness as to cause no delay in their own work or in that of any other contractor, copies of all Shop Drawings or Setting Drawings, Schedules for the Work of the various trades and samples of materials and finishes required for the Work, together with information or supporting data as may be required or called for. The Owner's Representative will pass upon them with reasonable promptness in accordance with GC Article 16. The Contractor shall make any corrections required by the Owner's Representative or Architect and resubmit corrected copies.
- E. Samples required or called for shall be exactly as specified for and intended to be used in the work; and Shop Drawings shall accurately portray the Work required. Materials, finishes and workmanship shall be equal in every respect to that of the reviewed submittals.
- F. Submittals shall be delivered as directed by the Owner's Representative, postage or delivery charges prepaid by the Contractor in all cases. Samples returned upon request from the Contractor shall be returned by collect mail, parcel post or any carrier named by Contractor.
- G. The furnishing by the Contractor or the review by the Architect of drawings, samples, schedules or other data shall not relieve the Contractor from responsibility for deviations from drawings or specifications, nor shall it relieve them of responsibility for errors of any sort in shop drawings, schedules or other submittals.
- H. By approving and submitting Shop Drawings, Product Data and Samples, the Contractor represents that they have determined and verified all materials, field measurements, and field construction criteria related thereto, or will do so, and that they have checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.
- I. Each Submittal shall be properly identified as required by the Owner's Representative.
- J. Deviations from requirements of Contract Documents, errors, inconsistencies with submittals previously made to or reviewed by Architect, and corrections to dimensions or supporting data shall be clearly identified by the Contractor by notations on the submittals or attached explanations.

- K. No portion of the Work requiring submission of a Shop Drawing, Product Data or Sample shall be commenced until the submittal has been reviewed by the Architect as provided in Subparagraph of GC Article 16. All such portions of the Work shall be in accordance with reviewed submittals.

GC 23. SURVEY AND LAYOUT

- A. All work pertaining to this Contract shall be laid out on the premises by the Contractor who shall be held responsible for its correctness.
- B. The Contractor shall retain and pay for the services of a registered Engineer or licensed surveyor, when applicable, who shall lay out the main lines of the building and other improvements at the site and provide other primary lines, pile locations and levels as may be required.
- C. All stakes, benchmarks, survey marks, monuments and other line or level points which have been or may be established in the building or on or about the premises shall be carefully preserved and respected by the Contractor.
- D. On-site work shall be laid out to properly meet existing off-site work not required to be removed or replaced, or to lines and levels established by civil authorities having jurisdiction, as applicable to conditions at the place of the Work.

GC 24. UNITY OF DOCUMENTS

- A. The Plans and Specifications are one document and any work shown, required or called for in the one and not in the other, or vice versa, shall be furnished or performed as though it were shown, required or called for in both.
- B. The Contractor admits and agrees that the Contract Documents exhibit the intent and purpose of the Owner in regard to the Work, and that they are not complete in every detail and are to be considered as showing the purpose and intent only; and Contractor further agrees to furnish all labor or material for any detail that is necessary to carry out said intent and purpose without extra charge to the Owner.
- C. The misplacement, addition or omission of any word, letter or punctuation mark shall in no way change the intent, purpose of meaning or the Plans and Specifications.
- D. Any part of the Work or any article or detail pertaining thereto which is not specifically set forth in the Specifications or shown on the Drawings, but which is necessary for the proper completion of the Work, shall be furnished and installed at the Contractor's expense the same as if it had been partly or fully shown or specified. The Contractor shall do and furnish all things necessary to make a complete and workmanlike job in accordance with the intent and purpose of the Contract Documents.

GC 25. INSPECTION BY CONTRACTOR

- A. The Contractor shall inspect, review, compare and familiarize himself with the Contract Documents and the premises of the Work, and shall at once report to the Architect, in writing if requested, any error, omission or inconsistency within the documents or between information given and conditions observed or found at the premises.
- B. The Contractor shall make a close inspection of all materials as delivered, and shall promptly return all damaged or defective materials without waiting for their rejection by the Owner's Representative, Project Inspector, or Architect.
- C. Before beginning any of the work, the Contractor shall examine all construction and work of other contractors or trades that may affect this work, and to satisfy that everything is in proper condition to receive this work; and shall at once notify the Owner's Representative, in writing if requested, of any

exception taken to any construction or condition so affecting this work, whether placed under this Contract or other contracts.

- D. Failure to file with the Owner's Representative any notice to the contrary shall constitute acceptance by the Contractor of the construction of other contractors or trades as being suitable in all ways to receive their work, except as to defects which later develop in the work of other contractors after the execution of their own work.
- E. Contractor's inspection of documents and premises shall include making known to himself the general and particular location, nature and character of the project work, the physical and contractual conditions, provisions and requirements, the nature and extent of work and equipment to be furnished by Owner, and the limitations and various other aspects relative to this project, including all coordination necessary for proper and timely execution of the Work.
- F. Owner will not consider any claims whatsoever on account of Contractor's failure to fully investigate or determine their requirements in advance of commencing the work or the conditions of the work throughout its progress.

GC 26. DEVIATION FROM PLANS OR SPECIFICATIONS

- A. No deviations shall be made from the plans or the specifications. If the Contractor shall vary from the plans the amount or value of the materials herein provided for, the Owner shall have the right to order such improper work or materials removed or replaced; any other work disturbed or damaged by such alteration shall be made good at the Contractor's expense.

GC 27. STANDARDS OF MATERIALS

- A. Wherever the name or brand of a manufacturer's article is specified herein, it is used as a measure of quality and utility; a standard.
- B. If the Contractor desires to use any other brand or manufacturer of equal quality and utility to that specified, Contractor shall make application to the Owner's Representative in writing, and submit samples if requested. Refer to Section 00 22 13, "Supplementary Instructions To Bidders" for substitution request procedures.

GC 28. QUALITY OF MATERIALS AND LABOR

- A. All materials used on this Contract shall be new and the best market quality unless specified or shown otherwise. All labor used on this Contract shall be competent and skilled for the Work. All Work executed under this Contract shall be done in the best, most thorough, substantial and workmanlike manner. All material and labor shall be subject to the approval of the Architect as to its quality and fitness, and shall be immediately removed if it does not meet with approval. The Owner's Representative may refuse to issue a Certificate of Payment for unapproved work until all defective materials or work have been removed and other material of proper quality substituted therefore.

GC 29. SUFFICIENT LABOR OR MATERIALS

- A. Should the Contractor abandon the Work called for under these specifications, or seek to assign this Contract, or if at any time the Owner's Representative shall be of the opinion and so certify in writing to the Owner that the Contractor is unnecessarily and unreasonably delaying the work, or that the Contractor is willfully violating any of the conditions or provisions of the plans and specifications, or is performing their work in bad faith, the Owner shall, in addition to all other remedies provided by Contract or by law, after seven (7) days written notice to the Contractor, have the power to notify the Contractor to discontinue all work or any part thereof under this Contract; and thereupon, the Contractor shall cease to continue said Work or such part thereof as the Owner may designate, and the Owner shall thereupon have the power to obtain by contract, purchase or hire, such implements, tools, labor or materials by contract or otherwise, as Owner may deem advisable, to work at and be

used to complete the Work herein described, or such part thereof as the Owner's Representative shall certify has not been completed, and to use such material as it may find at the building site. The expenses so incurred in the process shall be deducted by the Owner out of such monies as may either be due or may at any time thereafter become due to the Contractor under and by virtue of these plans and specifications, or any part thereof.

- B. If the unpaid balance of the Contract Sum exceeds the cost of finishing the Work, including compensation for the Owner's Representative or Architect's additional services made necessary thereby, such excess shall be paid to the Contractor. If such costs exceed the unpaid balance, the Contractor or their bondsmen shall pay the difference to the Owner on notice to either from Owner. The amount to be paid to the Contractor or to the Owner, as the case may be, shall be certified by the Owner's Representative, upon application, in the manner provided in GC Article 10, and this obligation for payment shall survive the termination of the Contract.

GC 30. OLD MATERIAL

- A. Old material shall not be used.
- B. Construction materials or other items used or placed in the work later shall be considered old materials and not reused.

GC 31. TESTS

- A. Contractor shall comply with the requirements set forth in Division 01, General Requirements Sections.

GC 32. PATENT RIGHTS, COPYRIGHTS, TRADE NAMES AND ROYALTIES

- A. The Contractor shall indemnify and save harmless the Owner and authorized persons acting for the Owner against all liability on account of any patent rights, copyrights or trade names which may affect the articles or materials or their application under the Contract.
- B. The Contractor shall pay all royalties or other charges that may arise due to methods, types of construction, processes, materials or use of equipment and shall hold the Owner harmless from any claims or charges whatsoever which may arise; and shall furnish written assurance satisfactory to the Owner that such charges have been paid.

GC 33. COMPLIANCE WITH BUILDING LAWS

- A. The Contractor shall conform to and abide by all applicable city, county, regional, state and federal building, labor, sanitary, health and safety laws, ordinances, rules and regulations as currently adopted or enforced, including Part 1 & 2 of Title 24, Calif. Code of Regulation and the International Building Code; a copy of Title 24, CCR and the current California Building Code shall be kept at the job site at all times by the Contractor. Such laws and regulations shall be considered a part of these specifications the same as if set forth herein full, and all work hereunder shall be executed in accordance therewith.
- B. All work and materials shall be in full accordance with the latest rules and regulations of the State Fire Marshal, the Safety Orders of the Division of Industrial Safety, the National Electric Code, the Uniform Plumbing & Mechanical Codes published by the International Association of Plumbing and Mechanical Officials, and other applicable state laws or regulation including all of Title 24, Calif. Code of Regulation. Nothing in these plans or specifications is to be construed to permit work not conforming to these codes.

GC 34. PERMITS AND LICENSES

- A. Unless otherwise provided in the Contract Documents, the Owner shall give all notices and procure and pay for permits and governmental fees, licenses and inspections necessary for the proper execution and completion of the Work which are customarily secured after execution of the Contract and not excluded in Paragraph D below.
- B. LICENSES: Professional, trade, business and other licenses required by state statute or local government are entirely the responsibility of the Contractor and Subcontractors, and shall be prerequisite to submitting a bid proposal or performing work on the Project.
- C. PERMITS:
1. Permits shall also include any cash deposits, returnable or otherwise, required by authorities having legal jurisdiction to make such demands;
 2. Owner reserves the right to cancel and declare null and void the Contract should any legal permit be refused or not issued for any reason;
 3. Due to cancellation for said reasons, Owner will not consider any claims by Contractor for loss of anticipated profits; or for work performed or materials procured prior to obtaining all permits required herein.
 4. The Contractor shall obtain Encroachment Permits from the City of Eureka, County of Humboldt, and CalTrans as needed.
- D. Contractor shall procure and deliver to the Owner's Representative, in forms prescribed and complete with dates and authorized signatures, all certificates of inspection, testing or approvals required of or by State or Civil authorities having legal jurisdiction or any public authority bearing on the performance of the Work.
- E. The Contractor shall give all notices and comply with all laws, ordinances, rules, regulations and lawful orders of any public authority bearing on the performance of the Work.

GC 35. TEMPORARY FACILITIES

- A. The Contractor shall provide and maintain a temporary field base of operation on the sites. Said base of operation shall be for the exclusive use of the Contractor; and shall be wind and weatherproof, furnished with sufficient lighting to permit reading of blueprints. A complete set of plans and specifications shall be kept continuously at each site. When vacated, said structure shall be removed and the work in that area completed in accordance with the Contract requirements. Based on need, Contractor shall maintain and pay for all utilities and fuels; shall provide maintenance and other services necessary for proper use and operation; and comply with related provisions as specified.
- B. The Contractor shall maintain a viable communications system at each site acceptable to the Owner's Representative, and shall maintain the same until the final completion of the Contract and the acceptance of the Work. The Owner's Representative, Architect and Inspector shall have free and unrestricted use of this communications system for all purposes in conjunction with the Work.
- C. The Contractor shall provide water closets and urinals for use by their employees and subcontractors and their employees, and in no case shall the permanent plumbing fixtures of buildings on the site be used for this purpose without the written consent of the Owner's Representative.
- D. The Contractor and each subcontractor shall furnish, at their own expense, all tools, equipment, appliances, materials, scaffolding or other means necessary for the entire completion of the Work; and shall be responsible for the care and guarding of same.
- E. The Contractor and each subcontractor shall erect and maintain where necessary to the progress and completion of the Work, all exterior and interior scaffolding which shall be erected in accordance with the safety rules of the State of California; and use of which shall be unrestricted for all persons performing work on the Project.

F. The Contractor shall pay the cost of all water, gas and electricity used by their employees or subcontractors during the process of the Work, or as required for temporary services or tests and inspections.

G. Also refer to Division 01, General Requirements Sections.

GC 36. LIABILITY FOR ACCIDENTS

A. The Contractor shall be liable for any and all loss, accident, neglect, injury, or damage to person, life or property which may be the result of or may be caused by their building operations or their execution of this Contract, and for which the Owner might be held liable; and shall protect and indemnify the Owner, the Owner's Representative, the Project Inspector, the Architect, and/or any officer, agent or employee of the Owner and hold them harmless in every way from all claims and from all suits or actions at law for damage or injury to persons, life or property that may arise or be occasioned in any way because of their building operations or their execution of this Contract.

B. Safety Precautions and Programs:

1. The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work.

C. The Contractor shall assume the full responsibility for personnel safety on the project and the means and methods of construction that pertain to personnel safety. Contractor is responsible that such means and methods of construction are adequate to provide safety to all personnel while accomplishing all requirements and standards of the Contract Documents. The Owner, Architect, Inspector and/or their representatives have no obligation, responsibility, or jurisdiction over safety or means and methods of construction that pertain to personnel safety on the project.

GC 37. ACCIDENT PREVENTION

A. The Contractor shall erect and maintain, as required by existing conditions and progress of the Work, all reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, and any other necessary construction required to secure safety of life or property; and shall maintain during all night hours sufficient lights to prevent accidents or damage to life or property.

B. No earth, building, temporary or other structure shall be loaded, used or stressed so as to endanger its safety.

C. In the event of an emergency affecting the safety of persons or property, the Contractor shall act, at their discretion, to prevent threatened damage, injury or loss. Claims by Contractor on account of alleged emergency actions shall be filed in writing with the Owner's Representative.

GC 38. EXISTING PREMISES AND IMPROVEMENTS

A. The Contractor shall care for, preserve and protect existing structures, utilities and other features, fixtures or improvements at the premises, including adjacent or co-terminus properties which are not required to be removed or altered by reason of work under this Contract; and shall, likewise, care for and protect work or improvements newly placed or recently installed at the premises. Any part or portion of said existing or newly placed improvements which are removed, damaged or disturbed because of this work, shall be replaced, cleaned or otherwise returned to the original condition entirely at the expense of the Contractor.

B. The removal and/or replacing of any existing structure, pipe, conduit, pavement or other existing improvement necessary for the proper completion of any work under the Contract shall be performed by the Contractor, and no claim for extra work shall be made on account of such removal and replacement.

- C. In case it shall be necessary to remove any telephone, telegraph or electrical power transmission poles, water pipes, electrical conduits, or underground structures of any character, or any portion thereof, the Owner or their agents shall be notified by the Contractor and the Contractor shall make the necessary arrangements for such removal. The right is reserved to the Owner and to gas, water, telephone, telegraph and electrical power transmission companies to enter upon the Work for purpose of making repairs and changes that have become necessary by reason of work related to the Project.
- D. The Contractor shall thoroughly investigate all existing poles, wires, pipes and conduits above and below ground and shall provide for the maintenance or replacing of same, in good condition and at no expense to the Owner. Any necessary new or additional pipe or materials shall be furnished by the Contractor at their expense.
- E. At the completion of the Work, the Contractor shall furnish the Owner's Representative with a written certificate from the owner of each and all conduits, pipes or structures to the effect that such replacements and maintenance have been satisfactorily performed.
- F. The Contractor shall amply protect all work or improvements, set in the building or at the premises, against any possible damage; and shall furnish all necessary building paper, rough boarding or other means or materials necessary therefore.
- G. Also refer to Division 01, General Requirements Sections.

GC 39. USE OF PREMISES AND CLEAN-UP

- A. During the progress of the Work, materials shall be neatly stacked at such points so as not to interfere with site access and shall be properly cared for and protected against damage by weather or other causes. Project staging and parking area are defined in the plans.
- B. In the case where there are several contractors operating at one time, arrangements must be made to allow the joint use of storage space so as to prevent delays in the work and unnecessary inconveniences.
- C. At the end of each working day, or as directed by the Owner's Representative, Project Inspector or Architect, the Contractor shall clean the building, premises, streets and adjacent properties of accumulated rubbish, debris, unnecessary appliances or any unused material which may constitute an obstruction to the progress or completion of the Work, whether the same was caused by their work or by the work of other crafts. Failure by the Contractor to maintain the site and building premises in a safe and clean condition will be considered a breach of contract and Contractor agrees to pay Owner for costs to have site cleaned or deduct said costs from any money due the Contractor under the contract.
- D. At the completion of the Work, and as one of the requisites thereof, the Contractor shall remove any and all tools, construction equipment, machinery, surplus materials, appliances, rubbish, packing, debris or other extraneous matter of any kind from the building, premises, sidewalks, streets or adjacent premises; Contractor shall go over all of their work and put the same in perfect order and condition and in strict accordance with the terms of the Contract; and shall repair or replace all damaged, broken or stained parts of their work, whether so injured by their workmen or others.
- E. No advertising signs of any kind shall be displayed on the building, premises, fences, offices or elsewhere upon the job, except the Project sign as called for in the specifications.
- F. At the completion of each phase of work of each kind of work or activity, the areas so used or involved shall be left in a "broom clean" condition daily unless otherwise more particularly required.

GC 40. DIRECTION OF THE WORK

- A. The Contractor shall have control or charge over their Subcontractors; shall be responsible to the Owner for the acts and omissions of their employees, subcontractors and their agents and employees,

and other persons performing any of the Work under a contract with the Contractor, and for all orders or instructions from the Owner, Owner's Representative or the Architect.

- B. It shall be the Contractor's duty to see that all of the subcontractors commence their work properly at the proper time and carry it on with due diligence as not to cause delay or injury either to work or materials; and that all damage caused by them or their workmen be properly made good by them or by himself at no cost to the Owner.
- C. The Contractor shall keep on the Work Site at all times and until the acceptance certificate is issued, a competent Project Manager and Project Superintendent for the purpose of receiving and executing without delay any orders in keeping with the terms of the Contract issued by the Owner, Owner's Representative or Architect. This Superintendent shall have charge of Plans and Specifications kept on the job; shall be instructed to be familiarized closely with all the provisions of the plans and specifications and to follow them in a precise manner.
- D. If at any time the Superintendent or workman who shall be employed by the Contractor or any of their Subcontractors shall be declared by the Owner's Representative to be incompetent or unfaithful in executing the work, then the Contractor upon receiving written notice shall, forthwith, dismiss such person and shall not again employ him on any part of the Work.
- E. Contractor shall supervise and direct the Work using their best skill and attention, and shall be solely responsible for all construction means, methods, techniques, sequences and procedures and for coordinating all portions of the work under the Contract; except that said responsibilities shall not be construed to permit use of any material, process, method or means if they are deemed unsuitable by Owner's Representative.
- F. Processing of Change Orders, Cost Estimates and like administrative matters, shall follow the procedures established and approved by the Owner at commencement of Work under the Contract. Change orders and other forms shall be as approved by the Owner's Representative or otherwise required or directed by Owner. Refer to GC 12.
- G. Review of Contract Documents: The Contractor shall carefully study and compare the Contract Documents and shall at once report to the Architect through the Owner's Representative any conflict, error, inconsistency or omission Contractor may discover. Refer to GC 11 A.
- H. The Contractor shall not be relieved from their obligations to perform the Work in accordance with the Contract Documents by the activities or duties of the Owner's Representative in their administration of the Contract, or by inspections, tests or approvals required or performed under GC 31, by person other than the Contractor.
- I. Progress Schedule:
 - 1. The Contractor shall prepare and submit to the Owner's Representative with copy to the Architect and the Construction Inspector the Contractor's Initial Construction Schedule within ten (10) calendar days after date on the Notice to Proceed. The Contractor's Initial Construction Schedule shall be comprised of either a Detailed Bar Chart, if the contract value is less than one million dollars (\$1,000,000), or a Critical Path Method network, if the contract value is one million dollars (\$1,000,000) or more. The Contractor's Initial Construction Schedule shall show the dates on which each part or division of the work is expected to be started and completed, and shall show all submittals associated with each work activity, allowing a minimum of twenty one (21) calendar days (per GC 16 F) for the Architect's review of each submittal unless a longer period of time is specified elsewhere in these Contract Documents. The work activities making up the schedule shall be of sufficient detail to assure that adequate planning has been done for proper execution of the work and such that, in the sole judgment of the Owner, it provides an appropriate basis for monitoring and evaluating the progress of the work. The schedule shall show the interdependence of each activity and a single critical path. The Contractor shall also submit a separate progress schedule listing

- all submittals required under the contract and when it is anticipated that each submittal will be submitted.
2. The Contractor's Initial Construction Schedule shall show the sequence, duration in calendar days, and interdependence of activities required for the complete performance of all work. The Contractor's Initial Construction Schedule shall begin with the date of issuance of the Notice to Proceed and conclude with the date of final completion.
 3. Float, slack time, or contingency within the schedule (i.e., the difference in time between the project's early completion date and the required contract completion date), and total float within the overall schedule, is not for the exclusive use of either the Owner or the Contractor, but is jointly owned by both and is a resource available to and shared by both parties as needed to meet contract milestones and the contract completion date.
 4. The Contractor shall not sequester shared float through such strategies as extending activity duration estimates to consume available float, using preferential logic, or using extensive crew/resource sequencing, etc. Since float time within the schedule is jointly owned, no time extensions will be granted nor delay damages paid until a delay occurs which extends the work beyond the Contract completion date. Since float time within the construction schedule is jointly owned, it is acknowledged that Owner caused delays on the project may be offset by Owner caused time savings (i.e., critical path submittals returned in less time than allowed by the contract, approval of substitution requests which result in a savings of time to the Contractor, etc.) In such an event, the Contractor shall not be entitled to receive a time extension or delay damages until all Owner caused time savings are exceeded and the contract completion date is also exceeded.
 5. Comments made by the Owner on the Contractor's Initial Construction Schedule during review will not relieve the Contractor from compliance with the requirements of the contract documents. The review is only for general conformance with the scheduling requirements of the contract documents. Upon the Owner's request, the Contractor shall participate in the review of the Contractor's Initial Construction Schedule submissions (including the original submittal, all update submittals, and any re-submittals). The Owner may request the participation of subcontractor in these reviews, as determined necessary by the Owner. All revisions shall be resubmitted within fifteen (15) calendar days after the Owner's review.
 6. The submittal of a fully revised and acceptable Contractor's Initial Construction Schedule shall be a condition precedent to the processing of the first monthly payment application.
 7. On any project with a construction value equal to or greater than one million dollars (\$1,000,000), the Contractor must submit a Critical Path Method (CPM) network. The network shall provide a workable plan for monitoring the progress of all the elements of the work, establish and clearly display the critical elements of the work, forecast completion of the construction, and match the contract duration in time. Exclusive of those activities for submittal review and material fabrication and delivery, activity duration shall not be less than one (1) nor more than thirty (30) calendar days, unless otherwise approved by the Owner. In addition to the detailed network diagram, the Contractor shall submit the following reports with the original submittal and all updates and revisions:
 - a. Predecessor/Successor Report or a list showing the predecessor activities and successor activities for each activity in the schedule.
 - b. Activity Report sorted by early start or a list showing each activity in the schedule, arranged by early start dates.
 8. Regardless of which schedule method the Contractor elects to use in formulating the Contractor's construction schedule, and unless the Owner's Representative in writing each month, specifically waives this requirement, an updated construction schedule shall be submitted to the Owner's Representative five (5) days prior to the submittal of the Contractor's monthly payment request. The submittal of the updated construction schedule which satisfies the requirements of the Contract Documents accurately reflects the status of the work, and incorporates all changes into the schedule, shall be a condition precedent to the processing of the monthly payment application. Updated schedules shall also be submitted at such other times as the Owner may direct. Upon approval of a change order or issuance of a direction to proceed with a change, the approved change shall be reflected in

- the next schedule update submittal by the Contractor, or other update submittal approved by the Owner.
9. If completion of any part of the work, the delivery of equipment or materials, or submittal of the Contractor submittals is behind the updated construction schedule and will impact the end date of the work past the contract completion date, the Contractor shall submit in writing, a plan acceptable to the Owner for completing the work on or before the current contract completion date.
10. No time extensions shall be granted nor delay damages paid unless the delay can be clearly demonstrated by the Contractor on the basis of the updated construction schedule current as of the month the change is issued or the delay occurred and which delay cannot be mitigated, offset, or eliminated through such actions as revising the intended sequence of work or other means. Contractor shall submit all disputes or claims under the provisions of GC 51, Claims Procedure, otherwise it shall be waived.
11. As a condition precedent to the release of retained funds, the Contractor shall, after completion of the work has been achieved, submit a final Contractor's construction schedule which accurately reflects the manner in which the project was constructed and includes actual start and completion dates for all work activities on the construction schedule.
- J. The Contractor shall forward all communications to the Owner and Architect through the Owner's Representative.

GC 41. CUTTING, FITTING AND PATCHING

- A. The Contractor shall do all cutting, fitting and patching of Work that may be required to make its several parts come together properly, and prepare it to join or be joined by the work of other contractors; and Contractor shall make good after them.
- B. The Contractor shall not endanger any work by cutting, digging or otherwise; and shall not cut or alter the work of any other contractor without the written consent of the Architect; and shall not cut a beam, timber or support of any kind without the consent of the Architect. Under no circumstances shall any principal brace, timber, truss, support or other structural member be cut or structurally weakened in any way.
- C. Where the construction is required to join with or match existing work, it shall be finished exactly similar to that work so as to form complete, unified and finished work.
- D. Contractor shall be responsible for and particularly supervise each and every operation and all work which in any way may affect the structural integrity of the various works, including below, or, or above grade structures, and whether for temporary or permanent work.
- E. Any cost for repairs or restoration caused by cutting, digging or otherwise due to ill-timed or defective work shall be borne by the Contractor.
- F. Also refer to Division 01, General Requirements Sections.

GC 42. RIGHT TO OCCUPY OR USE

- A. The Owner reserves the right to occupy or use any part or parts, or the entirety of the building and/or grounds when the Owner deems the same may be safe for use or occupancy.
- B. The exercising of this right shall in no way constitute an acceptance of such parts, or any part of the work, nor shall it in any way affect the dates and times when payments shall become due from the Owner to the Contractor, nor shall it in any way prejudice the Owner's right under the Contract or any bonds guaranteeing the same. The Contract shall be deemed completed only when all the Work contracted for shall be duly and properly performed and accepted by the Board of Supervisors.

- C. When any part or portion of the Project is to be used or occupied by Owner in advance of final completion and acceptance, and when duly notified by Owner's Representative, the Contractor shall arrange for completion of said portions of the Work the same as required under the Documents for the whole Work, including cleaning and other readying by the date stipulated with such notice.
- D. Contractor shall not be held responsible for any damage to the occupied part of the Project resulting from Owner's occupancy.
- E. Occupancy by Owner shall not be deemed to constitute a waiver of existing claims on behalf of Owner or Contractor against each other.
- F. Use and occupancy by Owner prior to project acceptance shall not relieve Contractor's responsibility to maintain all insurance and bonds required of Contractor under the Contract until the entire Project is completed and accepted by Owner.
- G. If after written notification by the Owner of the intent to occupy, the Contractor feels that such occupancy will delay progress of the work or will cause additional expense to the Contractor, Contractor may file a request for an equitable adjustment in Contract Price or Time of Completion, or both, with the Owner's Representative. If the Owner's Representative agrees he will either prepare a written change order for the Owner to sign or advise the Owner to delay occupancy.

GC 43. CHANGE OF CONTRACT TIME & LIQUIDATED DAMAGES

- A. Change by Change Order. The contract time may only be changed by change order. A request for an extension or shortening of the contract time shall be based on written notice delivered by the party making the request to County promptly after the occurrence of the event giving rise to the request and stating the general nature of the request. Notice of the extent of the request with supporting data shall be delivered to County and shall be accompanied by the written statement that the adjustment requested is the entire adjustment to which the requesting party has reason to believe it is entitled as a result of the occurrence of said event. No request for an adjustment in the contract time will be valid if not submitted in accordance with the requirements of this paragraph.
- B. Contract time may be extended. The contract time will be extended in an amount equal to time lost due to delays beyond the control of Contractor if the request is made therefor as provided in this article. Such delays shall include, but not be limited to, acts of neglect by County or others performing additional work, or to fires, floods, labor disputes, epidemics, abnormal weather conditions or acts of God.
- C. Delay and price change. All time limits stated in the contract documents are of the essence. There shall be no adjustment of contract price due to delays for fires, floods, labor disputes, epidemics, abnormal weather conditions or acts of God. The provisions of this Provision shall not exclude recovery for damages (including but not limited to fees and charges of engineers, architects, attorneys and other professionals and court costs) for delay by either party.
- D. Delays in completion of work :
 - 1. Notice of delays. Whenever the Contractor foresees any delay in the prosecution of the work, and in any event immediately upon the occurrence of any delay which the Contractor regards as unavoidable, Contractor shall notify County in writing of the probability of the occurrence of such delay and its cause in order that County may take immediate steps to prevent, if possible, the occurrence or continuance of the delay or, if this cannot be done, may determine whether the delay is to be considered avoidable or unavoidable, how long it continues, and to what extent the prosecution and completion of the work are to be delayed thereby. It will be assumed that any and all delays which have occurred in the prosecution and completion of the work have been avoidable delays, except such delays as shall have been called to the attention of County at the time of their occurrence and found by County to

- have been unavoidable. The Contractor shall make no requests for extensions of time as to delay not called to the attention of County at the time of its occurrence.
2. Avoidable delays. Avoidable delays in the prosecution or completion of the work shall include all delays which in the opinion of County would have been avoided by the exercise of care, prudence, foresight and diligence on the part of the Contractor or Contractor's subcontractors.
 3. Unavoidable delays. Unavoidable delays in the prosecution or completion of the work shall include all delays which, in the opinion of County, result from causes beyond the control of the Contractor and which could not have been avoided by the exercise of care, prudence, foresight and diligence on the part of the Contractor or the subcontractors and/or any suppliers. Delay in completion due to contract modifications ordered by County and unforeseeable delays in the completion of work or interference by other contractors employed by County will be considered unavoidable delays insofar as they interfere with the Contractor's completion of the work.
- E. Extension of time:
1. Avoidable delays. In case the work is not completed in the time specified, including such extensions of time as may have been granted for unavoidable delays, the Contractor will be assessed damages for delay in accordance with liquidated damages provision. The County, however, shall have the right to grant an extension of time for avoidable delay if it is deemed in County's best interest to do so. During such extension of time, the Contractor will be charged for engineering and inspection services and other costs but will not be assessed damages for the delay.
 2. Unavoidable delays. For delays which County considers to be unavoidable, the Contractor shall, pursuant to Contractor's application, be allowed an extension of time beyond the time herein set forth, proportional to such delay or delays, in which to complete the contract. During such extension of time, neither extra compensation for engineering and inspection provided nor damages for delay will be charged to the Contractor.
 3. Liquidated damages. County and Contractor recognize that time is of the essence and that County will suffer financial loss if the work is not completed within the time specified above, plus any extensions thereof allowed in accordance with this contract. They also recognize the delays, expense and difficulties involved in proving the actual loss suffered by County if the work is not completed on time. Accordingly, instead of requiring any such proof, and due to impracticality and difficulty of ascertaining exact damages caused by delay, County and Contractor agree that as liquidated damages for delay (but not as a penalty) Contractor shall pay County that amount set forth in the Contract, or if no such amount is specified, then one-half of one percent of the total contract price for each day that expires after the time specified above for completion. In case of joint responsibility for delay in the final completion of the work, where two or more separate contracts are in force at the same time and cover work at the same site, liquidated damages assessed against any one Contractor will be based upon the individual responsibility of that Contractor for the delay as determined by, and in the judgment of, County. County shall have the right to deduct the liquidated damages from any money in its hands, otherwise due, or to become due, to Contractor, or to sue for and recover compensation for damages for nonperformance of this contract within the time stipulated. County has determined and the Contractor acknowledges that the liquidated damages as established herein are governed by the provisions of Government Code § 53069.85 and are predicated upon the reasonable damages accruing to County stemming from any delay in the completion of this project.
- GC 44. HOURS OF WORK
- A. The time of service of any labor, workman or mechanic employed upon any of the Work herein specified, shall be limited and restricted to that allowed by law, and no laborer, workman or mechanic employed upon said Work herein specified shall be required or permitted to labor more than that allowed by law, except in cases of extraordinary emergency caused by fire, military or naval defenses or works in time of war.

- B. Within thirty (30) calendar days after any workman is permitted to work over that allowed by law in any one calendar day due to such an extraordinary emergency, the Contractor shall file with the Owner a verified report setting forth the nature of the said emergency, which shall contain the name of said workman and the hours worked by them on said particular day; and failure to file said report within the said thirty day period shall be prima facie evidence that no extraordinary emergency existed.
- C. The Contractor and each subcontractor shall keep an accurate record showing the name of and actual hours worked by each worker employed by said Contractor and subcontractor in connection with the work contemplated by this agreement. The record shall be kept open at all reasonable hours to inspection by the Owner or its officers or agents and by the Division of Labor Law Enforcement of the Department of Industrial Relations.
- D. The Contractor shall forfeit as a penalty to the Owner twenty-five dollars (\$25) for each laborer, workman or mechanic employed in the execution of this Contract by them or by any subcontractor under him, upon any public work herein specified for (a.) each calendar day during which any laborer, workman or mechanic is required or permitted to labor more than that allowed by law; or (b.) each calendar week during which any laborer, workman or mechanic is required or permitted to labor more than that allowed by law of the Labor Code of the State of California. Said sums and amounts which shall have been so forfeited pursuant to the herein paragraph and said provisions of said Labor Code shall be withheld and retained from payments due to the Contractor under this Contract, pursuant to this Contract, and the terms of said Code; but no sum shall be so withheld, retained or forfeited except from the final payment without a full investigation by either the Division of Labor Law Enforcement of the State Department of Industrial Relations or by the Owner.

GC 45. PREVAILING WAGE RATES & PAYROLL RECORDS

A. Prevailing Wage Rates

- 1. Pursuant to section 1770 and following of the Labor Code of the State of California, the Director of Industrial Relations has ascertained the general prevailing rate of per diem wages and the rates for overtime and holiday work in the locality in which the work is to be performed for each craft, classification or type of worker needed to execute the Contract which will be awarded to the successful bidder, copies of which are on file at Humboldt County Public Works, 1106 Second Street, Eureka, CA 95501, Phone (707) 445-7493 and are available to interested parties on request and by reference are incorporated herein and made a part hereof. Contractor will maintain a copy of prevailing rates and wages on the job site during the contract period.
- 2. It shall be mandatory upon the Contractor and upon any subcontractor under it, to pay not less than the specified rates to all laborers, workers, and mechanics employed in the execution of the Contract. It is further expressly stipulated that the Contractor shall, as a penalty to the Owner, forfeit not more than \$200 for each calendar day, or portion thereof, for paying less than the stipulated prevailing rates for any work done under this contract by Contractor or by any subcontractor under it; and Contractor agrees to comply with all provisions of Section 1775 of the Labor Code.
- 3. In case it becomes necessary for the Contractor or any subcontractor to employ on the project under this Contract any person in a trade or occupation (except executives, supervisory, administrative, clerical, or other non-manual workers as such) for which no minimum wage rate is herein specified, the Contractor shall immediately notify the Owner, who will promptly thereafter determine the prevailing rate for such additional trade or occupation and shall furnish the Contractor with the minimum rate based thereon. The minimum rate thus furnished shall be applicable as a minimum for such trade or occupation from the time of the initial employment of the person affected and during the continuance of such employment. Each contractor shall file a certified copy of the payroll records with the entity that requested the records within ten (10) days after receipt of a written request.
- 4. Any copy of records made available for inspection as copies and furnished upon request to the public or any public agency by the Owner, shall be marked or obliterated in such a manner as to prevent disclosure of an individual's name, address, and social security

- number. The name and address of the contractor awarded the contract for performing the contract shall not be marked or obliterated.
5. The Contractor shall inform the Owner of the location of the payroll records, including the street address, city and county, and shall, within five working days, provide a notice of any change of location and address.
 6. The Prime Contractor shall be responsible for compliance with this section.
- B. Payroll Records. The Contractor agrees to comply with all requirements of Section 1776 of the Labor Code, including, without limitation, the following:
1. The Contractor and each subcontractor shall keep an accurate payroll record, showing the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by it in connection with the public work. Each payroll record shall be verified by written declaration, under penalty of perjury, stating both the following:
 - a. The information contained in the payroll record is true and correct.
 - b. The employer has complied with the requirements of sections 1771, 1811 and 1815 of Labor Code for any work performed by his employees on the project.
 2. The above-referenced payroll records shall be certified and shall be available for inspection at all reasonable hours at the principal office of the Contractor on the following basis:
 - a. A certified copy of an employee's payroll record shall be made available for inspection or furnished to the employee or their authorized representative on request;
 - b. A certified copy of all payroll records shall be made available for inspection or furnished upon request to the Owner, the Division of Labor Standards Enforcement, or the Division of Apprenticeship Standards of the Department of Industrial Relations.
 - c. A certified copy of all payroll records shall be made available upon request by the public for inspection or copies thereof made; provided, however, that a request by the public shall be made through either the Owner, the Division of Apprenticeship Standards, or the Division of Labor Standards Enforcement. If the requested payroll records have not been provided, pursuant to paragraph b. above, the requesting party shall, prior to being provided the records, reimburse the cost of the Contractor, subcontractors, and the entity through which the request was made. The public shall not be given access to the records at the principal office of the Contractor.
- C. Pursuant to Section 1771.1(a) of the California Labor Code, a contractor or subcontractor shall not be qualified to bid on, be listed in a bid proposal, subject to the requirements of Section 4104 of the Public Contract Code, or engage in the performance of any contract for public work, as defined in Sections 1770 et seq. of the Labor Code, unless currently registered and qualified to perform public work pursuant to Section 1725.5 of the Labor Code. It is not a violation of Section 1771.1(a) for an unregistered contractor to submit a bid that is authorized by Section 7029.1 of the Business and Professions Code or by Section 10164 or 20103.5 of the Public Contract Code, provided the contractor is registered to perform public work pursuant to Section 1725.5 at the time the contract is awarded.
- GC 46. TAXES
- A. Any federal, state or city tax, including sales, excise, use and other taxes payable on articles furnished by the Contractor under the Contract shall be included in the Contract Price and paid for by the Contractor.
- GC 47. SUBCONTRACTORS
- A. In accordance with the provisions of Section 4100 et seq. of the Public Contract Code of the State of California, each bidder for the work herein specified shall set forth in their Bid Proposal the name and location of the place of business of each subcontractor who will perform work or labor or render

- service to the General Contractor in or about the construction of the Work or improvements an the amount in excess of one-half (1/2) of one percent (1%) of the General Contractor's total Base Bid; and the portion of the Work which will be done by each subcontractor if the Contract or said Work is awarded to said Bidder.
- B. If any General Contractor fails to specify a subcontractor or specifies more than one subcontractor for the same portion of the Work to be performed on the Contract in excess of one-half of one percent of the General Contractor's total Bid, Contractor agrees to perform such portion himself and, if Contractor's Bid is accepted, Contractor shall not be permitted to subcontract that portion of the Work.
- C. Should the General Contractor violate any provision of the subletting and subcontracting Fair Practices Act, the Contractor will be deemed in violation of the contract and the Owner may at it's option, (1) cancel the Contract. (2) assess upon the Contractor a penalty in an amount of not more than ten percent (10%) of the amount of the subcontract involved.
- D. Prior to the award of the Contract, the Owner's Representative shall notify the successful bidder in writing if the Owner, after due investigation, has reasonable objection to any person or organization on the required list of subcontractors. Failure of the Owner to make an objection to any person or organization on the list prior to the award shall constitute acceptance of such person or organization.
- E. The Contractor shall not contract with any subcontractor or any person or organization for any portion of the work who has not been accepted by the Owner. The Contractor will not be required to contract with any subcontractor or person or organization against whom Contractor has a reasonable objection.
- F. If after the award of the contract, the Owner refuses to accept any person or organization on the required list of subcontractors, the Contractor shall submit an acceptable substitute and the Contract Sum shall be increased or decreased by the difference in cost occasioned by such substitution, and an appropriate Change Order shall be issued; however, no increase in the Contract Sum shall be allowed for any such substitution unless the Contractor has acted promptly and responsively in submitting a name with respect thereto prior to the award.
- G. After the award, the Contractor shall resubmit the list of subcontractors, corrected or modified as may be necessary as directed by the Owner.
- H. Subcontracting
1. Nothing contained in the Contract Documents shall be construed as creating any contractual relationship between Owner and any subcontractor. The Divisions or Sections of the Specifications, and the divisioning of the Drawings are not intended to control the Contractor in dividing the Work among subcontractors or to limit the Work performed by any trade.
2. The Owner, Owner's Representative or Architect will not undertake to settle any differences between the Contractor and their subcontractors or between subcontractors.
3. 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 Owner may exercise over the Contractor under any provision of the Contract Documents. The Contractor shall make available to each proposed subcontractor prior to the execution of the Subcontract, copies of the Contract Documents to which the subcontractor will be bound by this Paragraph and identify to the subcontractor any terms and conditions of the proposed Subcontract which may be at variance with the Contract Documents. Each subcontractor shall similarly make copies of such Documents available to their sub-subcontractors.
- I. Payments to Subcontractors:
1. Contractor shall pay each subcontractor or supplier upon receipt of payment from Owner, an amount equal to the percentage of completion allowed to Contractor on account of such work

- performed or material supplied. Contractor shall also require each subcontractor to make similar payments to their subcontractors or suppliers.
2. Contractor shall pay each subcontractor a just share of any insurance monies received by Contractor when and as applicable, and Contractor shall require each subcontractor to make similar payments to their subcontractors or suppliers.
 3. The Owner's Representative may, on request and at their discretion, furnish to any subcontractor, if practicable, information regarding percentages of completion certified to the Owner on account of Work done under the Contract.
 4. Neither Owner, Owner's Representative or Architect shall have any obligation to see to the payment of any monies to any subcontractor except as may otherwise be required by law.
- GC 48. RECORDS, ACCOUNTS AND SEGREGATED PRICES
- A. Contractor agrees to keep one complete set of records and books of accounts, on a recognized cost accounting basis, satisfactory to Owner and Owner's Representative showing all expenditures, of whatever nature, made pursuant to this Contract.
 - B. Contractor shall furnish such records, information and data as may be reasonably required and shall cooperate with Owner or Owner's Representative in establishing total costs for various major portions of the Work as will be designated by the Owner's Representative.
 - C. If required for convenience of Owner's accounting, Contractor shall furnish segregated prices for various other portions of the Work. These segregated prices shall be in addition to or separate from the required Schedule of Values.
- GC 49. LIABILITY FOR TREES
- A. In case of damage to or loss of trees due to carelessness or lack of sufficient protective measures specified, Contractor shall forfeit an amount in proportion to the extent of damage or loss, which shall not be less than Two hundred (\$200) dollars nor exceed One Thousand (\$1,000) dollars per tree for total loss.
- GC 50. LIABILITY FOR SURVEY MARKS
- A. In case of damage to, disturbance or removal of survey marks, field markers, monuments, or other survey or layout devices due to carelessness or lack of sufficient protective means, the party responsible for such damage, disturbance or removal shall be liable for the expense to have them replaced and reset in compliance with specified requirements.
- GC 51. CLAIMS PROCEDURES
- A. For purposes of this section:
 1. "Claim" means a separate demand by a contractor sent by registered mail or certified mail with return receipt requested, for one or more of the following:
 - a. A time extension, including, without limitation, for relief from damages or penalties for delay assessed by the County under the contract for the project.
 - b. Payment by the County of money or damages arising from work done by, or on behalf of, the contractor pursuant to the contract for the project and payment for which is not otherwise expressly provided or to which the claimant is not otherwise entitled.
 - c. Payment of an amount that is disputed by the County.
 2. "Contractor" means any type of contractor within the meaning of Chapter 9 (commencing with Section 7000) of Division 3 of the California Business and Professions Code who has entered into a direct contract with the County for a project.
 3. "Subcontractor" means any type of contractor within the meaning of Chapter 9 (commencing with Section 7000) of Division 3 of the California Business and Professions Code who either is in direct contract with a Contractor or is a lower tier subcontractor.

- B. Upon receipt of a Contractor's claim, the County shall conduct a reasonable review of the claim and, within a period not to exceed 45 days, shall provide the claimant a written statement identifying what portion of the claim is disputed and what portion is undisputed. Upon receipt of a claim, the County and a contractor may, by mutual agreement, extend the time period provided in this section.
- C. The claimant shall furnish reasonable documentation to support the claim.
- D. If the County needs approval from its Board of Supervisors to provide the claimant a written statement identifying the disputed portion and the undisputed portion of the claim, and the governing body does not meet within the 45 days or within the mutually agreed to extension of time following receipt of a claim sent by registered mail or certified mail, return receipt requested, the County shall have up to three days following the next duly publicly noticed meeting of the governing body after the 45-day period, or extension, expires to provide the claimant a written statement identifying the disputed portion and the undisputed portion.
- E. Any payment due on an undisputed portion of the claim shall be processed and made within 60 days after the County issues its written statement. If the County fails to issue a written statement, paragraph (K) shall apply.
- F. If the Contractor disputes the County's written response, or if the County fails to respond to a claim issued pursuant to this section within the time prescribed, the Contractor may demand in writing an informal conference to meet and confer for settlement of the issues in dispute. Upon receipt of a demand in writing sent by registered mail or certified mail, return receipt requested, the County shall schedule a meet and confer conference within 30 days for settlement of the dispute.
- G. Within 10 business days following the conclusion of the meet and confer conference, if the claim or any portion of the claim remains in dispute, the County shall provide the Contractor a written statement identifying the portion of the claim that remains in dispute and the portion that is undisputed. Any payment due on an undisputed portion of the claim shall be processed and made within 60 days after the County issues its written statement. Any disputed portion of the claim, as identified by the contractor in writing, shall be submitted to nonbinding mediation, with the County and the claimant sharing the associated costs equally. The County and Contractor shall mutually agree to a mediator within 10 business days after the disputed portion of the claim has been identified in writing. If the parties cannot agree upon a mediator, each party shall select a mediator and those mediators shall select a qualified neutral third party to mediate with regard to the disputed portion of the claim. Each party shall bear the fees and costs charged by its respective mediator in connection with the selection of the neutral mediator. If mediation is unsuccessful, the parts of the claim remaining in dispute shall be subject to applicable procedures outside this section.
- H. For purposes of this section, mediation includes any nonbinding process, including, but not limited to, neutral evaluation or a dispute review board, in which an independent third party or board assists the parties in dispute resolution through negotiation or by issuance of an evaluation. Any mediation utilized shall conform to the timeframes in this section.
- I. Unless otherwise agreed to by the County and the Contractor in writing, the mediation conducted pursuant to this section shall excuse any further obligation under Section 20104.4 to mediate after litigation has been commenced.
- J. This section does not preclude the County from requiring arbitration of disputes under private arbitration or the Public Works Contract Arbitration Program, if mediation under this section does not resolve the parties' dispute.
- K. Failure by the County to respond to a claim from the Contractor within the time periods described in this subdivision or to otherwise meet the time requirements of this section shall result in the claim being deemed rejected in its entirety. A claim that is denied by reason of the County's failure to have responded to a claim, or its failure to otherwise meet the time requirements of this section, shall not constitute an adverse finding with regard to the merits of the claim or the responsibility or

qualifications of the claimant.

- L. Amounts not paid in a timely manner as required by this section shall bear interest at 7 percent per annum.
- M. If a subcontractor or a lower tier subcontractor lacks legal standing to assert a claim against the County because privity of contract does not exist, the Contractor may present to the County a claim on behalf of a subcontractor or lower tier subcontractor. A subcontractor may request in writing, either on his or her own behalf or on behalf of a lower tier subcontractor, that the Contractor present a claim for work which was performed by the subcontractor or by a lower tier subcontractor on behalf of the subcontractor. The subcontractor requesting that the claim be presented to the County shall furnish reasonable documentation to support the claim. Within 45 days of receipt of this written request, the Contractor shall notify the subcontractor in writing as to whether the Contractor presented the claim to the County and, if the original Contractor did not present the claim, provide the subcontractor with a statement of the reasons for not having done so.
- N. A waiver of the rights granted by this section is void and contrary to public policy, provided, however, that (1) upon receipt of a claim, the parties may mutually agree to waive, in writing, mediation and proceed directly to the commencement of a civil action or binding arbitration, as applicable, and (2) the County may prescribe reasonable change order, claim, and dispute resolution procedures and requirements in addition to the provisions of this section, so long as the contractual provisions do not conflict with or otherwise impair the time frames and procedures set forth in this section.

GC 52. ATTORNEY'S FEES

- A. Contractor hereby agrees to pay Owner, Owner's Representative and/or Architect a reasonable sum as attorney's fees in all court actions including arbitration brought by either of them against the other or in which they are both plaintiffs or defendants, and also in court actions involving claims of subcontractors or material suppliers and in actions involving offsetting claims between Contractor and Owner, Owner's Representative or Architect because of any doubts, disputes or actions arising out of this Contract, except in the following cases:
 - 1. When Contractor obtains a favorable net judgment against the Owner, Owner's Representative and/or Architect after consideration of claims and offsets of Owner which are allowed by the court against Contractor for breach of this Contract;
 - 2. When Owner, Owner's Representative and/or Architect is denied a favorable judgment by a court in a suit against Contractor which may be brought by Owner, Owner's Representative or Architect.

END OF SECTION 00 72 00

SECTION 00 73 00 - SUPPLEMENTARY GENERAL CONDITIONS

INDEX TO SUPPLEMENTARY GENERAL CONDITIONS

SGC	1.	GUARANTEE WORK	2
SGC	2.	LAWS AFFECTING PUBLIC WORKS	2
SGC	3.	OWNER'S REPRESENTATIVE, PROJECT INSPECTOR	2
SGC	4.	RESPONSIBILITY FOR COMPLIANCE WITH OSHA	2
SGC	5.	AS BUILT DRAWINGS	2
SGC	6.	FINAL CERTIFICATES	3
SGC	7.	LIENS AND STOP NOTICES	3
SGC	8.	GUARANTEES AND MAINTENANCE MANUALS	3
SGC	9.	THE WORK	3
SGC	10.	THE PROJECT	3
SGC	11.	OWNER	4
SGC	12.	OWNER'S RIGHT TO STOP THE WORK	4
SGC	13.	OWNER'S RIGHT TO CARRY OUT THE WORK	4
SGC	14.	INDEMNIFICATION	4
SGC	15.	COMPLIANCE WITH TITLES 24, CALIFORNIA CODE OF REGULATIONS AND THE UNIFORM BUILDING CODE	5
SGC	16.	LIABILITY OF CONTRACTOR	5
SGC	17.	NUCLEAR FREE HUMBOLDT COUNTY ORDINANCE COMPLIANCE	5
SGC	18.	REQUIRED LISTING OF PROPOSED SUBCONTRACTORS	5
SGC	19.	NONDISCRIMINATION	6
SGC	20.	HAZARDOUS WASTE IN EXCAVATION	6
SGC	21.	CONSTRUCTION ACTIVITIES	6
SGC	22.	DISCOVERY OF HUMAN REMAINS OR AN ARCHAEOLOGICAL SITE	6
SGC	23.	CONTRACTOR RESPONSIBILITY AND DEBARMENT	7
SGC	24.	BID PROTEST	7
SGC	25.	SECURITY BADGES	8
SGC	26.	SUPERVISORY BACKGROUND CHECKS	8

SGC 1. GUARANTEE WORK

- A. In the event of failure of Contractor to comply with the requirements of any guarantee by this Contract within seven (7) days after being notified in writing, Owner is authorized to proceed to have the defects repaired and made good at the expense of Contractor, who shall pay the costs and charges therefore immediately on demand.

SGC 2. LAWS AFFECTING PUBLIC WORKS

- A. Attention to bidders is called to necessity of being familiar with the various Federal, State and Local laws affecting public work, especially, but not limited to, those laws relating to hours of employment, minimum wage rates, payment of wages, sanitary and safety conditions for workmen, workmen's compensation insurance, type and kind of materials that can be used, non-discrimination in employment and affirmative-action programs. Contractor is advised that this project is being paid for by State and local funds. Contractor shall comply with applicable regulations and hold harmless the Owner for their failure to comply. Certain of those provisions may be set forth herein or in the General Construction Contract. The existence of these provisions does not excuse the Contractor from complying with other statutory requirements or provisions which are not set forth in these Contract Documents.

SGC 3. OWNER'S REPRESENTATIVE, INSPECTOR

- A. The Owner will employ an "Owner's Representative" and "Inspector". The Inspector will observe the installation of all materials and equipment to be incorporated into the Work and the placing of such materials and equipment to determine in general if the Work is proceeding in accordance with the Contract Documents. On the basis of their observations, the Inspector will keep the Owner's Representative informed as to the progress of the Work and will endeavor to guard the Owner against defects and deficiencies in the Work of the Contractor and subcontractors employed by the Contractor in the prosecution of the Work. The Owner's Representative and Inspector shall not be responsible for means, methods, techniques, sequences or procedures of construction, nor be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents.

SGC 4. RESPONSIBILITY FOR COMPLIANCE WITH OSHA

- A. All work, materials, work safety procedures and equipment shall be in full accordance with the latest OSHA rules and regulations.
- B. Contractor warrants that Contractor and each of their subcontractors shall, in performance of this Contract, comply with each and every compliance order issued pursuant to OSHA and CAL-OSHA. The Contractor assumes full and total responsibility for compliance with OSHA and CAL-OSHA Standards by their subcontractors as well as himself. The cost of complying with any compliance order and/or payment of any penalty assessed pursuant to OSHA and CAL-OSHA shall be borne by the Contractor. Contractor shall save, keep and hold harmless the Owner and all officers, employees and agents thereof from all liabilities, costs or expenses in law or in equity, that may at any time arise or be set up because of Contractor's or subcontractor's non-compliance or alleged non-compliance with OSHA and CAL-OSHA requirements.
- C. Nothing contained herein shall be deemed to prevent the Contractor and their subcontractors from otherwise allocating between themselves responsibility for compliance with OSHA and CAL-OSHA requirements; provided, however, that the Contractor shall not thereby be, in any manner whatsoever, relieved of their responsibility to the Owner as herein above set forth.

SGC 5. AS BUILT DRAWINGS

- A. The Contractor shall be given an extra set of drawings and specifications which shall be kept at the site of the Work at all times. Exact locations of all pipes and conduits, and all changes in construction and details shall be indicated and dimensioned upon these drawings, and all

changes in materials and equipment installed shall be indicated in these specifications. The as-built drawings shall be current (up-to-date) to qualify for payment; the job Inspector will verify. Upon completion of the Work, the As-Built Drawings shall be prepared by the Contractor and Specifications shall be reviewed by the Owner's Representative and Consultants and returned to the Owner prior to the final payment. The As-Built Drawings shall be neatly drafted on erasable mylar reproducible transparencies, or printed on vellum and submitted as a .dwg file if prepared electronically.

SGC 6. FINAL CERTIFICATES

- A. When the Work is ready for acceptance, by the Owner, the Owner's Representative shall so certify in writing to the Owner, indicating substantial completion and that the building can be occupied and used and a Certificate of Acceptance will be issued to the Contractor which will bring their Progress Payment up to ninety-five (95%) percent of the Contract Price, with five (5%) percent to remain in retention until after Notice of Completion, less sums withheld regarding liquidated damages, if any, or any other damages incurred by owner, or other sums withheld pursuant to the terms of this agreement or by law.
- B. Notice of Completion will be filed by the Owner after substantial completion and acceptance of the Work by the Board of Supervisors. Providing no stop notices have been filed, thirty-five days after filing of such notice of completion, payment due under the Contract will become due to the Contractor and the Owner's Representative shall so certify to the Owner authorizing the final payment. Such payment may withhold any reasonable sums payable to Contractor for any Work which has not been completed on said date, or that the Owner may have found defective and ordered to be replaced; final payment for withholding to be made when certified by Owner's Representative in writing to Owner.

SGC 7. LIENS AND STOP NOTICES

- A. Should Stop Notices be filed with the Owner, Owner shall in accordance with California Civil Code Section 9358, withhold the amount claimed, plus an allowance of 25% to cover its litigation costs plus interest at the rate of 10%, from certificates until such claims have been resolved pursuant to law.

SGC 8. GUARANTEES AND MAINTENANCE MANUALS

- A. The Contractor and each subcontractor and each supplier shall provide to the Owner, copies of all maintenance guarantees, maintenance manuals and technical specifications relating to their portion of the Project prior to completion of the Project, and in accordance with the GENERAL REQUIREMENTS, PROJECT CLOSE-OUT.

SGC 9. THE WORK

- A. The Work comprises the completed construction required by the Contract Documents and approved change orders and includes all labor necessary to produce such construction, and all materials and equipment incorporated or to be incorporated in such construction.

SGC 10. THE PROJECT

- A. The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part.
- B. By executing the Contract, the Contractor represents that Contractor has visited the sites, familiarized themselves with the local conditions under which the Work is to be performed, and correlated their observations with the requirements of the Contract Documents.
- C. The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work. The Contract Documents are complementary, and what is required by any one shall be as binding as if required by all. Work not covered in the Contract Documents will not be

required unless it is consistent therewith and is reasonably inferable therefrom as being necessary to produce the intended results. Words and abbreviations which have well-known technical or trade meanings are used in the Contract Documents in accordance with such recognized meanings.

- D. The organization of the Specifications into divisions, sections and articles, and the arrangement of Drawings shall not control the Contractor in dividing the Work among subcontractors or in establishing the extent of Work to be performed by any trade.

SGC 11. OWNER

- A. The Owner shall forward all instruction to the Contractor through the Owner's Representative.
- B. Information or services under the Owner's control shall be furnished by the Owner with reasonable promptness to avoid delay in the orderly progress of the Work.

SGC 12. OWNER'S RIGHT TO STOP THE WORK

- A. If the Contractor fails to correct defective Work as required by GC 17, or persistently fails to carry out the Work in accordance with the contract Documents, the Owner, by a written order signed personally or by an agent specifically so empowered by the Owner in writing, may order the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of the Owner to stop the Work shall not give rise to any duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity.

SGC 13. OWNER'S RIGHT TO CARRY OUT THE WORK

- A. If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within seven (7) calendar days after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, after seven (7) calendar days following receipt by the Contractor of an additional written notice and without prejudice to any other remedy the Owner may have, make good such deficiencies. In such case an appropriate Change Order shall be issued deducting from the payments then or thereafter due the Contractor the cost of correcting such deficiencies, including compensation for the Owner's Representative or Architect's additional services made necessary by such default, neglect or failure. If the payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner immediately upon demand.

SGC 14. INDEMNIFICATION

- A. To the fullest extent permitted by law, the Contractor shall indemnify, defend and hold harmless the Owner, Owner's Representative, Inspector and the Architect and their agents and employees from and against all claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from the performance of the Work, provided that any such claim, damage, loss or expense is (1) attributable to bodily injury, sickness, disease or death, or the injury to or destruction of tangible property (other than the Work itself) including the loss of use resulting therefrom, and (2) is caused in whole or in part by any negligent act or omission of the Contractor, and subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder; excepting only such claims as are caused by the sole negligence or willful misconduct of the Owner, Owner's Representative, Inspector or Architect. Such obligation shall not be construed to negate, abridge, or otherwise reduce any other right or obligation of indemnity which would otherwise exist as to any party or person described in this paragraph.
- B. In any and all claims against the Owner, Owner's Representative, Inspector or the Architect or any of their agents or employees by any employee of the Contractor, any subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation under this paragraph shall not be limited in any way by any limitation on the

amount or type of damages, compensation or benefits payable by or for the Contractor or any subcontractor under Workers' or Workmen's Compensation Acts, disability benefit acts or other employee benefit acts.

- C. The obligations of the Contractor under this paragraph shall not extend to the liability of Owner's Representative or the Architect, their agents or employees, arising out of (1) the preparation or approval of maps, drawings, opinions, reports, surveys, change orders, design or specification, or (2) the giving of or the failure to give directions or instruction by the Owner's Representative or the Architect, their agents or employees provided such giving or failure to give is the primary cause of the injury or damage.

SGC 15. COMPLIANCE WITH TITLE 24, CALIFORNIA CODE OF REGULATIONS AND THE INTERNATIONAL BUILDING CODE

- A. Governing Codes: Title 24, California Code of Regulations (C.C.R.), latest edition which adopts and amends the International Building Code, latest edition; International Fire Code, latest edition; Uniform Mechanical Code, latest edition; National Electrical Code, latest edition; Uniform Mechanical Code, latest edition; and the Uniform Plumbing Code, latest edition. The project shall also comply with the Americans with Disabilities Act, and the latest editions of associated regulations.

SGC 16. LIABILITY OF CONTRACTOR

- A. The Contractor shall do all of the Work and furnish all labor, materials, tools, and appliances, except as otherwise herein expressly stipulated, necessary or proper for performing the Work herein required in the manner and within the time herein specified. The mention of any specific duty or liability imposed upon the Contractor shall not be construed as a limitation or restriction of any general liability or duty imposed upon the Contractor by this contract, said reference to any specific duty or liability being made herein merely for the purpose of explanation.

- B. The right of general supervision by the Owner shall not make the Contractor an agent or employee of the Owner, and the liability of the Contractor for all damages to persons or to public or private property arising from the Contractor's execution of the Work shall not be lessened because of such general supervision.

- B. Until the completion and final acceptance by the Owner of all of the Work under and implied by this contract, the Work shall be under the responsible care and charge of the Contractor. The Contractor shall rebuild, repair, restore and make good all injuries, damages, re-erectations and repairs occasioned or rendered necessary or caused of any nature whatsoever, excepting only acts of God not covered by the all-risk insurance policy called for in Article GC 4 and not other, to all or any portions of the Work except as otherwise expressly stipulated.

SGC 17. NUCLEAR FREE HUMBOLDT COUNTY ORDINANCE COMPLIANCE

- A. Neither the Contractor, their Subcontractors or their suppliers are Nuclear Weapons Contractors, and are not knowingly or intentionally engaged in the research, development, production, or testing of nuclear warheads, nuclear weapons systems, or nuclear weapons components, as defined by the Nuclear Free Humboldt County Ordinance. Contractor, their Subcontractors and/or their suppliers agree to notify Owner immediately if they become a nuclear weapons contractor as defined above.

SGC 18. REQUIRED LISTING OF PROPOSED SUBCONTRACTORS

- A. Each proposal shall have listed therein the name, address, description of work and contractor's license number of each subcontractor to whom the bidder proposes to subcontract portions of the work in the amount of 1/2 of one percent of their total bid, in accordance with the Subletting and Subcontracting Fair Practices Act, commencing with Section 4100 of the Public Contract Code and for verification of conformance with Labor Code Sections 1771 and 1725.5. The bidder's attention is

invited to other provisions of said Act related to the imposition of penalties for a failure to observe its provisions by using unauthorized subcontractors or by making unauthorized substitutions.

- B. Pursuant to Section 1771.1(a) of the California Labor Code, a contractor or subcontractor shall not be qualified to bid on, be listed in a bid proposal, subject to the requirements of Section 4104 of the Public Contract Code, or engage in the performance of any contract for public work, as defined in Sections 1770 et seq. of the Labor Code, unless currently registered and qualified to perform public work pursuant to Section 1725.5 of the Labor Code. It is not a violation of Section 1771.1(a) for an unregistered contractor to submit a bid that is authorized by Section 7029.1 of the Business and Professions Code or by Section 10164 or 20103.5 of the Public Contract Code, provided the contractor is registered to perform public work pursuant to Section 1725.5 at the time the contract is awarded.
- C. A sheet for listing the subcontractors, as required herein, is included in the proposal- Please reference Section 00 43 36 "Subcontractor List."

SGC 19. NONDISCRIMINATION

- A. During the performance of this contract, the Contractor and its subcontractors shall not deny the contract's benefits to any person on the basis of religion, color, ethnic group identification, sex, age, physical or mental disability, nor shall they unlawfully discriminate, harass or allow harassment, against any employee or applicant for employment because of sex, race, color, ancestry, religious creed, national origin, disability (including HIV and AIDS), medical condition (cancer), age (over 40), marital status, denial of family care leave and denial of pregnancy disability leave in connection with any program or activity funded in whole or in part by Federal and/or State funds provided through this grant contract.
- B. Contractor and all subcontractors shall insure that the evaluation and treatment of their employees and applicants for employment are free from such discrimination and harassment. Contractor and subcontractors shall comply with the provisions of the Fair Employment and Housing Act (Government Code, Section 12990 [a-f] et seq.) and the applicable regulations promulgated thereunder (California Code of Regulations, Title 2, Section 7285.0 et seq.).
- C. The applicable regulations of the Fair Employment and Housing Commission implementing Government Code, Section 12990 (a-f), set forth in Chapter 5 of Division 4 of Title 2 of the California Code of Regulations are incorporated into this contract by reference and made a part hereof as set forth in full. Contractor and subcontractors shall give written notice of their obligations under this clause to labor organizations with which they have a collective bargaining or other agreement.
- D. Contractor shall comply with all applicable nondiscrimination laws and regulations.
- E. The Contractor and all subcontractors shall include the nondiscrimination and compliance provisions of this clause in all contracts and subcontracts to perform work under the contract.

SGC 20. HAZARDOUS WASTE IN EXCAVATION

- A. If the Contractor encounters material in excavation which Contractor has reason to believe may be hazardous waste, as defined by Section 25117 of the Health and Safety Code, Contractor shall immediately so notify the Owner's Representative in writing. Excavation in the immediate area of the suspected hazardous material shall be suspended until the OWNER authorizes it to be resumed. If such suspension delays the current controlling operation, the Contractor will be granted an extension of time by means of a change order.
- B. The Owner reserves the right to use other forces for exploratory work to identify and determine the extent of such material and for removing hazardous material from such area.

SGC 21. CONSTRUCTION ACTIVITIES

- A. Construction activities at the site shall be as required by the Contractor to complete the project by the prescribed completion date. Contractor must comply with Noise Abatement Provisions.

SGC 22. DISCOVERY OF HUMAN REMAINS OR AN ARCHAEOLOGICAL SITE

- A. If during construction activities, human remains or evidence of an archaeological site, including outhouse pits, construction shall be immediately halted and the Owner's Representative notified who will request an evaluation by a qualified archaeologist, approved by the Owner as to whether the discovery constitutes an "important archaeological resource" as defined in Section III, Appendix K of the CEQA Guidelines.
- B. If the resource is determined to be important, mitigation shall proceed as outlined by Appendix K of the Guidelines and as recommended by the archaeologist.

SGC 23. CONTRACTOR RESPONSIBILITY AND DEBARMENT

- A. A responsible contractor is a contractor who has demonstrated the attribute of trustworthiness, as well as quality, fitness, capacity and experience to satisfactorily perform the contract. It is the County's policy to conduct business only with responsible contractors. (Ord. 2291, § 1, 01/07/2003)
- B. The contractor is hereby notified that, in accordance with Title II, Division 14 of the County Code, if the County acquires information concerning the performance of the contractor on this or other contract which indicates that the contractor is not responsible, the County may, in addition to other remedies provided in the contract, debar the contractor from bidding on County contracts for a specified period of time, not to exceed three (3) years, and terminate any or all existing contracts the contractor may have with the County. (Ord. 2291, § 1, 01/07/2003)
- C. The County may debar a contractor if the Board of Supervisors finds, in its discretion, that the contractor has done any of the following: (1) violated any term of a contract with the County; (2) committed any act or omission which negatively reflects on the contractor's quality, fitness, or capacity to perform a contract with the County or any other public entity, or engaged in a pattern or practice which negatively reflects on same; (3) committed an act or offense which indicates a lack of business integrity or business honesty; or (4) made or submitted a false claim against the County or any other public entity. (Ord. 2291, § 1, 01/07/2003)
- D. If there is evidence that the contractor may be subject to debarment, the department will notify the contractor in writing of the evidence which is the basis for the proposed debarment and will advise the contractor of the scheduled date for a debarment hearing before the CHB (Contractor's Hearing Board). (Ord. 2291, § 1, 01/07/2003)
- E. The CHB will conduct a hearing where evidence on the proposed debarment is presented. The contractor and/or the contractor's representative shall be given an opportunity to submit evidence at that hearing. After the hearing, the CHB shall prepare a proposed decision, which shall contain a recommendation regarding whether the contractor should be debarred, and, if so, the appropriate length of time of the debarment. If the contractor fails to avail itself of the opportunity to submit evidence to the CHB, the contractor may be deemed to have waived all rights of appeal. (Ord. 2291, § 1, 01/07/2003)
- F. A record of the hearing, the proposed decision and any other recommendation of the CHB shall be presented to the Board of Supervisors. The Board of Supervisors shall have the right to modify, deny or adopt the proposed decision and recommendation of the hearing board. (Ord. 2291, § 1, 01/07/2003)
- G. These terms shall also apply to subcontractors and subconsultants of County contractors. (Ord. 2291, § 1, 01/07/2003)

SGC 24. BID PROTEST

Any bid protest must be in writing and must be received by the ADA Coordinator, Humboldt County Administrative Office ADA Compliance Team, 825 5th Street, Room 112, Eureka, CA, 95501, Fax: (707) 445-7266 or by email at ADA@co.humboldt.ca.us.

before 5:00 p.m. no later than three (3) working days following bid opening (the "Bid Protest Deadline") and must comply with the following requirements:

- A. Only a bidder who has actually submitted a Bid Proposal is eligible to submit a bid protest against another bidder. Subcontractors are not eligible to submit bid protests. A bidder may not rely on the bid protest submitted by another bidder, but must timely pursue its own protest.
- B. The bid protest must contain a complete statement of the basis for the protest and all supporting documentation. Material submitted after the Bid Protest Deadline will not be considered. The protest must refer to the specific portion or portions of the Contract Documents upon which the protest is based. The protest must include the name, address and telephone number of the person representing the protesting bidder if different from the protesting bidder.
- C. A copy of the protest and all supporting documents must also be transmitted by fax or by e-mail, by or before the Bid Protest Deadline, to the protested bidder and any other bidder who has a reasonable prospect of receiving an award depending upon the outcome of the protest.
- D. The protested bidder may submit a written response to the protest, provided the response is received by the Department Director before 5:00 p.m., within two (2) working days after the Bid Protest Deadline or after receipt of the bid protest, whichever is sooner (the "Response Deadline"). The response must include all supporting documentation. Material submitted after the Response Deadline will not be considered. The response must include the name, address and telephone number of the person representing the protested bidder if different from the protested bidder.
- E. The procedure and time limits set forth in this section are mandatory and are the bidder's sole and exclusive remedy in the event of bid protest. The bidder's failure to comply with these procedures shall constitute a waiver of any right to further pursue a bid protest, including filing a Government Code Claim or initiation of legal proceedings.

END OF SECTION 00 73 00

SECTION 01 11 00 - SUMMARY OF WORK

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Contractor's use of site and premises.
- B. County's occupancy requirements.
- C. Specification formats and conventions.

1.2 CONTRACTOR'S USE OF SITE AND PREMISES

- A. Vehicle access to Project site shall be held to a minimum. Vehicle access will be on one specific route approved by County; no exceptions will be allowed.
- B. Coordinate use of the premises under the direction of the County.
- C. Assume full responsibility for the protection and safekeeping of materials, products, and equipment under this Contract, stored on the site.
- D. Move any stored materials, products, and equipment under Contractor's control which interfere with the operations of County or a separate contractor.
- E. Obtain and pay for the use of additional storage or work areas needed for Contractor's operations.
- F. Contractor shall be aware of and abide by the Humboldt County and local Noise Ordinance and County's noise prevention requirements. Contractor to verify County's requirements.

1.3 COUNTY'S OCCUPANCY REQUIREMENTS

- A. Tenant Occupancy: the County's tenants, the Humboldt Department of Health & Human Services Facility, will continue to occupy and use the building during construction, with the exception of areas under construction, during the entire construction period.
- B. Contractor shall cooperate with County and their tenants to minimize conflicts, and to facilitate County's ongoing operations and use of the building.
- C. Contractor shall verify occupancy requirements with County, and schedule the Work to accommodate County's tenant's requirements.
- D. Contractor shall maintain access to existing alternate walkways, entrances to the building and other adjacent occupied or used facilities. Contractor shall not close or obstruct walkways or other occupied or used facilities without written permission from County and authorities having jurisdiction.
- E. Contractor shall provide not less than 72 hours of notice to County of activities that will affect Occupants operations.

1.4 ENVIRONMENTAL MANAGEMENT

- A. Spills: Contractor shall clean up all fluid spills caused by leaks in the equipment or generated while Contractor is performing the work under this Contract. Contractor shall provide drip catch pans for all equipment that drips or leaks oils or other fluids. Spills generated by Contractor's operation shall be cleaned up by Contractor at no cost to County.

B. Dust and Noise Control:

1. Precaution shall be exercised at all times to control dust and excessive noise created as a result of any operations during the construction period.
2. If serious problems and/or complaints arise due to airborne dust and excessive noise, and when directed by the County, operations causing such problems shall be temporarily discontinued until a suitable remedy is established. The remedy shall be approved by the County before implementation, and shall be considered part of Contractor's normal effort to maintain safety and cleanliness without cause for further payment.

1.5 MATERIALS AND WORKMANSHIP

- A. Except as otherwise specified all materials and equipment incorporated in the Work under the Contract shall be new. All workmanship shall be first-class and by persons qualified in the respective trades.

1.6 ACCIDENT PREVENTION AND PROTECTION OF LIVES AND HEALTH

- A. Precaution shall be exercised at all times for protection of all personnel and occupants, including employees of Contractor, County, and property.
- B. The California Department of Industrial Relations, Division of Occupational Safety and Health (DOSH, also known as Cal/OSHA) requirements for safety and health protection of workers and public apply. Other requirements not covered by Cal/OSHA, shall be in accordance with U.S. Department of Labor, Occupational Safety and Health Administration (OSHA) requirements.
- C. Comply with safety requirements of CCR, Title 8, Division 1, Chapter 4, "Division of Industrial Safety," and Title 8, Division 1, Chapter 3.2, "Cal/OSHA Regulations"; CCR, Title 24, CBC; and other applicable building and construction codes. Machinery, equipment, openings, power lines, and all other safety hazards shall be guarded or eliminated in accordance with safety requirements of Title 8, and Manual of Accident Prevention in Construction published by the Associated General Contractors of America.

1.7 UTILITIES

- A. Excavation at the Project site requires a call to Underground Service Alert North (USA North), 811 or by internet at <http://usanorth811.org>.
1. Contractor shall call USA North at least 7 days prior to commencing excavation work. Obtain a ticket number and confirm service date for marking underground facilities (utilities).
 2. Prior to placing the call, Contractor shall mark the outline of excavation with chalk, paint, or stakes, to enable representatives (locators) of USA North members to map the area for existing underground facilities (utilities).
- B. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by County or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
1. Notify the County not less than three days in advance of proposed utility interruptions.
 2. Obtain County's written permission before proceeding with utility interruptions.
- C. Provide necessary protection to existing utility services and repair work damaged as a result of operations under this Contract.

1.8 PROTECTION OF EXISTING FACILITIES

- A. Contractor shall take appropriate measures to prevent damage to existing facilities, site work, landscaping, and adjoining property. Should damage occur, such facilities, site work, landscaping, and property shall be restored to original condition, at no cost to County.
 - 1. Contractor shall arrange for protection of existing buildings at all times. Contractor shall furnish, install, and maintain, necessary barricades, temporary coverings, etc., as required for protection, and remove them at completion of the Work. When all Work is complete, damaged areas of the premises shall be restored to original undamaged condition that existed prior to installation of temporary protection.
- B. Housekeeping: The premises shall be kept in a clean, safe condition at all times. Rubbish shall be removed as fast as it accumulates.
- C. Burning: Burning of refuse, debris, and construction waste at Project site will not be permitted.

1.9 OVERLOADING

- A. Contractor shall not overload any part or parts of structures beyond their safe calculated carrying capacities by placing materials, equipment, tools, machinery or any other item thereon. No loads shall be placed on floors or roofs before they have attained their permanent and safe strength.

1.10 MANUFACTURER'S INSTRUCTIONS

- A. Where required in the Specifications that materials, products, equipment, and processes be installed or applied in accordance with manufacturer's instructions, directions, or specifications, or stated in words to that effect, it shall be construed to mean that said installation or application shall be in strict accordance with printed instructions furnished by manufacturer of the specified item and is suitable for use under conditions similar to those at the jobsite. Three copies of such instructions shall be included in the applicable submittal and furnished to the County for review. Obtain County's acceptance prior to commencement of the Work.

1.11 RESPONSIBILITY FOR THEFT AND DAMAGE

- A. County will not be responsible for the loss or theft of Contractor's tools, equipment and materials.

1.12 FIRE PROTECTION

- A. Contractor shall at all times maintain good housekeeping practices to reduce the risk of fire and water damage. All scrap materials, rubbish and trash shall be removed daily from jobsite, inside and around the buildings or structures, as applicable, and shall not be scattered on adjacent property.
- B. Suitable storage space shall be provided outside immediate building areas during construction for temporary storage of flammable materials and paints, as required by CFC Chapter 14 and NFPA 241. Excess flammable liquids being used inside the building shall be kept in closed metal containers and be removed from the building during unused periods.
- C. Contractor shall provide temporary fire extinguishers during construction in accordance with the recommendations of CBC Chapter 33, CFC Chapter 14, and NFPA Bulletins Nos. 10 and 241. However, in all cases a minimum of one fire extinguisher shall be available for use.
- D. Under provisions of CFC Chapters 14 and 26, provide a fire extinguisher at each location where cutting, soldering, or welding is being performed. Where electric or gas welding or cutting work is done, interposed shields of noncombustible material shall be used to protect against fire damage due to sparks and hot metal. When temporary heating devices are used, a watchman shall be present to cover periods when other workmen are not on the premises.

1.13 EMERGENCY CONDITIONS

- A. Emergency condition shall be any condition at the Project site which has the actual or potential for significant adverse effects to persons or property, whether or not resulting from Contractor's operations.
- B. Immediate action shall be taken by Contractor by whatever means necessary to alleviate the condition and to prevent damage or injury to persons or property. County shall be notified of the existence of such a condition, but shall not be called upon to perform emergency service.
- C. County may not respond to the emergency condition, which shall not be used as an excuse by Contractor to neglect immediate action; County will not be responsible or liable for any resulting conditions. Absence of Contractor's Representative during emergency conditions at jobsite shall not relieve Contractor from contractual responsibility of providing an immediate response to the situation, for restoration of conditions to normalcy.
- D. If the emergency conditions are not caused by Contractor's fault or neglect, the Contract Sum shall be adjusted to reflect the actual direct field costs of labor and materials to perform and complete emergency measures.
- E. The Contract Time shall also be adjusted to reflect the actual direct effect of such actions to the then critical path of the Construction Progress Schedule. The foregoing notwithstanding, adjustments of the Contract Sum or the Contract Time for actions taken by Contractor in response to emergency circumstances shall be subject to Contractor's strict compliance with all other applicable provisions of the Contract Documents relating to notices and time for delivery of notices.

1.14 SPECIFICATION FORMATS AND CONVENTIONS

- A. Specification Format: The Specifications are organized into Divisions and Sections using the 50-division format and numbering system of CSI "MasterFormat, 2004 Edition.
- B. Division 01 Sections govern the execution of the Work of all Sections in the Specifications.
- C. Specifications Conventions: Singular words shall be interpreted as plural and plural words shall be interpreted as singular, where applicable, as the context of the Contract Documents indicates.
- D. These specifications are written in imperative mood and streamlined form. This imperative language is directed to the Contractor, unless specifically noted otherwise. The words "shall be" are included by inference where a colon (:) is used within sentences or phrases.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01 26 00 - MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling and processing the following contract modifications:
 - 1. Request for Information.
 - 2. Field Order.
 - 3. Request for Cost Proposal.
 - 4. Cost Proposal.
 - 5. Change Orders.

1.3 DEFINITIONS

- A. Request for Information (RFI)
 - 1. Written request submitted by Contractor to Owner's Representative via the County's online project management system on a form supplied by Owner's Representative requesting clarification, interpretation, or additional information pertaining to Contract Documents.
 - 2. An RFI shall not be used as a vehicle for only confirming or verifying issues.
- B. Field Order (FO)
 - 1. Owner's Representative written directives to the Contractor covering a specific aspect of work, signed by the Owner or Owner's lead agency that authorizes changes in the Work to expedite the change order process.
- C. Request for Cost Proposal (RFCP)
 - 1. Written request by the Owner's Representative to the Contractor to quote change to Contract Sum and/or Contract Time for proposed change to Contract Document.
- D. Cost Proposal (CP)
 - 1. Written request by the Contractor to the Owner's Representative to change Contract Sum and/or Contract Time for proposed change to Contract Document.
- E. Change Order (CO)
 - 1. Initiated by the Owner, Contractor, Consultant, Owner's lead agency, or the Owner's Representative and signed by the Owner and Contractor stating their agreement to a change to Contract Documents and adjustment to Sum and/or Contract Time.

1.4 REQUEST FOR INFORMATION (RFI)

- A. Submit RFIs numbered in sequential order, reviewed by the Contractor with respect to Contract Documents.
 - 1. Submit RFIs on forms designated by the Owner's Representative.
- B. Owner's Representative will monitor the RFI process and responses from the Consultant. The Consultant will receive RFIs only from the Owner's Representative; Consultant will not accept RFIs directly from any other entity.
- C. Owner's Representative will receive only legible, properly prepared RFI:
 - 1. Unreadable facsimile machine RFIs, illegibly written RFIs, or RFIs with incomplete information, will be returned promptly without action.
 - 2. RFIs may be transmitted to Owner's Representative by online project management system.
 - a. Owner's Representative will forward to Consultant for review, and return response by same method received from Contractor.
 - 3. Consultant will review RFIs with respect to Contract Documents and return response in a timely manner, generally within 7 calendar days, or commensurate with RFI subject.
 - a. RFIs marked "URGENT" will take precedence over outstanding RFIs and be answered by Consultant as soon as possible.
- D. Contractor being fully familiar with Contract Documents, shall not be relieved of responsibility to coordinate the Work to prevent adverse impact to Project schedule when submitting RFIs to Owner's Representative for clarification or interpretation of Contract Documents, or additional information.
- E. If the Contractor believes the scope of work referenced in the RFI has a cost and /or time impact, he will not proceed with the work until either a Field Order or a Change Order has been issued.

1.5 FIELD ORDER (FO)

- A. Field Orders may include supplementary or revised Drawings and/or Specification to describe changes to Contract Documents.
- B. Field Orders will be executed on forms designated by the Owner's Representative.
- C. Field Orders may be generated by the Contractor's written notice submitted on a Cost Proposal form, that an RFI response or other unforeseen condition has changed the Contract cost and /or time, and that schedule impact will result if written directive is not provided in a timely manner.
- D. Contractor shall provide an estimate of cost and/or time impact at the time of the request for a Field Order.
- E. Owner's Representative will review the request for a Field Order and initiate a written Field Order for authorization by the Owner or Owner's lead agency.
- F. If the Field Order is approved by the Owner or Owner's lead agency, Owner's Representative will release the signed Field Order to the Contractor. If rejected, the Contractor is so notified by the Owner's Representative.

1.6 REQUEST FOR COST PROPOSAL (RFCP)

- A. Request for Cost Proposal is an informational request only, and is not an instruction or authorization to execute a change, or an order to stop Work in progress.

- B. Request for Cost Proposal may include supplementary or revised Drawings and/or Specification to describe proposed changes to Contract Documents.
- C. Contractor shall submit cost and/or time quotation to Owner's Representative within 15 calendar days following receipt of Request for Cost Proposal.

1.7 COST PROPOSAL (CP)

- A. Contractor shall submit to the Owner's Representative a Cost Proposal for all occurrences the Contractor believes impacts Scope of Work cost and/or time.
 - 1. A Cost Proposal shall be submitted within 15 calendar days of the occurrences.
- B. Submit Cost Proposal numbered in sequential order, reviewed by the Contractor with respect to Contract Documents.
 - 1. Submit Cost Proposals on forms designated by the Owner's Representative.
- C. All Cost Proposals submitted shall have detailed breakdown for all associated work, cost and/or time.
- D. Owner's Representative will solicit and monitor independent cost estimates responses from the Consultant.
- E. Owner's Representative shall return Cost Proposal responses and reviews to the Contractor within 15 calendar days following receipt of Cost Proposal.
- F. A processed Cost Proposals is informational back-up for a potential Change Order, and not an instruction or authorization to execute a change, or an order to stop Work in progress.

1.8 CHANGE ORDER (CO)

- A. Change Orders may be initiated by the Owner, Contractor, Consultant, Owner's lead agency, or the Owner's Representative.
- B. Changes to the Project Contract Sum and/or Contract Time listed or indicated in Change Orders shall include or be determined by methods described in the General Conditions.
- C. Owner's Representative has responsibility for processing and administering Change Orders for the Project, and will prepare each Change Order using form designated by the Owner's Representative.
- D. Contractor shall provide all pricing proposals Cost Proposals for a Change Order. The Consultant shall provide independent cost estimates to Cost Proposals.
 - 1. Cost differentials between the Contractor's Cost Proposal and the Owner's Representative may negotiate the Consultants cost estimates.
 - 2. If no agreement is reached, the Owner's Representative may issue a time and material change Order.
 - a. Use Daily Force Account Report designated by Owner's Representative.
- E. The Contractor, Consultant, Owner's Representative, Owner's lead agency and Owner will sign a fully documented Change Order.

1.9 CORRELATING CHANGE ORDERS WITH OTHER CONTRACT REQUIREMENTS

- A. Revise Schedule of Values and Applications for Payment to record each Change Order as a separate item of work with adjustment to Contract Sum and Contract Time.

- B. Revise Construction Schedule to reflect each change in Contract Time.
- C. Record modifications in Record Documents.

END OF SECTION

SECTION 01 30 00 - ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Coordination of construction operations.
- B. Coordination drawings.
- C. Field engineering.
- D. Preconstruction conference.
- E. Progress meetings.
- F. Pre-installation conferences.
- G. Electronic File Availability

1.2 COORDINATION

- A. Coordinate scheduling, submittals and Work of various Sections of the Contract Documents to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. In the event of discrepancy, immediately notify the County. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.
- C. Verify that utility requirement characteristics of operating equipment are compatible with building utilities. Coordinate work of various Sections having interdependent responsibilities for installing, connecting to, and placing operating equipment in service.
- D. Coordinate space requirements and installation of mechanical and electrical work which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts and conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for installation of other Work, maintenance work, and repair work.
- E. Do not use spray paint or indelible ink markers for layout on concrete floor slabs scheduled to receive sealed concrete, stained concrete, vinyl, linoleum, or rubber flooring.
- F. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- G. Coordinate completion and clean up of Work of separate Sections in preparation for Final Completion.
- H. After beneficial occupancy of premises by the County, coordinate access to site for correction of defective Work and Work not complying with the Contract Documents, and to minimize disruption of County's activities.

1.3 COORDINATION DRAWINGS

- A. Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components, or if coordination is required for installation of products and materials fabricated by separate entities.
- B. Provide Project-specific information, drawn accurately to scale. Do not base Coordination Drawings on reproductions of the Contract Documents or standard printed data. Include the following information, as applicable:

1. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
2. Indicate required installation sequences.
3. Indicate dimensions shown on the Contract Drawings, and make specific note of dimensions that appear to be in conflict with submitted equipment, and minimum clearance requirements. Provide alternate sketches to the County for resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

C. Sheet Size: Minimum of 8-1/2 by 11 inches but no larger than 24 by 36 inches.

1.4 FIELD ENGINEERING

- A. Employ Land Surveyor registered in the State of California and acceptable to the County.
- B. Locate and protect survey control and reference points. Promptly notify the County of discrepancies discovered.
- C. Control datum for survey is as shown on Drawings.
- D. Verify setbacks and easements; confirm Drawing dimensions and elevations.
- E. Provide field-engineering services. Establish elevations, lines, and levels, utilizing recognized engineering survey practices.
- F. Submit copies of site drawing and certificate signed by Land Surveyor certifying elevations and locations of the Work are in conformance with the Contract Documents.
- G. Maintain complete and accurate log of control and survey work as Work progresses.
- H. On completion of foundation walls and major site improvements, prepare certified survey illustrating dimensions, locations, angles, and elevations of construction and site work.
- I. Protect survey control points prior to starting site work; preserve permanent reference points during construction.
- J. Promptly report to the County loss or destruction of reference point or relocation required because of changes in grades or other reasons.
- K. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to the County.

1.5 PRECONSTRUCTION MEETING

- A. After the award of the contract, a meeting shall be conducted with the Contractor, Project Administrator, Lead Consultant, and the Owner. The purpose of the meeting is to introduce key personnel and to review contract requirements and procedures.
- B. Particular emphasis should be on:
 1. Functions and authority of personnel
 2. Regularly scheduled progress meetings
 3. Submittals/shop drawings
 4. Requests for Information
 5. Field Orders

6. Payment Applications
7. Progress Schedules
8. Safety and Job Site security
9. Change Order procedures
10. Subcontractors
11. Disputes
12. Quality Control
13. Coordination of contractors
14. Access and use of site

1.6 PROGRESS AND SCHEDULE MEETINGS

- A. A regularly scheduled weekly progress meeting time will be established at the pre-construction conference.
- B. Attendees will include the Owner's Representative, Owner's Project Administrator, the Contractor, and the Lead Consultant. Scheduled invited Attendees will include the Architect and sub-consultants, subcontractors, and other owner personnel.
- C. The Project Administrator will prepare an agenda with content lead from the Contractor (which usually is derived from the previous meeting minutes) for discussion at these meetings. The agenda should include a list of outstanding item, which will be reviewed as appropriate. As a minimum the following will be discussed:
 1. Construction Status
 2. Schedule
 - a. Critical Path Activities
 - b. Job site problems and conflicts
 - c. Upcoming Activities
 - d. Completion Date
 - e. Time Extension Requests
 3. Submittals/shop drawings
 4. Requests for Information
 5. Field Orders
 6. Cost Proposals
 7. Change Orders
 8. Safety and Security
 9. Claims
 10. Quality Control

- D. The Project Administrator will record and distribute minutes of the meeting to all attendees in a timely manner in order to allow review before the next regularly scheduled meeting.
- E. In addition to the ongoing items of discussion listed above, time should be reserved to review any unresolved issues. Any representative attending the meeting may introduce these. Control logs for RFI's, submittals, and Cost Proposals should be discussed in the meeting.

1.7 PAY REQUEST MEETINGS

- A. A regularly scheduled monthly meeting to review the pay request will be established as the 25th of the month.
- B. Attendees will include the Owner's Representative and the Contractor. Scheduled invited attendees will include the Lead Consultant, Architect and consultants, subcontractors, and other owner personnel.

1.8 PREINSTALLATION AND SPECIAL MEETINGS

- A. During the course of the project it will be necessary to schedule additional meetings. When a special meeting is required, the Project Administrator will coordinate time and place for all required attendees. The meeting minutes will be as follows:
 - a. Project:
 - b. Contract:
 - c. Purpose:
 - d. Date:
 - e. Time:
 - f. Attendees:
 - g. Minutes:
- B. The Project personnel requesting the meeting is responsible for recording and distributing minutes of the meeting to all attendees in a timely manner. In addition, the meeting minute's author will be responsible for following-up all action assignments from the meeting.

1.9 UTILITIES AND IRRIGATION LINES

- A. Send proper notices, make necessary arrangements, perform other services required in construction, care and maintenance of all utilities and irrigation lines, and assume all responsibility concerning the same. Provide necessary protection to existing utility services and irrigation lines as directed, and repair any work damaged as a result of operations of the Contract.

1.10 COMPLIANCE WITH CODE OF REGULATIONS

- A. All work and materials on this project shall be in compliance with the rules and regulations as set forth in the Title 24, CCR Parts 1 – 6, 9, and 12 which shall be kept continuously at the site of the Work until completion and final acceptance.

1.11 PROJECT COORDINATION

- A. If, because of the non-related sizes of various materials and locations of existing utilities and conditions, etc., it is not possible to accomplish the Work as shown, Contractor shall meet with County at the site to determine the most satisfactory arrangement. Contractor shall establish lines and grades for all trades.

1.12 INTEGRATING EXISTING WORK

- A. All adjoining existing Work shall be protected from damage of any type due to or by Contractor's operations, equipment, and workmen during the Contract period.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 33 00 - SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Shop drawings.
 - 2. Product data.
 - 3. Samples
 - 4. Manufacturers' certificates.
 - 5. Deferred Agency Approvals.

1.2 DESCRIPTION

- A. Types of SUBMITTALS: Submittal procedures specified in this section include construction progress schedules, shop drawings, product data, samples, and manufacturer's installation instructions.
- B. Intent: Architect's review of shop drawings is intended to be a preview of what the Contractor intends to provide, and will function as an effort to foresee unacceptable materials or assemblies and to avoid the possibility of their rejection at the Project Site. Architect will review submittals only for conformance with the design concept of the Project and with the information given in the Contract Documents.
- C. The Architect's review of shop drawings will be general and shall not be construed:
 - 1. As permitting departure from the Contract requirements except as otherwise provided for under "substitution" provisions of Section 01 60 00;
 - 2. As relieving Contractor of responsibility for omissions or errors, including details, dimensions, materials, etc.;
 - 3. That review of a separate item indicates acceptance of an assembly in which the item functions. Architect will only review acceptance of an assembly in which the item functions. Architect will only review submittals required by Contract Documents for conformance with design concept of the Project and with the information given in the Contract Documents.

1.3 GENERAL SUBMITTAL PROCEDURES

- A. Submittals shall be classified as either electronic or physical. Procedures for each type of submittal, as described below, shall be followed.
- B. Transmit each submittal with "Submittal Transmittal" form supplied by County.
- C. Number each submittal sequentially with a decimal for resubmittals. Also include in the submittal number the specification section number as a suffix (ie. 2.01-07 81 16).
- D. Identify Project, Contractor, Subcontractor or supplier; pertinent Drawing sheet and detail number(s), and specification Section number, as appropriate.
- E. Apply Contractor's stamp and signature or initial (electronically or physically) certifying that review, verification of Products required, field dimensions, adjacent construction Work, and

coordination of information, is in accordance with the requirements of the Work and Contract Documents.

- F. Unless otherwise authorized by the Architect, all of the submittals required by a specification section shall be submitted together at the same time. Electronic submittals of product data, shop drawings, etc. may be submitted ahead of physical color samples with approval of the Engineer. Submittals that do not include all required submittals for a given specification section will be returned without review.
- G. Schedule submittals to expedite the Project, and deliver to Owner's Representative. Coordinate submission of related items.
- H. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.
- I. Substitutions must be submitted according to Section 01 60 00. Substitutions submitted without following this procedure will be rejected.
- J. Provide space for Contractor and Architect review stamps.
- K. Revise and resubmit submittals as required, identify all changes made since previous submittal.
- L. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.

1.4 ELECTRONIC SUBMITTAL PROCEDURES

- A. Construction Progress Schedules, Product Data, Shop Drawings, and Manufacture's Installation Instructions shall be submitted electronically.
- B. Electronic submittals shall be emailed or uploaded to County's Project Administrator in full size PDF format. Do not reduce Shop Drawings from original sheet size.
- C. PDF copy of electronic submittals will be returned to the Contractor. Contractor may distribute submittals to the concerned parties electronically or physically. Any printing costs for physical distribution of submittals shall be borne by the Contractor. The Architect will not print copies for distribution.
- D. Follow all General Submittal Procedures as described above.

1.5 PHYSICAL SUBMITTAL PROCEDURES

- A. Samples, Color Charts, and Agency Deferred Approvals shall be physical submittals. Construction Progress Schedules, Product Data, Shop Drawings and Manufacturer's Installation Instructions may, with the County's approval, be physical submittals.
- B. The County will retain a minimum of three samples, submit the number that will be needed by contractor plus three.
- C. Follow all General Submittal Procedures as described above.

1.6 CONTRACTOR RESPONSIBILITIES

- A. Review shop drawings, product data and samples prior to submission.
- B. Determine and verify:
 - 1. Field measurements.
 - 2. Field construction criteria.

3. Catalog numbers and similar data.
 4. Conformance with specifications.
 5. Conformance with applicable codes.
- C. Submittals giving inadequate indication of contractor review and approval will be returned without review, for resubmission.
 - D. Coordinate each submittal with requirements of the Work and of the Contract Documents.
 - E. Notify the Architect in writing, at time of submission, of any deviations in the submittals from requirements of the Contract Documents.
 - F. Begin no fabrication or construction activity that requires submittals until return of submittals with Architect's stamp and initials or signature indicating finish review.
 - G. After Architect's final review, distribute copies.
- 1.7 SHOP DRAWINGS
- A. Submit electronically.
 - B. After review and distribution in accordance with Submittal Procedures, retain one copy of all reviewed shop drawings at the job and label them "PROJECT RECORD" as described in Section 01 77 00 Contract Closeout.
- 1.8 PRODUCT DATA
- A. Submit electronically.
 - B. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information unique to this Project.
 - C. After review, distribute in accordance with Submittal Procedures and provide copies for Record Documents as described in Section 01 77 00.
 - D. Show dimensions and clearances required.
- 1.9 SAMPLES
- A. Submit samples to illustrate functional and aesthetic characteristics of the Product, with integral parts and attachment devices. Provide units identical with final condition of proposed materials or products for the work. Coordinate sample submittals for interfacing work.
 - B. Submit samples of finishes from the full range of manufacturers' standard colors textures, and patterns for Architect's selection.
 - C. Include identification on each sample, with full Project information.
 - D. Submit the number or samples specified in individual specification Sections; three of which will be retained by Engineer.
 - E. Reviewed samples which may be used in the Work are indicated in individual specification Sections.
- 1.10 MANUFACTURER'S INSTRUCTIONS
- A. Submit manufacturers' instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, electronically.

- B. Identify conflicts between manufacturers' instructions and Contract Documents.

1.11 MANUFACTURER'S CERTIFICATES

- A. When specified in individual specification Sections, submit manufacturers' certificate electronically.
- B. Contractor/Subcontractor Warranty form for the work of the particular spec section, completed except for signature. The Effective Date of warranty shall reference the date to be established as Final Acceptance.

1.12 DEFERRED AGENCY APPROVALS

- A. The General Contractor shall submit, or cause to be submitted by Subcontractors, within 60 days of contract signing, all required deferred approvals. The General Contractor or Subcontractors shall complete all deferred approval packages, including design and engineering calculations, in a manner acceptable to the agency requiring such submittal. The General Contractor shall within 15 days of contract signing, develop a schedule of critical dates of deferred approval acceptance by the reviewing agency. These critical dates shall be reflected in the required project schedule and all deferred approvals submitted within 45 days of schedule submittal.
- B. For all deferred items, it is the responsibility of the contractor to see that all submittals are stamped and signed by a California licensed design professional (an architect or PE is acceptable). The County and Architect will then review the submittal and if the design is acceptable provide a Statement of General Conformance that the submittal conforms to the design intent. Neither the Project's Architect or any of its consulting engineers will stamp and sign these deferred approval submittals other than with the standard shop drawing stamp. It is the responsibility of the manufacturing entity to procure necessary stamps and signatures from its own design professionals.
- C. All Deferred Approvals shall be submitted by the County to all required permitting agencies. If the Contractor fails to provide a required submittal, the Owner may elect to engage the design team or additional consultants to produce these and back charge the General Contractor for the cost and any schedule impact this may cause.

1.13 ACTION ON SUBMITTALS

- A. The County will review each submittal, mark with a "Review Code" and where possible, return within a reasonable period of time from date of receipt. Where submittal must be held for coordination, Contractor will be so advised without delay. Action markings shall be interpreted as follows:
 - 1. No Exceptions Noted
 - 2. Implement Exceptions Noted
 - 3. Revise and Resubmit
 - 4. Rejected
 - 5. Cancelled

PART 2 PRODUCTS (NOT USED)

PART 2 - PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 40 00 - QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. References.
- B. Quality assurance.
- C. Tolerances.
- D. Labeling.
- E. Seismic Considerations.
- F. Field samples.
- G. Testing and inspection laboratory services.
- H. Manufacturers' field services and reports.

1.2 REFERENCES

- A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Conform to reference standard by date of issue current on date for receiving bids, except where specific date is established by code.
- C. Obtain copies of standards where required by product specification Sections.
- D. When specified reference standards conflict with Contract Documents, request clarification from Engineer before proceeding.
- E. Neither contractual relationships, duties, nor responsibilities of parties in Contract nor those of Engineer or Architect shall be altered from Contract Documents by mention or inference otherwise in reference documents.
- F. Contractor shall be responsible for being current and knowledgeable in building codes applicable to all trades under his direction.
- G. Provide all work and materials in full accordance with the latest Rules and Regulations of the CCR, Title 24, CBC, California Mechanical Code, California Plumbing Code, California Electrical Code, California Fire Code, Title 19, Division 1, State Fire Marshal; applicable requirements of Title 8, Division 1, Department of Industrial Relations; and other applicable laws or regulations. Nothing in Drawings and Specifications shall be construed to permit work not conforming to these Codes.
- H. Furnish additional material and labor as required to comply with applicable Rules and Regulations.

1.3 QUALIFICATIONS

- A. General: Qualifications paragraphs in this Subsection establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product, that are similar to those indicated for this Project in material, design, and extent.
- E. Specialists: Certain sections of the Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
- F. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.
 - 1. NRTL: A Nationally Recognized Testing Laboratory according to 29 CFR 1910.7.
 - 2. NVLAP: A testing agency accredited according to National Voluntary Laboratory Accreditation Program (NVLAP) by National Institute of Standards and Technology (NIST).

1.4 QUALITY ASSURANCE

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions and workmanship, to produce Work of specified quality.
- B. Comply fully with manufacturers' instructions, including each step in sequence.
- C. When manufacturers' instructions conflict with the Contract Documents, request clarification from Engineer before proceeding.
- D. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Work shall be performed by persons qualified to produce workmanship of specified quality.
- F. Verify field measurements are as indicated on Shop Drawings or as instructed by manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.
- H. Contractor's Line of Authority: Contractor shall provide one person who shall be both knowledgeable and responsible for all work to be performed on this project at all times during normal work hours. In Contractor's absence, Contractor's appointed representative shall be responsible for all directions given him and said directions shall be binding as if given to Contractor. Contractor's representative shall be responsible to coordinate all work to be performed.

- I. Shop and field work shall be performed by mechanics skilled and experienced in the fabrication and installation of the work involved. All work on this project shall be done in accordance with the best practices of the various trades involved and in accordance with Drawings, accepted shop drawings, and Specifications.
- J. All work shall be erected and installed plumb, level, square and true and in proper alignment and relationship to the work of other trades. All finished work shall be free from defects. Engineer reserves the right to reject any materials and workmanship that are not considered to be up to the highest standards of the various trades involved. Such inferior material or workmanship shall be replaced at no cost to County.
- K. All work shall be installed by knowledgeable installers and defined "Eligible" by the specified materials manufacturers. Specifications and recommendations of the manufacturer, whose materials are used, shall be strictly adhered to during application or installation of materials.
- L. Any additional work beyond that specified or illustrated, or any modification thereto, that is necessary for the furnishing of warranty shall be provided by Contractor at no cost to County.

1.5 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. When manufacturers' tolerances conflict with Contract Documents, request clarification from Engineer before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

1.6 LABELING

- A. Attach label from agency approved by authority having jurisdiction for products, assemblies, and systems required to be labeled by CBC.
- B. Label Information: Include manufacturer's or fabricator's identification, approved agency identification, and the following information, as applicable, on each label.
 - 1. Model number.
 - 2. Serial number.
 - 3. Performance characteristics.

1.7 SEISMIC CERTIFICATION OF NONSTRUCTURAL COMPONENTS

- A. The manufacturer of each designated seismic system components subject to the provisions of ASCE 7 Section 13.2.2 shall test or analyze the component and its mounting system or anchorage and submit a certificate of compliance for review and acceptance by the registered design professional responsible for the design of the designated seismic system and for approval by the building official in accordance with 2010 CBC, Chapter 17 "Structural Tests and Special Inspections", Section 1708.4 "Seismic Certification of Nonstructural Components."

1.8 CONFLICTING REQUIREMENTS

- A. General: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Engineer for a decision before proceeding.

- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Engineer for a decision before proceeding.

1.9 FIELD SAMPLES

- A. Install field samples at the site as required by individual specifications Sections for review.
- B. Acceptable samples represent a quality level for the Work.
- C. Where field sample is specified in individual Sections to be removed, clear area after field sample has been accepted by Architect.

1.10 INSPECTION AND TESTING LABORATORY SERVICES

- A. Contractor will select and pay for the services of an independent Inspection/Testing Laboratory to perform inspections and testing.
 - 1. Special Inspector: As required by 2010 CBC including Chapter 17 "Structural Tests and Special Inspections."
 - a. Special Inspection: As defined in CBC Chapter 17, Section 1704 "Special Inspections."
- B. Inspection/Testing Laboratory will perform inspections, tests, and other services specified in individual specification Sections and as required by Engineer.
 - 1. Testing Equipment: Calibrated at reasonable intervals with devices of an accuracy traceable to National Bureau of Standards or accepted values of natural physical constants.
- C. Reports will be submitted by inspection/Testing Laboratory to Architect, Engineer, and Contractor, indicating observations and results of tests and indicating compliance or non-compliance with the Contract Documents.
- D. Cooperate with Inspection/Testing Laboratory; furnish samples of materials, design mix, equipment, tools, storage and assistance as requested.
 - 1. Notify Engineer, and Inspection/Testing Laboratory 24 hours prior to expected time for operations requiring services.
 - 2. Make arrangements with Inspection/Testing Laboratory and pay for additional samples and tests required for Contractor's use.
- E. The Inspection/Testing Laboratory shall perform inspection of work to determine conformance with these Standards.
 - 1. Request for inspection shall be made to the office of the Inspection/Testing Laboratory a minimum of 24 hours in advance of the time the inspection is desired.
 - 2. Underground work shall not be backfilled or covered until an inspection by the Inspection/Testing Laboratory has been completed and the work approved. Any work that is covered without inspection shall be uncovered at Contractor's expense, for completion of inspection work.
 - 3. The Inspection/Testing Laboratory shall have access to the Work at all times and shall be furnished every reasonable facility for ascertaining that the work done, materials used and workmanship performed are in accordance with the requirements of these Standards.
 - 4. Inspection of the Work shall not relieve Contractor of any of his obligations to satisfactorily perform the Work in accordance with requirements of Contract Documents.

- F. Retesting or reinspection required because of non-conformance to specified requirements shall be performed by the same Inspection/Testing Laboratory. Payment for retesting will be charged to Contractor by deducting inspection or testing charges from the Contract Sum.
- G. If the Work to be tested or inspected is not ready or sufficiently completed to allow the test/inspection service to complete required test(s)/inspection(s), costs and expenses of the test/inspection service to return to the Site or fabrication facility to perform/complete required test(s)/inspection(s) shall be charged to Contractor by deducting such costs and expenses from the Contract Sum.
- H. All Samples, specimens and tests shall be prepared and accomplished by a properly qualified person or testing laboratory, selected by County, who shall furnish County, Architect, Engineer, and Contractor with test reports, including test results, and stating that they were prepared in accordance with the specified provisions. All tests as well as sampling and preparation of samples shall be in accordance with applicable ASTM and other specified standards.

1.11 MANUFACTURERS' FIELD SERVICES AND REPORTS

- A. When specified in individual specification Sections, material and product suppliers, and manufacturers shall provide qualified personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, testing, adjusting, and balancing of equipment, as applicable, and to initiate instructions when necessary.
- B. Submit qualifications of qualified personnel to Engineer at least thirty days in advance of required observations.
- C. Qualified personnel shall report observations, site decisions, and supplemental instructions given to applicators and installers, and description of work installed contrary to manufacturers' written instructions, as applicable.
- D. Submit report in duplicate within thirty days of observation to Engineer for review.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify and ensure that existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.
- B. Verify and ensure that existing substrate is capable of structural support and attachment of new Work being applied or attached.
- C. Examine and verify specific conditions described in individual specification Sections.
- D. Verify utility services are available, of correct characteristics, and in correct locations.

3.2 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.

- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying new material or substance in contact or bond.

END OF SECTION

SECTION 01 77 00 - CONTRACT CLOSEOUT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for contract closeout including, but not limited to, the following:
 - 1. Inspection procedures.
 - 2. Project record document submittal.
 - 3. Operation and maintenance manual submittal.
 - 4. Submittal of warranties.
 - 5. Final cleaning.
- B. Closeout requirements for specific construction activities are included in the appropriate Sections.

1.3 SUBSTANTIAL COMPLETION

- A. Prior to requesting inspection for certification of Substantial Completion, complete the following. List exceptions in the request.
 - 1. In the Application for Payment that coincides with, or first follows, the date Substantial Completion is claimed, show 100 percent completion for the portion of the Work claimed as substantially complete.
 - a. 100 percent completion will bring the Contractor's progress Payment up to (95%) ninety percent of the Contract Price with (5%) percent to remain in retention until after Notice of Completion.
 - b. Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum.
 - c. If 100 percent completion cannot be shown, include a list ("punchlist") of incomplete items, the value of incomplete construction, and reasons the Work is not complete.
 - 2. Advise the Owner of pending insurance changeover requirements.
 - 3. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications, and similar documents.
 - 4. Obtain and submit releases enabling the Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - 5. Submit record drawings, maintenance manuals, final project photographs, damage or settlement surveys, property surveys, and similar final record information.
 - 6. Deliver tools, spare parts, extra stock, and similar items.
 - 7. Make final changeover of permanent locks and transmit keys to the Owner. Advise the Owner's personnel of changeover in security provisions.
 - 8. Complete startup testing of systems and instruction of the Owner's operation and maintenance personnel. Discontinue and remove temporary facilities from the site, along with mockups, construction tools, and similar elements.
 - 9. Complete final cleanup requirements, including touchup painting.
 - 10. Touch up and otherwise repair and restore marred, exposed finishes.

B. Substantial Completion will not be issued without the following:

1. Issuance of a Certificate of Occupancy.
2. The electrical system, fire alarm, and sprinkler system 100% complete.
3. Operation manuals, maintenance manuals and warranties submitted and approved.
4. Instruction of staff in the operation and maintenance of equipment and systems.
5. Record drawings submitted and approved.
6. Any extra material required by contract delivered.

C. Inspection Procedures:

1. On receipt of a request for inspection, the Owner's Representative and the Architect will either proceed with inspection or advise the Contractor of unfilled requirements.
2. The Owner's Representative will prepare the Certificate of Substantial Completion following inspection or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.
 - a. The Owner's Representative and the Architect will repeat inspection when requested and assured that the Work is substantially complete.
 - b. Results of the completed inspection will form the basis of requirements for final acceptance.
3. Owner will allow the Contractor no longer than 30 calendar days from the Date of Substantial Completion to remedy deficiencies.

1.4 FINAL ACCEPTANCE

A. Prior to requesting final inspection for certification of final acceptance and final payment, complete and submit the following:

1. Final payment request with releases and supporting documentation not previously submitted and accepted. Include insurance certificates for products and completed operations where required.
2. Submit an updated final statement, accounting for final additional changes to the Contract Sum.
3. Certified copy of the Owner's Representative and Architect's final inspection list of items to be completed or corrected endorsed and dated by the Owner's Representative and Architect.
 - a. Certification shall state that each item has been completed or otherwise resolved for acceptance.
4. Submit consent of surety to final payment.
5. Submit all subcontractor final unconditional lien releases.
6. Submit a final liquidated damages settlement statement.
7. Submit evidence of final, continuing insurance coverage complying with insurance requirements.

B. Re-inspection Procedure:

1. Owner's Representative and /or Architect will re-inspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed.
 - a. Indicate items whose completion is delayed under circumstances acceptable to the Owner's Representative.
2. Should the Owner's Representative determine that Work is incomplete or defective:
 - a. Owner's Representative will notify the Contractor, in writing, listing incomplete or defective Work.
 - b. Contractor shall remedy deficiencies promptly and notify Owner's Representative when ready for re-inspection.

C. Final Acceptance Certificate

1. Upon completion of inspection or any re-inspections, the Owner's Representative and /or Owner's Lead Agency will prepare a certificate of final acceptance in accordance with the Project Specification Section 00 80 00, Supplemental General Conditions.
2. Final Acceptance will be presented to the County Board of Supervisors.
 - a. Only the County Board of Supervisors has final authority over Acceptance of Project.

D. Notice of Completion

1. Upon final acceptance by the County Board of Supervisors, the Owner's Lead Agency will prepare and file a Notice of Completion in accordance with the Project Specification Section 00800, Supplemental General Conditions.
 - a. Start of mandatory 35-day lien period.

1.5 RECORD DOCUMENT SUBMITTALS

A. Project Record Drawings:

1. Maintain a clean, undamaged set of Contract Drawings and Shop Drawings and identify as "RECORD DRAWINGS - PROJECT SET".
2. Mark the Drawings to show the actual installation where the installation varies substantially from the Work as originally shown.
 - a. Using an erasable colored pencil (not ink or indelible pencil) clearly describes change by graphic line or note.
 - b. Date all entries, and note related Change Order number where applicable.
 - c. Call attention to all entries by a "cloud" drawn around area affected.
 - d. Where overlapping changes occur, mark with different colors.
3. Conversion of schematic layouts:
 - a. Design of future modifications of facility may require accurate information as to final physical layout of items that are shown schematically on Drawings.
 - b. Show on Project set of Record Drawings, by dimension accurate to within one inch, centerline of each run of items shown schematically on Drawings. Clearly identify item by accurate note such as "cast iron drain", "galv. water", and the like. Show, by symbol or note, vertical location of item ("under slab", "in ceiling plenum", "exposed" and the like).
4. Prior to request for Substantial Completion, secure from the Owner's Representative at no charge to the Contractor, a complete set, full sized drawings and (.DWG) files of all Contract Documents.
 - a. Clearly transfer change data shown on Project set of Record Drawings to corresponding transparencies, coordinating changes as required.
 - b. Clearly indicate at each affected detail and other drawings a full description of changes made during construction, and actual location of items.
 - c. Show final location of electrical junction boxes and outlets, telephone and data outlets, supply and return registers, and like items.
 - d. Call attention to all entries by a "cloud" drawn around area affected.
 - e. Make changes neatly, consistently, and with proper media to assure longevity and clear reproduction.

B. Record Specifications:

1. Maintain one complete copy of the Project Manual, including addenda and other written construction documents, such as Change Orders and modifications issued during construction.

2. Mark Specifications to show substantial variations in actual Work performed in comparison with the text of the Specifications.
3. Note substitutions in reference to items specified.

C. Maintenance Manuals:

1. Contractor to submit a written summary of all maintenance manuals to be transmitted to Owner's Representative.
2. Submit 3 complete copies of all maintenance manuals prior to start-ups and instruction of operation to maintenance personnel.
3. Provide manuals in 8-1/2 x 11 inch format with plastic/fiberboard covers and colored fly-sheets separating sections, to include the following:
 - a. Covered labeled as "Operating and Maintenance Instructions" with name and address of Project, and names of Contractor and Subcontractor.
 - b. Typewritten index near front of manual, providing immediate information as to location within manual of emergency information regarding installation.
 - c. Complete instructions regarding operation and maintenance of all equipment, including lubrication, disassembly, and re-assembly.
 - d. Complete nomenclature of all parts of all equipment.
 - e. Complete nomenclature and part number of all replacement parts, name and address of nearest vendor, and all other data pertinent to procurement and procedures.
 - f. Copy of garnets and warranties issued.
 - g. Manufacturers' bulletins, cuts, and descriptive data, where applicable, clearly indicating precise items included in this installation and deleting, or otherwise clearly indicating, all manufacturers' data which this installation is not concerned.
 - h. Such other data as required in applicable Specification Sections.

D. Guarantees/warranties and Bonds:

1. General:
 - a. Manufacturers' warranties notwithstanding, warrant the entire Work against defects in materials and workmanship for twelve (12) months from the date of Substantial Completion in accordance with the GENERAL CONDITIONS & SUPPLEMENTARY GENERAL CONDITIONS.
 - b. Guarantee/warrant or bond Work as required in the Specifications.
 - c. Warranties between the Contractor and manufacturers, and the Contractor and suppliers, shall not affect guarantees/ warranties between the Contractor and the Owner.
 - d. The Contractor will not be held responsible for defects due to misuse, negligence, willful damage, improper maintenance, or accident caused by Others, nor shall he be responsible for defective parts whose replacement is necessitated by failure of the Owner's maintenance forces to properly clean and service them, provided the Contractor has furnished complete maintenance instructions to the Owner.
 - e. Compile specified guarantees/warranties and bonds.
 - f. Time of Submittal:
 - i. For equipment or component parts of accepted equipment put into service for the Owner's benefit during the progress of the Work, submit guarantees/warranties within ten (10) calendar days after acceptance of the Work.
 - ii. Otherwise, submit guarantees/warranties within ten (10) calendar days after date of Substantial Completion and prior to the Final Application for Payment.
 - iii. For items of Work where acceptance is delayed materially beyond the date of Substantial Completion, furnish updated submittal within ten (10) calendar days after such delayed acceptance, listing the date of delayed acceptance as the start of the guarantee/warranty period.

E. Other Documents:

1. Three sets of warranties, guaranties and bonds.
2. Spare parts and materials extra stock list.
3. One set of evidence of compliance with requirements of governmental agencies having jurisdiction including, but not limited to:
 - a. Certificates of Inspection.
 - b. Certificates of Occupancy.
4. One set of certificates of insurance for products and completed operations.
5. One set of evidence of payment and release of liens.
6. One copy of list of Subcontractors, service organizations, and principal vendors, including names, addresses, and telephone numbers where they can be reach for emergency service at all times including nights, weekends, and holidays.

1.6 INSTRUCTION

- A. Arrange for each Installer of equipment and systems that requires regular maintenance to meet with the Owner's personnel for instruction in proper operation and maintenance of systems, equipment and similar items, which were provided as part of the Work.
 1. Submit to Owner's Representative an instruction schedule listing instruction subjects and proposed dates at least 15 calendar days prior to the first proposed date.

1.7 FINAL CLEANING

- A. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion.
 1. Remove labels that are not permanent labels.
 2. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.
 3. Clean exposed exterior and interior hard-surfaced finishes to a dust-free condition, free of stains, films, and similar foreign substances. Restore reflective surfaces to their original condition. Leave concrete floors broom clean. Vacuum carpeted surfaces.
 4. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.
 5. Clean the site, sweep paved areas broom clean; remove stains, spills, and other foreign deposits. Rake grounds that are neither paved nor planted to a smooth, even-textured surface.
- B. Remove temporary protection and facilities installed for protection of the Work during construction.
- C. Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from the site and dispose of lawfully.
 1. Where extra materials of value remain after completion of associated Work, they become the Owner's property. Dispose of these materials as directed by the Owner.

END OF SECTION

SECTION 02-4119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide Demolition, Cutting, and Patching as specified and shown on Drawings.

1.2 DEFINITIONS

- A. Demolition: Includes disconnecting and removing from the premises items shown on plans to be removed, or items which are not required in the finished installation.
- B. Cutting: Includes cutting into existing construction to permit completion of contract work.
- C. Patching: Includes restoration of surfaces disturbed by demolition, cutting, or other contract operations.

1.3 QUALITY ASSURANCE

- A. Employ skilled workmen with experience in type of work required.
- B. Requirements for Structural Work: Do not cut and patch structural work in a manner that would result in a reduction of load-carrying capacity or load-deflections ratio.
- C. Before cutting and patching the following categories of work, obtain architect's approval to proceed.
 - 1. Structural steel.
 - 2. Structural concrete.
 - 3. Piping, ductwork, vessels and equipment.
 - 4. Electrical systems.
- D. Operational and Safety Limitations: Do not cut and patch operational elements or safety related components in a manner that would result in a reduction of their capacity to perform in the manner intended, including energy performance, or that would result in increased maintenance, or decreased operational life of decreased safety.
- E. Visual Requirements: Do not cut and patch work exposed on the building's exterior or in occupied spaces, in a manner that would, in the architect's opinion, result in lessening the building's aesthetic qualities. Do not cut and patch work in a manner that would result in substantial visual evidence of cut and patch work. Remove and replace work judged by the architect to be cut and patched in a visually unsatisfactory manner.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Carefully remove, store, and protect materials designated to be re-used in contract work.
- B. Materials designated for demolition shall become Contractor's property and removed from the Site.
- C. Materials designated to be salvaged for the District shall be removed with care, protected, and stored in a location specified by the University.
- D. Comply with minimum requirements in Section 01-3500.

1.5 SCHEDULING

- A. Schedule Demolition, Cutting, and Patching to precede construction and be completed without delay.
- B. Schedule work in ceiling spaces above occupied rooms in advance of other work and on overtime.
- C. Do not permit demolition work or noisy activities during scheduled time for removal of debris.
- D. Comply with requirements in Section 01-3100 and 01-3200.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: 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. Use materials for patching that will result in equal or better performance characteristics.
- B. Plaster (where applicable) Comply with requirements of Section 09-2400, or comply with requirements in Part - 3 of this Section.
- C. Concrete: Contractor designed mixes to produce following:
 - 1. Concrete, Typical: Compressive strength of 3000 pounds per square inch at 28 days.
- D. Bonding Agent: "Weldcrete" of Larson Products, "Hornweld" of A.C. Horn, "Sonocrete" of Sonneborn-Contech, or equal.
- E. Grout for patching holes in existing concrete surfaces: Nonshrink type, factory pre-mixed grout, "Vibrofoil" of A.C. Horn, "Ferrolith" of Sonneborn Contech, or equal.
- F. Patching of Holes in Fire-Rated Surfaces: Comply with requirements of Section 07-8400.
- G. Weather Exposed Or Moisture Resistant Surfaces Or Elements:

1. Where specifications are not included for items requiring patching comply with requirements of Article titled "Materials", sub-Article titled "General" in this Section and manufacturer's specifications and standards for each product involved.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Before beginning demolition work, examine site and verify the following:
 1. Existing utility lines to be removed have been disconnected.
 2. Utility lines serving occupied portions of building will remain in operation during demolition.
 3. Dust barriers are in place, and conditions specified in Sections 01-3510, 01-4000, and 01-5000 are met.
- B. Before Cutting Operations: Examine surfaces to be cut and patched and conditions under which work is to be performed. If unsafe, or otherwise unsatisfactory conditions are encountered, take corrective action before proceeding with the work.
- C. If any hazardous material is encountered, notify Architect immediately and obtain instructions for safe handling and removal. See Division 0 – Hazardous Material Emergency Response Act.

3.2 PREPARATION

- A. Temporary Support: To prevent structural failures, provide temporary support of work to be cut.
- B. Protection:
 1. Protect adjacent work from damage during demolition, cutting and patching.
 2. Provide protection from adverse weather conditions for that part of the project that may be exposed during cutting and patching operations.
- C. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Take precautions not to cut existing pipe, conduit, or ducts serving the building but scheduled to be relocated until provisions have been made to bypass them.
- E. Rooms adjacent to contract work may be occupied during the construction period. Maintain a tight barrier at openings into those rooms and remove debris in covered containers.

3.3 CUTTING

A. General:

1. Use methods least likely to damage existing construction to remain and materials to be re-established.
2. Ensure by-pass of utility services, such as pipe and conduit, has been completed before cutting, where such utility services are shown or required to be removed, relocated, or abandoned.
3. After cutting, cap, valve, or plug and seal tight remaining portions of pipe and conduit to prevent entrance of moisture or other foreign matter.

3.4 PATCHING

A. General:

1. Patch with seams which are durable and as invisible as possible. Comply with specified tolerances for the work. Where feasible, inspect and test patched areas to demonstrate integrity of the work.
2. Restore exposed finishes of patched areas. Where necessary, extend finish restoration into retained adjoining work in a manner which will eliminate evidence of patching and refinishing.
3. Where patch occurs in a smooth painted surface, and after patched area has received prime and base coat, extend final paint coat over entire un-broken surface containing the patch.
4. Patch, repair, or re-hang existing ceilings as necessary to provide an even plane of surface of uniform appearance. Where partitions or portions of existing ceilings have been removed, reinforce edges of remaining ceiling.
5. Where existing plaster surfaces have been removed and remaining edges are to mate with gypsum board, carefully cut board to closely approximate the plaster profile. Carefully shim, fur, or otherwise provide backing for gypsum board in order to bring it to the face of existing plaster. Remove paint from existing plaster edges, apply tape and joint compound and feather out to existing plaster surfaces.

B. Plaster Installation:

1. Unless otherwise indicated, provide 3-coat work in accordance with the California Lathing and Plastering Contractors Association, Inc. (CLPC) recommendations.
2. Finish plaster with surface to closely match adjacent surface.
3. Cut, patch, point-up, and repair plaster as necessary to accommodate other work and to restore cracks, dents, and imperfections.
4. Comply with specifications in Section 09200.

- C. Hangers and Supports:
 - 1. Provide new hangers and supports for existing piping, conduit, or ductwork to remain after removal of existing partitions or ceilings. Conform to support details specified or shown for new work. Refer to specifications in Divisions 22 through 33.
- D. Holes in Existing Concrete Floor Slabs, with a diameter not over the depth of the slab: Ream to a conical shape not less than 0.25:1 with the smallest diameter at the bottom of the slab. Roughen surfaces and clean away dust and loose particles. Fill with grout specified in this Section for patching holes in existing concrete surfaces. For patching larger openings, notify the Architect for this project.

3.5 PATCHING EXISTING DAMAGE

- A. Floor Openings Around Pipe, Duct, and Conduit Penetrations:
 - 1. Remove non-rated or loose filler material and fill with approved 2-hour fire resistive packing.
 - 2. Comply with specifications in Section 07-8400 and Divisions 22 and 33.
- B. Piping: Restore damaged pipe covering to its original condition.

3.6 LEVELING EXISTING CONCRETE FLOOR SLABS

- A. Patch depressions and level existing concrete floor slab to a surface plane tolerance of maximum 1/8-inch in 10-feet. Test with a 10-foot long straight edge.
- B. Apply underlayment over entire work area in strict accordance with manufacturer's written instructions, before any partition framing is placed.
- C. Keep traffic off the floor during curing period in accordance with manufacturer's printed recommendations, but in any case not less than 4-days.

3.7 ELECTRICAL DEMOLITION

- A. Do not shut down electrical service without approval of school administrator.
- B. Do not begin demolition until all conduits have been traced by Contractor and services have been disconnected, as specified in Division 16.
- C. Provide additional wiring and work as required to maintain service to adjacent spaces during demolition, as specified in Division 16.
- D. Remove electrical service in demolition area including items in existing walls and ceilings to remain.
- E. Demolition of electrical Services:
 - 1. Remove device and wiring to panel without disturbing existing service to remain.

2. Remove empty conduit back to boundary of Project area.
- F. Relocate or re-hang existing conduit when existing supports have been demolished or where there is interference with new light fixtures, in accordance with specifications in Division 26, 27 and 28.
 - G. Electrical demolition work shall be performed by certified journeyman electrician.

3.8 CLEANING

- A. Thoroughly clean spaces where work has been performed or used for access to work.
- B. Completely remove paint, mortar, oils, putty, and materials of similar nature.
- C. Thoroughly clean piping, conduit, and similar items, before painting or other finishing is applied.
- D. Remove debris daily. Remove debris which must be transported through public corridors during non-occupied hours.
- E. Debris Containers:
 1. Transport removal of debris in tightly sealed, covered, rubber tired containers.
 2. Fit containers with clean polyethylene covers completely sealed at perimeters by taping or tying with wire.
 3. Wipe containers clean before leaving construction area to prevent tracking of dust.
- F. Place covers over debris boxes between periods when they are being filled.

END OF SECTION

SECTION 03 1000 FORMWORK

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work Includes: Provision of formwork for cast-in-place concrete and installation of embedded items.

1.2 REFERENCES

- A. Requirements of GENERAL CONDITIONS and DIVISION NO. 1 apply to all Work in this Section.
- B. Published specification, standards, tests, or recommended methods of trade, industry, or governmental organizations apply to Work of this Section where cited by abbreviations noted below (latest editions apply).
1. California Code of Regulations. Title 24, 2016 edition, also known as California Building Code (CBC), with amendments.
 2. American Society for Testing and Materials (ASTM).
 3. Federal Specifications (FS).
 4. American Concrete Institute's "Recommended Practice for Concrete Formwork," (ACI 347).
 5. United States Voluntary Product Standard for Construction and Industrial Plywood (PSI-83).
 6. American Plywood Association's "Guide to Plywood Grades" (APA).
 7. West Coast Lumber Inspection Bureau's "Standard Grading Rules No. 16" (WCLIB).

1.3 QUALITY ASSURANCE

- A. Design Criteria: Formwork shall conform to ACI 347 and CBC Section 1906.
1. Formwork:
 - a. Shall prevent leakage or washing out of cement mortar.
 - b. Shall resist spread, shifting, and settling.
 - c. Shall reproduce accurately required lines, grades, and surfaces within tolerances specified.
 2. Safety: The Contractor shall be responsible for adequate strength and safety of all formwork including falsework and shoring.

- B. Allowable Tolerances: Formwork shall produce concrete within tolerance limits recommended in ACI 347, unless otherwise noted.

1.4 SUBMITTALS

- A. Samples: Only as requested by the Architect.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use.

1.6 JOB CONDITIONS

- A. Sequencing Schedule:
 - 1. Ensure timely delivery of embedded items. Be responsible for cutting and patching necessitated by failure to place embedded items.
 - 2. Plan erection and removal to permit proper sequence of concrete placing without damage to concrete.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Forming Materials:
 - 1. Panel or board forms at the Contractor's option.
 - a. Panel Forms: Minimum 5/8-inch thick exterior grade plywood with sealed edges, PS 1 grade Plyform Class I and II B-B Exterior or HDO Exterior.
 - b. Board Forms: Shiplap or tongue and groove lined with PS 1 grade Plyform Class I and II Exterior 1/2-inch or HDO Exterior 1/2-inch or 3/16-inch thick fiberboard conforming to FS LLL-B-810a(1), type I.
 - 2. Forms for Exposed Finish Concrete: Plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on Drawings.
 - a. Use Plywood complying with U.S. Product Standard PS-1 "B-B (Concrete Form) Plywood", Class I, Exterior Grade or better, with each piece bearing legible inspection trademark. Panels to receive specified form sealer to ensure uniform finish of exposed surfaces.
 - b. Designated "Architectural Concrete" Surfaces: Use overlaid plywood complying with U.S. Product Standard PS-1 "A-C or B-B High Density Overlaid Concrete Form", Class 1.

3. Chamfer Strips: Burke Concrete Accessories' PVC type CSF ½-inch, all exposed corners.
- B. Wood Framing: WCLIB standard grade or better Douglas Fir.
- C. Form Ties and Spreaders: Metal type acting as spreaders, leaving no metal within one inch of concrete face and no fractures, spalls, depressions or other surface disfigurations greater than 3/4-inch in diameter.
- D. Expansion Joint Filler:
 1. Fiber Type: Premolded asphalt-impregnated fiber, ASTM D1751, 1/4-inch thick unless otherwise noted. Same as W. R. Meadows, Inc.'s "Sealtight Fiber Expansion Joint"; Grace Construction Materials "Serviced Fiber Expansion Joint Filler, Code 1390"; National Expansion Joint Co.'s "Fiber Joint Filler No. 12"; Burke Concrete Accessories, Inc.'s "Burke Fiber Expansion Joint"; or equal product substituted per Section 01630.
 2. Cork Type: Preformed cork, ASTM D1752, Type II, 1/4-inch size unless otherwise noted. Same as W. R. Meadows, Inc.'s "Sealtight Cork Expansion Joint"; Sonneborn-Contech's "Sonoflex Cork"; Grace Construction Materials' "Serviced Standard Cork Expansion Joint Filler, Code 4323; or equal product substituted per Section 01630.
- E. Form Sealer: Same as Grace Construction Material's "Formfilm"; or equal product substituted per Section 01630.
- F. Release Agent: Must not stain or otherwise adversely affect architectural concrete surfaces. Same as The Nox-Crete Co.'s "Nox-Crete Form Coating"; Industrial Synthetics Corp.'s "Synthex;" or equal product substituted per Section 01630.
- G. Foam Board: Extruded close cell polystyrene foam, channeled for drainage, with a minimum compressive strength of 60 psi at 0.1-inch deformation when tested in accordance with ASTM D1621-73, and meeting requirements of FS-HH-I-524b, Type II, Class B. Same as The Dow Chemical Co.'s "Styroform PD Brand" or equal product substituted per Section 01630.

2.2 SOURCE QUALITY CONTROL

- A. Plywood shall bear APA grade-trademark.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas where formwork will be constructed and verify that:
 1. Excavations are sufficient to permit placement, inspection and removal of forms.
 2. Excavations for earth forms have been neatly and accurately cut.
 3. Conditions are otherwise proper for formwork construction.

- B. Do not start work until unsatisfactory conditions have been corrected.
- 3.2 PREPARATION
- A. Obtain necessary information for coordination of formwork with items to be embedded in concrete and other related work.
- 3.3 CONSTRUCTION
- A. General:
 - 1. Design, erect, support, brace and maintain formwork to support vertical and lateral, static, and dynamic loads that might be applied until concrete structure can support such loads. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation and position. Maintain formwork construction tolerances complying with ACI 347.
 - 2. Construct forms to sizes, shapes, lines and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb Work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in Work. Use selected materials to obtain required finishes. Solidly butt joints and provide back-up at joints to prevent leakage of cement paste.
 - 3. Frame openings where indicated on Architectural, Structural, Mechanical, Plumbing and Electrical drawings.
 - B. Earth Forms:
 - 1. Construct wood edge strips at top sides of excavations.
 - 2. Provide forms for footings wherever concrete cannot be placed against solid earth excavation.
 - 3. Remove loose dirt and debris prior to concrete pours.
 - 4. Foundation concrete may be placed directly into neat excavations provided the foundation trench walls are stable as determined by the Architect or Structural Engineer. In such case, minimum formwork shown on the drawings is mandatory to insure clean excavations immediately prior to and during the placing of concrete.
 - C. Walls and Other Formed Elements:
 - 1. Erect outside forms for exposed exterior walls first and obtain the Architect's approval before reinforcement is placed. Obtain Architect's approval of the reinforcement before interior form is erected.
 - 2. Carefully align inside and outside forms before tightening ties.

3. Plywood Forms: Insure vertical joints are plumb and horizontal joints are level; arrange joints and ties in geometrical pattern as approved by the Architect.
 4. Form inside corners at exposed conditions with mitered boards or plywood so that no concrete is placed against form ends.
 5. After erection, seal all cracks, holes, slits, gaps, and apertures in forms so that they will withstand the pressure and will remain completely watertight.
 6. Provide a means to seal the bottom of forms at construction joints such as foam tape or other gasket devices.
 7. Apply a coating of release agent prior to the erection of formwork. Follow approved manufacturer's recommendations.
- D. Slab Forms:
1. Establish levels and set screeds.
 2. Depress slabs where required to receive special floor finishes.
- E. Cleanouts and Openings: Provide on interior face of wall forms as required for effective removal of loose dirt, debris and waste material, for inspection of reinforcing and for introduction of vibrators where the Architect deems necessary.
- F. Expansion Joints:
1. Provide in exterior concrete paving on grade at maximum 24-feet on center or as noted and at intersections with vertical surfaces, curbs, manholes or other penetrations through paving.
 2. Use fiber type expansion joint fillers typically and depress 1/4-inch unless otherwise noted.
 3. Use cork type expansion joint fillers at conditions with non-bituminous waterproofing, liquid waterproofing or sealant systems.
- G. Construction Joints:
1. Provide where shown on the drawings as directed by the Architect and per CBC Section 1906A.4.
 2. Provide key indentations at all joints.
 3. Provide pour strips on inside face of forms at horizontal joints, but remove strips and thoroughly clean out reglets before placing subsequent portions of wall.
 4. Prevent formations of shoulders and ledges.

5. Provide means for drawing forms into firm contact with concrete before placing additional concrete over previous pours where shrinking and warping has separated concrete from forms.

H. Embedded Items:

1. Properly locate, unless locating is specified elsewhere, and place inserts and embedded items required by other trades prior to casting concrete.

I. Shoring:

1. Adequately brace and maintain shoring to safely support vertical, lateral, and asymmetrical loads until completed structure has attained design strength.
2. Distribute shoring loads over area where shoring is erected and protect against undermining or settlement.
3. Provide means for making vertical adjustments to compensate for settlement either before or during placing of concrete.
4. Reshoring will be permitted. Shores and reshores shall be designed by a Structural Engineer registered in the State of California and installed under his/her direction. This Structural Engineer shall be employed by the Contractor.

3.4 REMOVAL

- A. Secure the Architect's approval for time and sequence of form removal.
- B. Form Removal: Forms shall be removed without damage to the concrete, and in no case shall they be removed prior to the concrete member attaining 60% of the specified design strength.
- C. Advance Form Removal: In the following situations, forms may be removed after 24 hours with the approval of the Architect:
 1. Foundations and grade beams
 2. Stem walls under 4 feet in height
- D. Forms:
 1. Remove forms carefully to avoid damaging corners and edges of exposed concrete.
 2. Reuse:
 - a. The Architect will approve reuse of forms provided they are straight, clean, free from nails, dirt, hardened concrete, or other injurious matter and edges and surfaces are in good condition.

- b. Clean and repair any damage caused by placing, removal, or storage. Reuse of formwork with repairs or patches which would result in adverse effects to architectural concrete finish will not be permitted.
 - c. Store formwork in manner to prevent damage or distortion.
 - d. Reseal as required to achieve concrete of specified quality.
- E. Shoring and Reshoring
- 1. Two levels of shoring or one level of shores over one level of reshores shall be maintained below any newly cast level until it has attained design strength and is at least 28-days old.

END OF SECTION

SECTION 03-2000 - CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Reinforcing steel bars, welded steel wire fabric fabricated steel bar or rod mats for cast-in-place concrete.
- B. Support chairs, bolsters, bar supports, and spacers, for supporting reinforcement.
- C. Tie-ins to existing concrete.

1.2 REFERENCES

- A. CBC – 2016 California Building Code, Chapter 19 (ACI 318).
- B. CCR - California Code of Regulations, Title 24, Part 2, Chapter 19A (ACI 318).
- C. ACI 301 - Specifications for Structural Concrete for Buildings.
- D. ACI 315 (SP-66) - Details and Detailing of Concrete Reinforcement.
- E. ACI 318 - Building Code Requirements for Reinforced Concrete.
- F. ASTM A82 - Cold Drawn Steel Wire for Concrete Reinforcement.
- G. ASTM A185 - Welded Steel Wire Fabric for Concrete Reinforcement.
- H. ASTM A615 - Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
- I. ASTM A706 - Standard Specification for Low Alloy Steel Deformed Bars for Concrete Reinforcement.
- J. ASTM C1116 - Specification for Fiber-Reinforced Concrete and Shotcrete.
- K. AWS D1.4 - Structural Welding Code Reinforcing Steel.
- L. CRSI - Manual of Practice.
- M. CRSI - Placing Reinforcing Bars.

1.3 QUALITY ASSURANCE

- A. Perform concrete reinforcement work in accordance with CRSI Manual of Standard Practice.
- B. Conform to ACI 301 and ACI 315 (SP-66).

- C. Conform to CBC and California Code of Regulations, Title 24, Part 2.

1.4 CERTIFICATES

- A. Submit mill test certificates of supplied concrete reinforcing, indicating physical and chemical analysis.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Reinforcing Steel: ASTM A615, Grade 40 Billet-steel deformed bars, uncoated finish.
- B. Welded Reinforcement: ASTM A706, Grade 40, deformed bars, unfinished unless otherwise noted.
- C. Welded Steel Wire Fabric: ASTM A185 plain type; coiled rolls; uncoated finish.
- D. Steel Wire: ASTM A82, plain, cold drawn steel.

2.2 ACCESSORY MATERIALS

- A. Tie Wire: Minimum 16 gage annealed type.
- B. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during installation and placement of concrete including load bearing pad on bottom to prevent vapor barrier puncture.
- C. Chairs, Bolsters, Bar Supports, Spacers Adjacent to Architectural Concrete Surfaces: Plastic coated sized and shaped as required.

2.3 FABRICATION

- A. Fabricate in accordance with ACI 315 (SP-66), providing concrete cover specified in Section 03300.
- B. Locate reinforcing splices not indicated on Drawings at points of minimum stress. Indicate location of splices on shop drawings.
- C. Weld reinforcing bars in accordance with AWS D1.4.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Before placing concrete, clean reinforcement of foreign particles or coatings.
- B. Place, support, and secure reinforcement against displacement. Do not deviate from alignment or measurement.
- C. Dowel into existing concrete as detailed.
- D. Do not displace or damage vapor barrier when required by drawings or specifications.

3.2 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under County's Div 0 and 1 specifications and City Inspection requirements.

END OF SECTION

SECTION 03-3000 -CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Section Includes: Provision of cast-in-place concrete unless specifically noted otherwise.

1.2 REFERENCES

- A. Requirements of GENERAL CONDITIONS and DIVISION NO. 1 apply to all Work in this Section.
- B. Published specifications, standards, tests, or recommended methods of trade, industry, or governmental organizations apply to Work of this Section where cited by abbreviations noted below (latest editions apply).
1. California Code of Regulations. Title 24, 2016 edition, also known as California Building Code (CBC), with amendments.
 2. American Society for Testing and Materials (ASTM).
 3. American Concrete Institute's:
 - a. "Specification for Structural Concrete for Buildings" (ACI 301).
 - b. "Recommended Practice for Cold Weather Concreting" (ACI 306).
 - c. "Recommended Practice for Hot Weather Concreting" (ACI 305).
 - d. "Recommended Practice for Measuring, Mixing and Placing Concrete" (ACI 304).
 - e. "Building Code Requirements for Reinforced Concrete" (ACI 318).
 4. State of California, Business and Transportation Agency Division of Highways' "Materials Manual," (CMM).

1.3 QUALITY ASSURANCE

- A. The Contractor's Testing Laboratory Qualifications: The Contractor's Testing Laboratory shall be under direction of a Civil Engineer registered in the State of California, shall have operated successfully for four years prior to this work, and shall conform to requirements of ASTM E329.
- B. Requirements of ACI 301 shall govern work, materials and equipment related to this Section; specifications herein set minimum results required, and references to procedures are intended to establish minimal guides.
- C. The Contractor shall be responsible for quality of concrete in place and shall bear burden of proof that concrete meets minimum requirements.

- D. Placing of concrete by means of pumping will be an acceptable method of placement providing that the Contractor can demonstrate that:
 - 1. Specified concrete strengths will be met.
 - 2. Equipment has a record of satisfactory performance under similar conditions and using a similar mix.
 - 3. Trial batches have been made.

1.4 SUBMITTALS

- A. The Contractor's Testing Laboratory's certificate of compliance.
- B. The Contractor shall submit:
 - 1. Certified copies of mix designs for each concrete class specified including compressive strength test reports.
 - 2. Certification that materials meet requirements specified.
 - 3. Samples only as requested by the Architect.
 - 4. Certification from vendor that samples originate from and are representative of each lot proposed for use.
- C. The Owner's Testing Agency will submit reports on tests and inspections performed to the Owner, the Architect, the Contractor, and the City Inspector.
- D. Shop Drawings: Show construction joint locations and details.
- E. Schedule of placing for the Architect's review before starting Work.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Ensure storage facilities are weather tight and dry.
- B. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use.
- C. Store bulk cement in bins capable of preventing exposure to moisture.
- D. Use sacked cement in chronological order of delivery. Store each shipment so that it may be readily distinguishable from other shipments.

PART 2 - PRODUCTS

2.1 CONCRETE CLASSES

CLASS	STRENGTH	AGGREGATE	WEIGHT	SLUMP	W/C (By Weight)
	3000 psi	1" Max	150 pcf	3" +/- 1"	0.45 Max.

25% maximum fly ash applies to both the foundations and slab.

- A. Strength: Compressive strength in psi after 28-days when tested in accordance with ASTM C39. All concrete shall develop compression strength specified in 28-days. To meet above requirements, mix shall be designed such that average compressive strength will exceed specified 28-day strength by an amount as specified by ACI 318.
- B. Aggregate: Maximum size in inches.
- C. Weight: Pounds per cubic foot, air dry.
- D. Slump: In inches when tested in accordance with ASTM C143.
- E. W/C: Water-cement ratio.

2.2 MATERIALS

- A. General Requirements:
 - 1. Cement and aggregates shall have proven history of successful use with one another. Sources of cement and aggregate shall remain unchanged through-out work unless the Architect approves request for change made at least 10-days prior to anticipated date of casting.
 - 2. Ready-mixed concrete shall meet requirements of ASTM C94.
 - 3. Deviations in properties of materials tested by the Owner's Testing Agency shall be cause for their rejection pending additional test results and redesign of mix by the Contractor's Testing Laboratory.
 - 4. No frozen aggregates will be permitted.
- B. Portland Cement: ASTM C150, Type I unless otherwise noted. Use one brand of cement throughout project unless otherwise acceptable to Architect.
- C. Fly Ash: ASTM C618, Type C or Type F.
- D. Aggregates:
 - 1. Coarse: ASTM C33. Coarse aggregate shall consist of a clean, hard, fine grained, sound crushed rock, or washed gravel or a combination of both. It shall be free from oil, organic matter or other deleterious substances and shall not contain more than two percent by weight of shale or cherty material. "Cleanness value shall not be less than 75 when tested per MM Test Method, 227 and conforming to CBC Section 1903A.3.2.
 - 2. Fines: ASTM C33. Sand equivalent shall be not less than 75 when tested as per ASTM D2419.
 - 3. Provide aggregates from a single source for exposed concrete.
- E. Water: Clean and potable, free from impurities detrimental to concrete.

- F. Water-Reducing Admixture: ASTM C494, Type A, non-lignini sulfonate. Same as Grace Construction Materials' "WRDA with Hycol"; Master Builders "Pozzolith 322N"; Sika Corp.'s "Plastocrete 161"; or equal product substituted per Section 01630.
1. Air Entraining Admixture: ASTM C260, certified by manufacturer to be compatible with other products. Same as W.R. Grace's "Daravair", Master Builders' "Micro-Air", Sika Corp.'s "Sika Aer", or equal product substituted per Section 01630.
 2. High-Range Water-Reducing Admixture (Super Plasticizer): ASTM C494, Type F or Type G. Same as W.R. Grace's "WRDA 19", Master Builders' "Rheobuild", Sika Corp.'s "Sikament", or equal product substituted per Section 01630.
 3. Water Reducing, Accelerator Admixture: ASTM C494, Type E. Same as W.R. Grace's "Daraset", Master Builder's "Pozzutec 20", Euclid's "Accelgurad 80", or equal product substituted per Section 01630.
 4. Water Reducing, Retarding Admixture: ASTM C494, Type D. Same as W.R. Grace's "Daratard-17", Master Builders' "Pozzolith R", Sika's "Plastiment", or equal product substituted per Section 01630.
 5. Fibrous Reinforcement: Engineered polypropylene fibers designed for secondary reinforcement of concrete slabs. Same as W.R. Grace's "Grace Fibers", Euclid's "Fiberstrand 100", Fibermesh's "Fibermesh", or equal product substituted per Section 01630.
- G. Other Admixtures: Only as approved by the Architect.
- H. Moisture Barrier: Polyethylene minimum 6 mils thick, fungus-resistant in 12' wide sheets, lapped 6 inches and taped.
- I. Sand Protection Course: Non-abrasive sand as approved by the Architect in 2 inch layers above and below the moisture barrier.
- J. Wax Sealer: Heavy penetrating type as manufactured by approved manufacturer of clear hardener.
- K. Abrasive Grains: Aluminum oxide type. Same as Sonneborn-Contech's "Frictex NS"; General Abrasive Co., Inc.'s "Fut-Sure"; The Exolon Co.'s "Exolon Anti-Slip"; or equal product substituted per Section 01630.
- L. Non-Shrink Grout: Premixed high strength grout requiring only addition of water at the site. Same as Master Builder's "Masterflow 928 Grout"; Burke's "Non-Ferrous, Non-Shrink Grout", or equal product substituted per Section 01630.
- M. Curing Materials:
1. Waterproof Paper: ASTM C171, Type 1, regular. Same as Sisalkraft Division of St. Regis Paper Co.'s "Orange Label"; or equal product substituted per Section 01630.
 2. Sheet Plastic: Polyethylene, four mils thick, fungus-resistant.

3. Curing Compound: ASTM C309. Same as Grace Construction Materials' "Horn Clear Seal"; Grimes Co.'s "Sealcrete"; Master Builders' "Masterseal W", or equal product substituted per Section 01630.
- N. Concrete Sealer: Clear water repellent treatment, blend of six resins containing no silicones or stearates, no darkening or change of color. Same as Sonneborn-Contech's "White Rox M-6-50-8"; Tamms Industries' "Chemstop" or equal product substituted per Section 01630.
- O. Hardener, Clear Liquid Type: Grace construction Materials' "Hornstone Crystal Chemical Hardener"; Master Builder's "Mastercron"; Sonneborn-Contech's "Lapidolith"; Upco Co.'s "Vitrox 4701"; or equal product substituted per Section 01630.
- P. Epoxy Adhesive: Two component material suitable for anchoring rebar into dry or damp concrete. Same as Covert's "CIA-Gel 7000", Hilti's "HIT HY-150" or equal product substituted per Section 01630.

2.3 MIXES

- A. General Requirements:
 1. The Contractor shall perform tests or assemble the necessary data indicating conformance with specifications.
 2. For each mix submit data showing that proposed mix will attain the required strength in accordance with requirements of CBC Section 1905A.3, Method "B".
 3. The Contractor shall instruct Laboratory to base mix design on use of materials tested and approved by the Owner's Testing Agency.
 4. Mix design shall include compression strength test reports per CBC Section 1905A.3.1.
 5. Mix shall be designed, tested, and adjusted if necessary in ample time before first concrete is scheduled to be placed. Laboratory data and strength test results for revised mix design shall be submitted to Architect prior to using in project.
 6. Specified and of uniform density without segregation.
 7. If mix yield exceeds 1-cubic yard, modify mix design to no more than one cubic yard without changing cement content.
 8. The Contractor's mix designs shall be subject to review by the Architect and by the Owner's Testing Agency.
 9. Introduction of calcium chloride will not be permitted.
 10. Unspecified admixtures will not be permitted unless the Architect reviews, the Contractor modifies mix designs as necessary, and modifications are accepted by the Owner's Testing Agency.

- B. Slab-on-Grade Mix requirements
 - 1. Maximum water/cement ratio of 0.45.
 - 2. Maximum fly ash content of 25% (as percentage replacement of cement).
 - 3. Do not use air entrainment additives.
 - 4. Use of Water-Reducing admixture is required. High Range Water-Reducing admixture (super plasticizer) shall be used when required to maintain workability and pumpability.
 - C. Patching Mortar: Mix in proportions by volume of one part cement to two parts fine sand.
 - D. Non-Shrink Grout: Follow approved manufacturer's printed instructions and recommendations.
- 2.4 MIXING
- A. Batching Plant Conditions:
 - 1. Ensure equipment and plant will afford accurate weighing, minimize segregation and will efficiently handle all materials to satisfaction of the Architect and the Owner's Testing Agency.
 - 2. Replace at no additional expense equipment the Architect and the Owner's Testing Agency deem inadequate or unsuitable.
 - 3. Use approved moisture meter capable of determining moisture content of sand.
 - B. General Requirements:
 - 1. Thoroughly clean concrete equipment before use for architectural concrete mixes to avoid contamination.
 - 2. Mix cement, fine and coarse aggregates, admixtures and water to exact proportions of mix designs. Method of mixing shall comply with CBC Section 1905A.8.
 - 3. Measure fine and coarse aggregates separately according to approved method which provides accurate control and easy checking.
 - 4. Adjust grading to improve workability; do not add water unless otherwise directed.
 - 5. Maintain proportions, values, or factors of approved mixes throughout work.
 - 6. Mix concrete in transit mixers five minutes immediately prior to discharge in addition to mixing as called for by ACI 304 and ASTM C94.

- C. Admixtures: Use automatic metering dispenser to introduce admixture into mix. Dispenser shall be recommended and calibrated by admixture manufacturer.

2.5 SOURCE QUALITY CONTROL

A. The Owner's Testing Agency will:

1. Review mix designs, certificates of compliance, and samples of materials the Contractor proposes to use.
2. Test and inspect materials, as necessary, in accordance with ACI 318 and CBC Sections 1903A, 1905A and 1929A for compliance with requirements.
3. Take samples as required from the Contractor's designated sources.
4. Take one grab sample for each 100 tons of Portland cement except that, when used in bulk loading ready-mix plants where separate bins for pretested cement are not available, take grab samples for each shipment of cement placed in bin with not less than one sample being taken for each day's pour and subsequently test such samples if required by the Architect.
5. Test both coarse and fine aggregate by use of solution of sodium or magnesium sulfate, or both whenever in the judgement of the Architect such tests are necessary to determine quality of material. Perform such tests in accordance with ASTM C88. Loss shall not exceed 6-percent of either fine or coarse aggregate. Aggregate failing to comply with this requirement may be used in the Work provided it contains less than 2- percent of shale and other deleterious particles and shows a loss in soundness test of not more than 10-percent when tested in the sodium sulphate solution. Test aggregates as required by CBC Section 1903A.3.
6. Test for sand equivalent of fine aggregate in accordance with California Test 217.
7. Test for cleanness value of coarse aggregate in accordance with California Test 227.
8. Inspect plant prior to any work to verify following:
 - a. Plant is equipped with approved metering devices for determining moisture content of fine aggregate.
 - b. Other plant quality controls are adequate.
9. Continuously inspect quality and quantity of materials used in transit mixed concrete, in batched aggregates and ready-mixed concrete at mixing plant or other location per CBC Section 1929A.4 where other materials are measured.

B. Waiver of Batch Plant Inspection:

1. Continuous batch plant inspection may be waived in accordance with CBC Section 1929A.5 if the plant complies with ASTM C94 and has been certified

by an agency acceptable to the architect to comply with the requirements of the National Ready Mix Concrete Association.

2. When batch plant inspection is waived, the following requirements shall apply:
 - a. Testing Agency shall check the first batching at the start of work and furnish mix proportions to the licensed Weighmaster.
 - b. Licensed Weighmaster shall identify material quantities and certify each load by a ticket.
 - c. Project Inspector shall collect truck mix tickets with load identification and maintain a daily record of placement. Trucks without a load ticket identifying the mix shall be rejected. Copies of daily placement record shall be submitted to the architect.
 - d. At the end of the project, the Weighmaster shall submit an affidavit to the architect certifying that all concrete supplied conforms to proportions established by mix designs.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine units of work to be cast and verify that:
 - 1. Construction of formwork is complete.
 - 2. Moisture barrier is placed and properly protected.
 - 3. Required reinforcement, inserts, and embedded items are in place.
 - 4. Form ties at construction joints are tight.
 - 5. Concrete-receiving places are free of debris.
 - 6. Dampen subgrade or sand course for slabs-on-grade. Do not saturate.
 - 7. Depths of depressed slab conditions are correct for delayed finish noted and for its proper bonding to concrete.
 - 8. Conveying equipment is clean and properly operating.
 - 9. The Architect has reviewed formwork and reinforcing steel and that preparations have been checked with the Project Inspector.
- B. Do not begin casting before unsatisfactory conditions have been corrected.
- C. At locations where new concrete is doweled to existing work, drill holes in existing concrete and insert epoxy dowels per general notes in Drawings.
- D. Install vapor barrier in compliance with ASTM E1643 under interior slabs. Turn vapor barrier up at exterior walls and seal. Lap horizontal joints 6 inches and seal with pressure-sensitive tape. Seal penetrations of vapor barrier. Place 2 inch sand fill under and over vapor barrier.

3.2 PREPARATION

- A. Ensure availability of sufficient labor, equipment and materials to place concrete correctly in accordance with scheduled casting.
- B. Protect finished surfaces adjacent to concrete-receiving places.
- C. Clean transportation and handling equipment at frequent intervals and flush thoroughly with water before each day's run. Do not discharge wash water into concrete form.
- D. Construction Joints: Clean and roughen all construction joint contact surfaces by removing all surface laitance and exposing sound mortar. Sandblasting and bush-hammering are acceptable methods.

3.3 PLACING

- A. The Inspector of Record, Architect, Structural Engineer, Testing Laboratory and DSA shall be notified at least 48 hours before placing concrete.
- B. Place concrete in accordance with CBC Section 1905A.
- C. Place concrete in cycles as a continuous operation to permit proper and thorough integration and to complete scheduled placement. Place no concrete where sun, wind, heat, or facilities prevent proper finishing and curing.
- D. Convey concrete as rapidly and directly as practicable to preserve quality and to prevent separation from rehandling and flowing; do not deposit concrete initially set. Cast concrete within ninety (90) minutes after adding water unless otherwise noted. Retempering of concrete which has partially set will not be permitted.
- E. Take precautions to avoid damage to under-slab moisture barrier and displacement of reinforcement and formwork.
- F. Deposit concrete vertically in its final position. Avoid free falls in excess of five feet where reinforcement will cause segregation and in typical conditions unless the Architect approves otherwise.
- G. Keep forms and reinforcement clean above pour line by removing clinging concrete with wire brush before casting next lift. Also remove leakage through forms.
- H. Interruption in casting longer than 60-minutes shall be cause for discontinuing casting for remainder of day. In this event, cut back concrete and provide construction joints as the Architect directs; clean forms and reinforcement as necessary to receive concrete at a later time.
- I. Hot Weather Concreting: Conform to ACI 305 and following requirements when mean daily temperature rises above 75 degrees Fahrenheit.
 - 1. An upper temperature limit of concrete mixes shall be established by the Contractor for each class of concrete. Concrete temperature during placing shall not be so high as to cause difficulty from loss of slump, flash set, or cold joints, and shall not exceed 90°F. Other project climatic conditions detrimental to concrete quality such as relative humidity, wind velocity, and solar radiation shall also be considered.
 - 2. Trial batches of concrete for each mix design shall be made at the limiting mix temperature selected. In lieu of trial batches, compression strength test reports (20 minimum) at the limiting temperature for each proposed mix shall be submitted to the Owner's testing laboratory for review.
 - 3. Practices to maintain concrete below maximum limiting temperature shall be in accordance with ACI 305. Concrete ingredients may be cooled before mixing, or flake ice or well-crushed ice of a size that will melt completely during mixing may be substituted for part of the mixing water.
 - 4. Practices to avoid the potential problems of hot weather concreting shall be employed by the Contractor in accordance with ACI 305.

5. When the temperature of the reinforcing steel or steel deck forms is greater than 120°F, reinforcing and forms shall be sprayed with water just prior to placing the concrete.

J. Cold Weather Concreting:

1. No placement of concrete will be allowed at temperatures below 20 degrees Fahrenheit or if mean daily temperature for curing period is anticipated to be below 20 degrees Fahrenheit.
2. No concrete placement will be allowed on frozen subgrade.
3. Conform to ACI 306 and following requirements when mean daily temperature falls below 40 degrees Fahrenheit.
 - a. Reinforcement, forms, and ground to receive concrete shall be completely free from frost.
 - b. Concrete at time of placement for footings shall have temperature no lower than 50 degrees Fahrenheit, for all other concrete this minimum temperature at time of placement shall be 60 degrees Fahrenheit. Maximum temperature shall be 90 degrees Fahrenheit.
 - c. Concrete shall be maintained at temperature no lower than 50 degrees Fahrenheit for minimum 7-day period after placement by means of blanket insulation, heaters, or other methods as approved by the Architect.
 - d. Use of calcium chloride or admixtures containing calcium chloride as accelerators will not be permitted.
 - e. The Contractor shall keep a record of concrete surface temperature for first 7-days after each pour. This record shall be open to inspection by the Architect.

K. Consolidating:

1. Use vibrators for thorough consolidation of concrete.
2. Provide vibrators for each location during simultaneous placing to ensure timely consolidation around reinforcement, embedded items and into corners of forms; ensure availability of spare vibrators in case of failures. Vibrate through full depth of freshly placed concrete.
3. Do not place vibrators against reinforcement, attach to forms, or use to spread concrete.
4. Exposed Concrete: Vibrate with rubber type heads and, in addition, spade along forms with flat strap or plate.

L. Construction Joints:

1. Verify location and conformance with typical details; provide only where designated or approved by the Architect. Comply with CBC Section 1906A.4.
2. All horizontal and vertical construction joints to be thoroughly sandblasted to clean and roughen entire surface to minimum 1/4-inch relief exposing clean coarse aggregate solidly embedded in mortar matrix.
3. Just prior to depositing concrete, the surface of the construction joint shall be thoroughly wetted.

M. Contraction (Control) Joints in Slabs-on-Grade:

1. Construct contraction joints in slabs-on-ground to form panels of patterns indicated on Drawings. Use saw cuts 1/8" x 1/4 slab depth, unless otherwise indicated.
2. Time saw cutting to allow sufficient curing of concrete to prevent raveled or broken edges.
3. Contraction joints in unexposed floor slabs may be formed by saw cuts as soon as possible after slab finishing as may be safely done without dislodging aggregate.
4. If joint pattern not shown, provide joints not exceeding 12'-6" in either direction and located to conform to bay spacing wherever possible (at column centerlines, half bays, third-bays).

N. Walls and Other Formed Elements:

1. Space points of deposit to eliminate need for lateral flow. Placing procedures of concrete in forms permitting escape of mortar, or flow of concrete itself, will not be permitted.
2. Level top surface upon stopping work.
3. Take special care to fill each part of the forms by depositing concrete directly as near final position as possible, and to force concrete under and around reinforcement, embedded items, without displacement.
4. After concrete has taken its initial set, care shall be exercised to avoid jarring forms or placing any strain on ends of projecting reinforcement.
5. Where backfill is placed against a wall, it shall be adequately shored until it has attained design strength.

3.4 CURING

A. General Requirements:

1. Take curing measures immediately after casting and for measures other than application of curing compound, extend for seven days. The Architect may recommend longer periods based upon prevailing temperature, wind and relative humidity. Comply with CBC Section 1905A.11.

2. Avoid alternate wetting and drying and fluctuations of concrete temperature.
 3. Protect fresh concrete from direct rays of sun, rain, freezing, drying winds, soiling, and damage.
 4. Do not permit curing method to affect adversely finishes or treatments applied to finish concrete.
- B. Curing Method, Typical: Obtain the Architect's approval of alternate measures.
1. Keep forms and concrete surfaces moist during period forms are required to remain in place.
 2. Apply curing compound per manufacturers' recommendations, except at slabs-on-grade apply curing compound at 150% of manufacturer's recommended application coverage rate.

3.5 CLEANING, PATCHING AND DEFECTIVE WORK

- A. Where concrete is under strength, out of line, level or plumb, or shows objectionable cracks, honeycombing, rock pockets, voids, spalling, exposed reinforcement, signs of freezing or is otherwise defective, and, in the Architect's judgment, these defects impair proper strength or appearance of the work, the Architect will require its removal and replacement at the Contractor's expense.
- B. Immediately after stripping and before concrete is thoroughly dry, patch minor defects, form-tie holes, honeycombed areas, etc., with patching mortar. Patch shall match finish of adjacent surface unless otherwise noted. Remove ledges and bulges.
- C. Compact mortar into place and neatly file defective surfaces to produce level, true planes. After initial set, dress surfaces of patches mechanically or manually to obtain same texture as surrounding surfaces.
- D. Rock Pockets:
1. Cut out to full solid surface and form key.
 2. Thoroughly wet before casting mortar.
 3. Where the Architect deems rock pocket too large for satisfactory mortar patching as described, cut out defective section to solid surface, key and pack solid with concrete to produce firm bond and match adjacent surface.
- E. Cleaning
1. Insure removal of bituminous materials, form release agents, bond breakers, curing compounds if permitted and other materials employed in work of concreting which would otherwise prevent proper application of sealants, liquid waterproofing, and other delayed finishes and treatments.
 2. Where cleaning is required, take care not to damage surrounding surfaces or leave residue from cleaning agents.

3.6 PROTECTION

- A. Protect concrete from injurious action of the elements and defacement of any nature during construction operations.
- B. Protect exposed corners of concrete from traffic or use which will damage them in any way.
- C. Make provisions to keep all exposed concrete free from laitance caused by spillage or leaking forms or other contaminants. Do not allow laitance to penetrate, stain, or harden on surfaces which have been textured.

3.7 FIELD QUALITY CONTROL

- A. The Owner's Testing Agency will:
 - 1. Perform testing in accordance with ACI 318 and CBC Section 1903A and 1905A.
 - 2. Review concrete mix designs.
 - 3. Inspect concrete and grout placement continuously.
 - 4. Test concrete to control slumps according to ASTM C143.
 - 5. Continuously monitor concrete temperature as it arrives on the site.
 - 6. Test concrete for required compressive strength in accordance with CBC Section 1905A.6:
 - a. Make and cure three specimen cylinders according to ASTM C31 for each 50 cubic yards, or fraction thereof, of each class poured at site each day.
 - b. Retain one cylinder for 7-day test and two for the 28-day test.
 - c. Number each cylinder 1A, 1B, 1C, 2A, 2B, 2C, etc; date each set; and keep accurate record of pour each set represents.
 - d. Transport specimen cylinders from job to laboratory after cylinders have cured for 24-hours on site. Cylinders shall be covered and kept at air temperatures between 60 and 80 degrees Fahrenheit.
 - e. Test specimen cylinders at age 7-days and age 28-days for specified strength according to ASTM C39.
 - f. Base strength value on average of two cylinders taken for 28-day test.
 - 7. Test and inspect materials, as necessary, in accordance with ACI 318, MM Test Method 227 (Coarse Aggregates) and MM Test Method 217 (Fine Aggregates), for compliance with requirements specified in this section.

- B. The Contractor shall:
1. Submit ticket for each batch of concrete delivered to job site. Ticket shall bear the following information:
 - a. Design mix number.
 - b. Signature or initials of ready mix representative.
 - c. Time of batching.
 - d. Weight of cement, aggregates, water and admixtures in each batch with maximum aggregate size.
 - e. Total volume of concrete in each batch.
 - f. Notation to indicate equipment was checked for contaminants prior to batching.
 2. Pay the Owner's Testing Agency for taking core specimens of hardened structure and testing specimen according to ASTM C88 and C42 when laboratory tests of specimen cylinders show compressive strengths below specified minimum.

3.8 FINISH OF FORMED SURFACES

- A. Rough Form Finish: For formed concrete surfaces not exposed-to-view in the finish Work or by other construction. Concrete surface shall have texture imparted by form facing material used, with tie holes and defective areas repaired and patched and fins and other projections exceeding 1/4 inch in height rubbed down or chipped off.
- B. Smooth Form Finish: For formed concrete surfaces exposed-to-view, or to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, damp proofing, painting or other similar system. This is as-cast concrete surface obtained with selected form facing material, arranged orderly and symmetrically with a minimum of seams. Repair and patch defective areas with fins or other projections completely removed and smoothed.
- C. Architectural Concrete Finish: Integrally colored concrete, using specified color additive; smooth light sandblast surface.
- D. Related Unformed Surfaces: At tops of walls, horizontal offsets and similar unformed surfaces occurring adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.
- E. Salt Finish: Covered under Section 02751.

3.9 SLAB FINISHES

- A. Scratch Finish: Apply scratch finish to monolithic slab surfaces that are to receive concrete floor topping or mortar setting beds for tile, Portland cement terrazzo, and

other bonded applied cementitious finish flooring material, and as otherwise indicated.

1. After placing slabs, plane surface to tolerances for floor flatness (F_F) of 15. Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set, with stiff brushes, brooms or rakes.
- B. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as hereinafter specified, and slab surfaces which are to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo, and as otherwise indicated.
1. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats, or by hand-floating if area is small or inaccessible to power units. Check and level surface plane to tolerances of F_F 18. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.
- C. Trowel Finish: Apply trowel finish to monolithic slab surfaces to be exposed-to-view, and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or other thin film finish coating system.
1. After floating, begin first trowel finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and with surface leveled to tolerances of F_F 20. Grind smooth surface defects which would telegraph through applied floor covering system.
 2. Floors to receive traffic topping shall have steel trowel finish.
- D. Trowel and Fine Broom Finish: Where ceramic or quarry tile is to be installed with thin-set mortar, apply trowel finish as specified, then immediately follow with slightly scarifying surface by fine brooming.
- E. Non-Slip Broom Finish: Apply non-slip broom finish to exterior concrete platforms, steps and ramps, and elsewhere as indicated.
1. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.
- F. Dry Shake Hardener, Wear-Resistant Finish: Provide hardened wear-resistant finish at Loading Dock floor slabs.
1. Apply dry shake materials for wear-resistant finish at rate of not less than 60 lbs. per 100 sq. ft., unless greater amount is recommended by material manufacturer.
 2. Immediately following first floating operation, uniformly distribute approximately 2/3 of required weight of dry shake material over concrete

surface, and embed by means of power floating. Follow floating operation with second shake application, uniformly distributing remainder of dry shake material at right angles to first application, and embed by power floating.

3. After completion of broadcasting and floating, apply trowel finish as herein specified. Cure slab surface with curing compound recommended by dry shake hardener manufacturer. Apply curing compound immediately after final finishing.

3.10 CLEAN UP

- A. Perform Work under this Section to keep affected portions of building site neat, clean, and orderly. Remove, immediately upon completion of Work under this Section, surplus materials, rubbish, and equipment associated with or used in performance. Be aware that failure to perform clean-up operations within 24 hours of notice by Architect will be considered adequate grounds for having work done by others at no added expense to the Owner.

END OF SECTION

SECTION 05-5000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This section includes the following metal fabrications:
 - 1. Rough hardware.
 - 2. Loose bearing and leveling plates.
 - 3. Loose steel lintels.
 - 4. Miscellaneous framing and supports for the following:
 - a. Applications where framing and supports are not specified in other sections.
 - 5. Miscellaneous steel trim.
 - 6. Shelf and relieving angles.
 - 7. Metal bar gratings.
 - 8. Steel pipe railings.
 - 9. Pipe bollards.

1.3 DEFINITIONS

- A. Definitions in ASTM E 985 for railing-related terms apply to this section.

1.4 SYSTEM PERFORMANCE REQUIREMENTS

- A. Structural Performance of Handrails and Railing Systems: Design, engineer, fabricate, and install handrails and railing systems to comply with requirements of ASTM E 985 for structural performance based on testing performed in accordance with ASTM E 894 and E 935.
 - 1. Top Rail of Guardrail Systems: Capable of withstanding the following loads applied as indicated:
 - a. Concentrated load of 300 lbf applied at any point nonconcurrently, vertically downward, or horizontally.

- b. Concentrated and uniform loads above need not be assumed to act concurrently.
2. Handrails Not Serving as Top Rails: Capable of withstanding the following loads applied as indicated:
- a. Concentrated load of 200 lbf applied at any point nonconcurrently, vertically downward or horizontally.
 - b. Concentrated and uniform loads above need not be assumed to act concurrently.
3. Infill Area of Guardrail Systems: Capable of withstanding a horizontal concentrated load of 200 lbf applied to one sq. ft. at any point in the system including panels, intermediate rails balusters, or other elements composing the infill area.

1.5 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product data for products used in miscellaneous metal fabrications, including paint products and grout.
- C. Shop drawings detailing fabrication and erection of each metal fabrication indicated. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide templates for anchors and bolts specified for installation under other sections.
- D. Samples representative of materials and finished products as may be requested by Architect.
- E. Welder certificates signed by Contractor certifying that welders comply with requirements specified under "Quality Assurance" article.
- F. Qualification data for firms and persons specified in "Quality Assurance" article to demonstrate their capabilities and experience. Include list of completed projects with project name, addresses, names of Architects and Owners, and other information specified.

1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: Firms experienced in successfully producing metal fabrications similar to that indicated for this Project, with sufficient production capacity to produce required units without causing delay in the Work.
- B. Installer Qualifications: Arrange for installation of metal fabrications specified in this section by same firm that fabricated them.
- C. Qualify welding processes and welding operators in accordance with AWS D1.1 "Structural Welding Code - Steel," D1.3 "Structural Welding Code - Sheet Steel", and D1.2 "Structural Welding Code - Aluminum."

1. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Check actual locations of walls and other construction to which metal fabrications must fit, by accurate field measurements before fabrication; show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delay of Work.

1.8 SEQUENCING AND SCHEDULING

- A. Sequence and coordinate installation of wall handrails as follows:
 1. Mount handrails only on completed walls. Do not support handrails temporarily by any means not satisfying structural performance requirements.
 2. Mount handrails only on gypsum board assemblies reinforced to receive anchors, and where the location of concealed anchor plates has been clearly marked for benefit of Installer.

PART 2 - PRODUCTS

2.1 FERROUS METALS

- A. Metal Surfaces, General: For metal fabrications exposed to view upon completion of the Work, provide materials selected for their surface flatness, smoothness, and freedom from surface blemishes. Do not use materials whose exposed surfaces exhibit pitting, seam marks, roller marks, rolled trade names, roughness, and, for steel sheet, variations in flatness exceeding those permitted by reference standards for stretcher-leveled sheet.
- B. Steel Plates, Shapes, and Bars: ASTM A 36.
- C. Steel Bars for Gratings: ASTM A 569 or ASTM A 36.
- D. Steel Tubing: Product type (manufacturing method) and as follows:
 1. Hot-Formed Steel Tubing: ASTM A 501.
 - a. For exterior installations and where indicated, provide tubing with hot-dip galvanized coating per ASTM A 53.
- E. Uncoated Structural Steel Sheet: Product type (manufacturing method), quality, and grade, as follows:
 1. Cold-Rolled Structural Steel Sheet: ASTM A 611, grade as follows:
 - a. Grade A, unless otherwise indicated or required by design loading.
- F. Uncoated Steel Sheet: Commercial quality, product type (method of manufacture) as follows:

1. Cold-Rolled Steel Sheet: ASTM A 366.
- G. Galvanized Steel Sheet: Quality as follows:
 1. Structural Quality: ASTM A 446; Grade A, unless another grade required for design loading, and G90 coating designation unless otherwise indicated.
- H. Steel Pipe: ASTM A 53; finish, type, and weight class as follows:
 1. Galvanized finish.
 2. Type F, standard weight (schedule 40), unless otherwise indicated, or another weight, type, and grade required by structural loads.
 3. Pipe to be used for handrails is required to be 1½" O.D.
- I. Gray Iron Castings: ASTM A 48, Class 10.
- J. Malleable Iron Castings: ASTM A 47, grade 32510.
- K. Brackets, Flanges and Anchors: Cast or formed metal of the same type material and finish as supported rails, unless otherwise indicated.
- L. Concrete Inserts: Threaded or wedge type; galvanized ferrous castings, either malleable iron, ASTM A 47, or cast steel, ASTM A 27. Provide bolts, washers, and shims as required, hot-dip galvanized per ASTM A 153.
- M. Welding Rods and Bare Electrodes: Select in accordance with AWS specifications for the metal alloy to be welded.

2.2 STAINLESS STEEL

- A. Bar Stock: ASTM A 276, Type 304.
- B. Plate: ASTM A 167, Type 304.

2.3 GROUT AND ANCHORING CEMENT

- A. Nonshrink Nonmetallic Grout: Premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with CE CRD-C 621. Provide grout specifically recommended by manufacturer for interior and exterior applications of type specified in this section.
- B. Erosion-Resistant Anchoring Cement: Factory-prepackaged, nonshrink, nonstaining, hydraulic controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound. Provide formulation that is resistant to erosion from water exposure without need for protection by a sealer or waterproof coating and is recommended for exterior use by manufacturer.
- C. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include but are not limited to the following:

1. Nonshrink Nonmetallic Grouts:
 - a. "Bonsal Construction Grout"; W.R. Bonsal Co.
 - b. "Diamond-Crete Grout"; Concrete Service Materials Co.
 - c. "SonogROUT"; Sonneborn Building Products Div., Rexnord Chemical Products, Inc. or Approved Equal
2. Erosion-Resistant Anchoring Cement:
 - a. "Super Por-Rok"; Minwax Construction Products Division.

2.4 FASTENERS

- A. General: Provide zinc-coated fasteners for exterior use or where built into exterior walls. Select fasteners for the type, grade, and class required.
- B. Bolts and Nuts: Regular hexagon head type, ASTM A 307, Grade A.
- C. Lag Bolts: Square head type, FS FF-B-561.
- D. Machine Screws: Cadmium plated steel, FS FF-S-92.
- E. Wood Screws: Flat head carbon steel, FS FF-S-111.
- F. Plain Washers: Round, carbon steel, FS FF-W-92.
- G. Drilled-In Expansion Anchors: Expansion anchors complying with FS FF-S-325, Group VIII (anchors, expansion, [nondrilling]), Type I (internally threaded tubular expansion anchor); and machine bolts complying with FS FF-B-575, Grade 5.
- H. Toggle Bolts: Tumble-wing type, FS FF-B-588, type, class, and style as required.
- B. Lock Washers: Helical spring type carbon steel, FS FF-W-84.

2.5 PAINT

- A. Shop Primer for Ferrous Metal: Manufacturer's or fabricator's standard, fast-curing, lead-free, universal modified alkyd primer selected for good resistance to normal atmospheric corrosion, for compatibility with finish paint systems indicated, and for capability to provide a sound foundation for field-applied topcoats despite prolonged exposure complying with performance requirements of FS TT-P-645.
- B. Galvanizing Repair Paint: High zinc dust content paint for regalvanizing welds in galvanized steel, with dry film containing not less than 94 percent zinc dust by weight, and complying with DOD-P-21035 or SSPC-Paint-20.
- C. Bituminous Paint: Cold-applied asphalt mastic complying with SSPC-Paint 12 except containing no asbestos fibers.

2.6 FABRICATION, GENERAL

- A. Form metal fabrications from materials of size, thickness, and shapes indicated but not less than that needed to comply with performance requirements indicated. Work to dimensions indicated or accepted on shop drawings, using proven details of fabrication and support. Use type of materials indicated or specified for various components of each metal fabrication.
- B. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.
- C. Allow for thermal movement resulting from the following maximum change (range) in ambient temperature in the design, fabrication, and installation of installed metal assemblies to prevent buckling, opening up of joints, and overstressing of welds and fasteners. Base design calculations on actual surface temperatures of metals due to both solar heat gain and nighttime sky heat loss.
 - 1. Temperature Change (Range): 100 deg F (55.5 deg C).
- D. Shear and punch metals cleanly and accurately. Remove burrs.
- E. Ease exposed edges to a radius of approximately 1/32 inch, unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- F. Remove sharp or rough areas on exposed traffic surfaces.
- G. Weld corners and seams continuously to comply with AWS recommendations and the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and contour of welded surface matches those adjacent.
- H. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.
- J. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

- K. Cut, reinforce, drill and tap miscellaneous metal work as indicated to receive finish hardware, screws, and similar items.
 - L. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.
- 2.7 ROUGH HARDWARE
- A. Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels, and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware items are specified in Division 6 sections.
 - B. Fabricate items to sizes, shapes, and dimensions required. Furnish malleable-iron washers for heads and nuts which bear on wood structural connections; elsewhere, furnish steel washers.
- 2.8 LOOSE BEARING AND LEVELING PLATES
- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction, made flat, free from warps or twists, and of required thickness and bearing area. Drill plates to receive anchor bolts and for grouting as required. Galvanize after fabrication.
- 2.9 LOOSE STEEL LINTELS
- A. Provide loose structural steel lintels from steel angles and shapes of size indicated for openings and recesses in concrete walls and partitions at locations indicated.
 - B. Weld adjoining members together to form a single unit where indicated.
 - C. Galvanize loose steel lintels, unless otherwise noted.
- 2.10 MISCELLANEOUS FRAMING AND SUPPORTS
- A. General: Provide steel framing and supports for applications indicated or which are not a part of structural steel framework, as required to complete work.
 - B. Fabricate units to sizes, shapes, and profiles indicated and required to receive adjacent other construction retained by framing and supports. Fabricate from structural steel shapes, plates, and steel bars of welded construction using mitered joints for field connection. Cut, drill, and tap units to receive hardware, hangers, and similar items.
 - 1. Equip units with integrally welded anchors for casting into concrete or building into masonry. Furnish inserts if units must be installed after concrete is placed.
 - a. Except as otherwise indicated, space anchors 24 inches o.c. and provide minimum anchor units in the form of steel straps 1-1/4 inches wide x 1/4 inch x 8 inches long.

C. Galvanize miscellaneous framing and supports in the following locations:

1. Exterior locations.

D. Stainless steel miscellaneous framing and supports in the following locations:

1. Exposed supports within lavatories

2.11 MISCELLANEOUS STEEL TRIM

A. Provide shapes and sizes indicated for profiles shown. Unless otherwise indicated, fabricate units from structural steel shapes, plates, and steel bars, with continuously welded joints and smooth exposed edges. Use concealed field splices wherever possible. Provide cutouts, fittings, and anchorages as required for coordination of assembly and installation with other work.

B. Galvanize miscellaneous framing and supports in the following locations:

1. Exterior locations.

2. Interior locations where indicated.

2.12 STEEL PIPE RAILINGS AND HANDRAILS

A. General: Fabricate pipe railings and handrails to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thickness of pipe, post spacings, and anchorage, but not less than that required to support structural loads. All Handrail pipes to be fabricated from 1-1/2" O.D. pipe.

B. Interconnect railing and handrail members by butt-welding or welding with internal connectors, at fabricator's option, unless otherwise indicated.

1. At tee and cross intersections, notch ends of intersecting members to fit contour of pipe to which end is joined and weld all around.

C. Form changes in direction of railing members as follows:

1. By radius bends of radius tightest radius without crimping or deforming pipe.

D. Form simple and compound curves by bending pipe in jigs to produce uniform curvature for each repetitive configuration required; maintain cylindrical cross-section of pipe throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of pipe.

E. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated.

F. Close exposed ends of pipe by welding 3/16 inch thick steel plate in place or by use of prefabricated fittings, except where clearance of end of pipe and adjoining wall surface is 1/4 inch or less.

G. Toe Boards: Where indicated, provide toe boards at railings around openings and at the edge of open-sided floors and platforms. Fabricate to dimensions and details

indicated, or if not indicated, use 4 inches high x 1/8 inch steel plate welded to, and centered between, each railing post.

- H. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, end closures, flanges, miscellaneous fittings, and anchors for interconnections of pipe and attachment of railings and handrails to other work. Furnish inserts and other anchorage devices for connecting railings and handrails to concrete or masonry work.
 - 1. For railing posts set in concrete fabricate sleeves from steel pipe not less than 6 inches long and with an inside diameter not less than 1/2 inch greater than the outside diameter of post, with steel plate closure welded to bottom of sleeve.
 - 2. For removable railing posts, fabricate slip-fit sockets from steel pipe whose inside diameter is sized for a close fit with posts and to limit deflection of post without lateral load, measured at top, to not more than 1/12 of post height. Provide socket covers designed and fabricated to resist accidental dislodgement.
- I. Fillers: Provide steel sheet or plate fillers of thickness and size indicated or required to support structural loads of handrails where needed to transfer wall bracket loads through wall finishes to structural supports. Size fillers to suit wall finish thicknesses. Size fillers to produce adequate bearing to prevent bracket rotation and overstressing of substrate.
- J. For exterior steel railings and handrails formed from steel pipe with galvanized finish, galvanize fittings, brackets, fasteners, sleeves, and other ferrous components.
- K. For interior steel railings and handrails formed from steel pipe with galvanized finish, galvanize fittings, brackets, fasteners, sleeves, and other ferrous components.

2.13 PIPE BOLLARDS

- A. Fabricate pipe bollards from Schedule 80 steel pipe. Cap bollards with 1/4 inch minimum thickness steel base plate.
- B. Fabricate sleeves for bollard anchorage from steel pipe with 1/4 inch thick steel plate welded to bottom of sleeve.

2.14 FINISHES, GENERAL

- A. Comply with NAAMM "Metal Finishes Manual" for recommendations relative to application and designations of finishes.
- B. Finish metal fabrications after assembly.

2.15 STEEL AND IRON FINISHES

- A. Galvanizing: For those items indicated for galvanizing, apply zinc-coating by the hot-dip process compliance with the following requirements:
 - 1. ASTM A 153 for galvanizing iron and steel hardware.

2. ASTM A 123 for galvanizing both fabricated and unfabricated iron and steel products made of uncoated rolled, pressed, and forged shapes, plates, bars, and strip 0.0299 inch thick and heavier.
- B. Preparation for Shop Priming: Prepare uncoated ferrous metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:
 1. Exteriors (SSPC Zone 1B): SSPC-SP6 "Commercial Blast Cleaning."
 2. Interiors (SSPC Zone 1A): SSPC-SP3 "Power Tool Cleaning."
- C. Apply shop primer to uncoated surfaces of metal fabrications that will be concealed in other construction, except those with galvanized finish or to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated. Comply with requirements of SSPC-PA1 "Paint Application Specification No. 1" for shop painting. Stripe paint all edges, corners, crevices, bolts, welds, and sharp edges.
- D. Apply TNEMEC primer or approved equal to uncoated surfaces of metal fabrications that will be exposed in exterior or interior locations, except those with galvanized finish or to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated. Comply with requirements of Special Coatings manufacturer.
 1. Stripe paint all edges, corners, crevices, bolts, welds, and sharp edges.

2.16 ALUMINUM FINISHES

- A. Finish designations prefixed by "AA" conform to the system established by the Aluminum Association for designating aluminum finishes.
- B. As Fabricated Finish: AA-M10 (Mechanical Finish: as fabricated, unspecified).

PART 3 - EXECUTION

3.1 PREPARATION

- A. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, including concrete inserts, sleeves, anchor bolts, and miscellaneous items having integral anchors that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.
- B. Center nosings on tread widths with noses flush with riser faces and tread surfaces.
- C. Set sleeves in concrete with tops flush with finish surface elevations; protect sleeves from water and concrete entry.

3.2 INSTALLATION, GENERAL

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; include threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors as required.

- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installation of miscellaneous metal fabrications. Set metal fabrication accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- C. Provide temporary bracing or anchors in formwork for items that are to be built into concrete masonry or similar construction.
- D. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.
- E. Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, methods used in correcting welding work, and the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and contour of welded surface matches those adjacent.
- F. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint or zinc chromate primer.

3.3 SETTING LOOSE PLATES

- A. Clean concrete and masonry bearing surfaces of any bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of bearing plates.
- B. Set loose leveling and bearing plates on wedges, or other adjustable devices. After the bearing members have been positioned and plumbed, tighten the anchor bolts. Do not remove wedges or shims, but if protruding, cut off flush with the edge of the bearing plate before packing with grout.
 - 1. Use metallic nonshrink grout in concealed locations where not exposed to moisture; use nonmetallic nonshrink grout in exposed locations, unless otherwise indicated.
 - 2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.4 INSTALLATION OF SUPPORTS FOR TOILET PARTITIONS

- A. Anchor supports securely to, and rigidly brace from, overhead building structure.

3.5 INSTALLATION OF STEEL PIPE RAILINGS AND HANDRAILS

- A. Adjust railings prior to anchoring to ensure matching alignment at abutting joints. Space posts at spacing indicated, or if not indicated, as required by design loadings. Plumb posts in each direction. Secure posts and railing ends to building construction by one of the following:
1. Anchor posts in concrete by means of pipe sleeves preset and anchored into concrete. After posts have been inserted into sleeves, fill annular space between post and sleeve solid with the following anchoring material, mixed and placed to comply with anchoring material manufacturer's directions.
 2. Anchor posts in concrete by core drilling holes not less than 5 inches deep and 3/4 inch greater than outside diameter of post. Clean holes of all loose material, insert posts and fill annular space between post and concrete with the following anchoring material, mixed and placed to comply with anchoring material manufacturer's directions.
 - a. Nonshrink, nonmetallic grout.
 - b. Leave anchorage joint exposed, wipe off surplus anchoring material, and leave 1/8 inch build-up, sloped away from post. For installations exposed on exterior, or to flow of water, seal anchoring material to comply with grout manufacturer's directions.
 3. Anchor posts to steel with steel oval flanges, angle type or floor type as required by conditions, welded to posts and bolted to steel supporting members.
 4. Anchor rail ends into concrete and masonry with steel round flanges welded to rail ends and anchored into wall construction with lead expansion shields and bolts.
 5. Anchor rail ends to steel with steel oval or round flanges welded to rail ends and bolted to structural steel members, unless otherwise indicated.
 6. Install removable railing/gate sections where indicated in slip-fit metal sockets cast into concrete. Accurately locate sockets to match post spacing.
- B. Secure handrails to wall with wall brackets and end fittings. Provide bracket with exactly 1-1/2 inch clearance from inside face of handrail and finished wall surface. Locate brackets as indicated, or if not indicated, at spacing required to support structural loads. Secure wall brackets and wall return fittings to building construction as follows:
1. Use type of bracket with pre-drilled hole for exposed bolt anchorage.
 2. For concrete and solid masonry anchorage, use drilled-in expansion shield and either concealed hanger bolt or exposed lag bolt, as applicable.
 3. For wood stud partitions, use lag bolts set into wood backing between studs. Coordinate with stud installations for accurate location of backing members.

- C. Expansion Joints: Provide expansion joints at locations indicated, or if not indicated, at intervals not to exceed 40 feet. Provide slip joint with internal sleeve extending 2 inches beyond joint on either side; fasten internal sleeve securely to one side; locate joint within 6 inches of post.

3.6 INSTALLATION OF BOLLARDS

- A. Anchor bollards in concrete by means of pipe sleeves preset and anchored into concrete. After bollards have been inserted into sleeves, fill annular space between bollard and sleeve solid with nonshrink, nonmetallic grout, mixed and placed to comply with grout manufacturer's directions.

3.7 ADJUSTING AND CLEANING

- A. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting to comply with SSPC-PA 1 requirements or Special Coating Manufacturer for touch-up of field painted surfaces.
 - 1. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.
- B. For galvanized surfaces clean welds, bolted connections and abraded areas and apply galvanizing repair paint to comply with ASTM A 780.

END OF SECTION 05500

SECTION 06-1000 ROUGH CARPENTRY

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Section Includes: Provision of all lumber framing, rough hardware and blocking as indicated in the contract drawings.

1.2 REFERENCES

- A. Requirements of GENERAL CONDITIONS and DIVISION NO. 1 apply to all Work in this Section.
- B. Published Specifications, standards, tests, or recommended methods of trade, industry, or governmental organizations apply to Work in this Section where cited by abbreviations noted below (latest editions apply).
 - 1. California Code of Regulations. Title 24, 2013 edition, also known as California Building Code (CBC), with amendments.
 - 2. (APA) - American Plywood Association, "Guide to Plywood Grades".
 - 3. (PS) - United States Product Standard, PS-1 "Construction and Industrial Plywood".
 - 4. (UL) - Underwriters' Laboratories, Inc., "Fire Hazard Classification, FR-S".
 - 5. (WCLIB) - West Coast Lumber Inspection Bureau, "Standard Grading Rules No. 16".
 - 6. (WWPA) - Western Wood Products Association, "Grading Rules for Lumber".
 - 7. (AWPA) - American Wood Preservers Association Standards.
 - 8. (ASTM) - American Society of Testing and Materials.

1.3 SUBMITTALS

- A. Shop Drawings of all specially fabricated rough hardware.
- B. Certificates of compliance with standards specified.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Provide proper facilities for handling and storage of materials to prevent damage to edges, ends, and surfaces.
- B. Keep materials dry. Where necessary, stack materials off ground on level flat forms, fully protected from weather.

1.5 JOB CONDITIONS

- A. Environmental Requirements: Maintain uniform moisture content of lumber at not more than 19-percent before, during, and after installation.
- B. Sequencing, Scheduling: Coordinate details with other Work supporting, adjoining or fastening to rough carpentry Work.

PART 2 - PRODUCTS

2.1 MATERIAL

- A. Rough Carpentry:
 - 1. Sills on Concrete: Pressure treated Douglas Fir.
 - 2. Lumber (Wood Framing): Meet requirements of Section 06-1600.
 - 3. Plywood Sheathing: Meet requirements of Section 06-1600. Provide thickness shown on drawings.
- B. Rough Hardware: All exterior hardware shall be hot-dipped galvanized.
 - 1. Nails: Common wire, typical.
 - 2. Powder Driven Fasteners: Tempered steel pins with special corrosion-resistant finish. Provide guide washers to accurately control penetration, maximum 3/4-inch. Accomplish fastening by low-velocity piston-driven powder-actuated tool. Pins and tool: Hilti Fastening Systems, Impex Tool Corporation, or equal product.
 - 3. Expansion Bolts: Reverse cone, self-wedging, expansion type, Tightening of nut or increased tension on bolt shank shall act to force wedges outward to create positive increased resistance to withdrawal, Ramset/Read Head "Tru-Bolt", Hilti Kwik - Bolt TZ or better product.
 - 4. Metal Timber Framing Connectors: Fabricate from hot-dipped galvanized steel. Connectors shall be at least 16-gauge material, 1/8-inch plate materials where welded, unless otherwise shown or specified, punched for nailing. Nails and nailing shall conform to the manufacturer's instructions, with a nail provided for each punched hole. Manufactured by Simpson Strong-Tie Company or equal product.
 - 5. Miscellaneous Hardware: Provide all common screws, bolts, fastenings, washers and nuts required to complete rough carpentry Work.

2.2 TREATMENTS

- A. Fire-Retardant Treatment: Same as Koppers Co., Inc.'s "Non-Com" J.H. Baxter and Co.'s "Baco-Pyresote"; or equal product substituted.
- B. Preservative Treatment: Furnish in accordance with AWPA.

2.3 FABRICATION

- A. Preparation (Finish Carpentry):
 - 1. Verify measurements at job site.
 - 2. Verify details and dimensions of equipment and fixtures integral with finish carpentry for proper fit and accurate alignment.
 - 3. Coordinate details with other work supporting, adjoining, or fastening to casework.

 - B. Lumber:
 - 1. Air- or kiln-dry to maximum 19-percent moisture content prior to shipment. Stack and air-dry to maximum 15 percent in field prior to installation.
 - 2. Furnish surfaced four sides, S4S, unless otherwise noted.
 - 3. Size to conform with rules of governing standard. Sizes shown are nominal unless otherwise noted.

 - C. Wood Treatments:
 - 1. Fire-Retardant Treatment:
 - a. Fire-retardant treat only wood blocking supporting truss joists on steel beams.
 - b. Treat in accordance with AWPA C20 and approved manufacturer's recommendations.
 - 2. Preservative Treatment:
 - a. Treat lumber and plywood sheathing exposed to weather.
 - b. Lumber: Treat in accordance with AWPA C2.
 - c. Plywood: Treat in accordance with AWPA C9.
 - d. After treatment and prior to shipping, air- or kiln-dry lumber to maximum 19 percent moisture content. Air dry in field to maximum 15 percent prior to installation.
- 2.4 QUALITY CONTROL
- A. Lumber shall bear grade-trademark or be accompanied by certificate of compliance of appropriate grading agency.
 - B. Plywood shall bear APA grade-trademark.
 - C. Air-dry all framing lumber to a maximum of 15 percent moisture content prior to installing.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive rough carpentry Work and verify following:
1. Completion of installation of building components to receive rough carpentry Work.
 2. That surfaces are satisfactory to receive Work.
 3. That spacing, direction, and details of supports are correct to accommodate installation of blocking, backing, stripping, furring and nailers.
 4. That all anchor bolts and holddown bolts are properly installed.

3.2 INSTALLATION

- A. Cutting: Perform all cutting, boring, and similar Work required.
- B. Studs, Joists, Beams, and Posts: Install all members true to line. No wood shingle shims are permitted. Place joists with crown up; maximum 1/4-inch crown permitted.
- C. Nail joints in accordance with applicable requirements of the CBC unless otherwise shown or specified. Pre-drill where nails tend to split wood.
- D. Bolt holes to be 1/16-inch oversize. Threads shall not bear on wood. Use standard malleable iron washers against wood. Carriage bolts require washers under the nut only.
- E. Provide blocking, grounds, nailers, stripping, and backing as shown and as required to secure other Work.
- F. Maintain 1/8-inch gap between all plywood panel edges.
- G. Do not utilize plywood sheets having a width smaller than 2-feet 0-inches.
- H. Plywood flooring shall be field glued with adhesives meeting APA specification AFG-01 applied in accordance with the manufacturers' recommendations. Apply continuous line of glue on joists and in groove of tongue and groove panels.
- I. Where wood is cut, sawed, planed, bored or marred after preservative or fire-retardant treatment, apply two heavy brush coats of same material used in treatment.
- J. Nail heads shall be driven flush with plywood surface. Overdriven nails (nails which fracture the outer ply layer) shall be replaced one for one.
- K. Screws (Wood or Lag): Screws shall be screwed and not driven into place. Screw holes shall be predrilled to the same diameter and depth of shank. Holes for threaded portion shall be predrilled less than or equal to the diameter of the root of the thread. Provide standard cut washers under head of lag screws.
- L. Sills under bearing, exterior and shear walls shall be bedded on 1/2-inch minimum drypack or grout to obtain continuous bearing.

3.3 CLEANING AND ADJUSTING (FINISH CARPENTRY)

- A. Remove damaged or otherwise disfigured portions and replace with new prior to the Owner's acceptance.
- B. Wash finished Work in strict accordance with product manufacturer's directions and ensure that washed surfaces do not differ from clean unwashed surfaces. Any difference will be considered unsatisfactory work.

3.4 FIELD QUALITY CONTROL

- A. The Owner's Testing Agency shall:
 - 1. Inspect erected timber framing as required to establish conformity of work with Drawings.
 - 2. Inspect all bolted connections.
 - 3. Inspect all timber connectors per CBC Section 2337A.2.
 - 4. Inspect roof diaphragm nailing for nail size, spacing and penetration at plywood panel edges, and special nailing at collector and drag members.
 - 5. Inspect anchor tiedown system and shear wall nailing for nail size, spacing and penetration at plywood panel edges, and nailing at tiedown posts.

END OF SECTION

SECTION 06-1600 - FRAMING AND SHEATHING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Structural wall and roof framing.
- B. Framing modifications as required for alterations.
- C. Wall and roof sheathing, where indicated.
- D. Wood furring, backing, and grounds.
- E. Preservative treatment of wood.

1.2 REFERENCES

- A. CBC – 2013 California Building Code.
- B. CCR - California Code of Regulations Title 24, Part 2, Chapter 23A.
- C. ALSC - American Lumber Standards Committee: Softwood Lumber Standards.
- D. ANSI/NFPA NDS-91 - National Design Specifications for Wood Construction.
- E. APA - The Engineered Wood Association.
- F. AWPA - American Wood Preservers' Association: Book of Standards.
- G. AWPB - American Wood Preservers' Bureau.
- H. NFPA - National Forest Products Association.
- I. National Bureau of Standards - Product Standard PS-1-83 for Construction and Industrial Plywood.
- J. WCLIB - West Coast Lumber Inspection Bureau: Standard Grading Rules for West Coast Lumber.
- K. WWPA - Western Wood Products Association.

1.3 QUALITY ASSURANCE

- A. Lumber Grading Agency: Certified by ALSC.
- B. Plywood Grading Agency: Certified by APA.

1.4 REGULATORY REQUIREMENTS

- A. Conform to CBC and California Code of Regulations, Title 24, Part 2.
 - B. Allowable stress design values shall be in compliance with the California Code of Regulations, Title 24, Part 2, Section 2316A and ANSI/AF&PA NDS-2012 National Design Specification (NDS) for Wood Construction.
- 1.5 SUBMITTALS
- A. Submit product data under provisions of Section 01-1300.
 - B. Provide technical data on wood preservative materials and application instructions.
- 1.6 DELIVERY, STORAGE, AND HANDLING
- A. Store and protect products under provisions of Section 01-1640.

PART 2 - PRODUCTS

2.1 LUMBER MATERIALS

- A. Lumber Grading Rules: NFPA, WCLIB and WWPA. Lumber shall bear WCLIB grade stamp.
- B. Beam Framing: Douglas Fir species, Dense No. 1 grade, 19 percent maximum moisture content (S-DRY).
- C. Joist Framing: Douglas Fir species, No. 1 grade, 19 percent maximum moisture content (S-DRY).
- D. Rafter Framing: Douglas Fir species, No. 1 grade, 19 percent maximum moisture content (S-DRY).
- E. Structural Framing, Studs, Plate and Blocking: Douglas Fir Species, No. 1 grade, 19 percent moisture content (S-Dry).
- F. Non-structural Light Framing Studs, Plate, and Blocking: Douglas Fir species, construction grade, 19 percent maximum moisture content (S-DRY).
- G. Furring Strips: Redwood foundation grade.

2.2 PLYWOOD MATERIALS

- A. Roof Sheathing: exterior Grade C-D, Exposure 1 minimum 5-ply construction, meeting product Doc PS 1 or Doc PS 2.
- B. Wall Sheathing: APA, exterior Grade C-D Structural I, Exposure 1 minimum 5-ply construction, meeting product Doc PS 1 or Doc PS 2.

2.3 ACCESSORIES

- A. Fasteners: Hot-dipped galvanized steel for exterior, high humidity, and treated wood locations; plain finish elsewhere; size and type to suit condition.

- B. Connectors: As indicated.
- C. Joist Hangers: Galvanized steel, sized to suit joists and framing conditions; manufactured by Simpson, Silver Teco or KC Metals.
- D. Anchors: Thru bolt or anchor bolt to concrete or masonry unless otherwise noted. Bolt for anchorage to steel unless otherwise noted.
- E. Building Paper: No. 15 asphalt felt. Plain untreated cellulosic building paper.

2.4 WOOD TREATMENT

- A. Preservative Treatment: Where lumber or plywood is indicated as treated or is specified herein to be treated, comply with applicable requirements of AWPA Standards C2 (Lumber) and C9 (Plywood) and of AWPB Standards listed below. Mark each treated item with the AWPB Quality Mark Requirements.
- B. Pressure treat all lumber in contact with ground with water-borne preservatives to comply with AWPB LP-22. After treatment kiln-dry lumber to a maximum moisture content of 19 percent.
- C. Pressure treat above ground items with water-borne preservatives to comply with AWPB LP-2. After treatment, kiln-dry lumber and plywood to a maximum moisture content, respectively, of 19 percent and 15 percent. Treat indicated items and the following:
 - 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping and similar members in connection with roofing, flashing, vapor barriers and waterproofing.
 - 2. Horizontal wood sills, sleepers, blocking, furring, stripping and similar concealed members in contact with masonry or concrete.
 - 3. Horizontal wood framing members less than 18 inches above grade.
 - 4. Wood floor plates installed over concrete slabs directly in contact with earth.
 - 5. Ends of wood girders entering masonry or concrete walls.
 - 6. Framing members used in exterior door, window, or louver openings.
- D. Complete fabrication of treated items prior to treatment, where possible. If cut or drilled after treatment, coat cut or drilled surfaces with heavy brush coat of same chemical used for treatment and to comply with AWPA M4-99. Inspect each piece of lumber or plywood after drying and discard damaged or defective pieces.

2.5 FIRE-RETARDANT-TREATED PLYWOOD

- A. General: Where indicated, pressure impregnate lumber with fire-retardant chemical of formulation indicated to produce materials with fire-performance characteristics specified.
- B. Fire-Retardant Chemical: Use exterior type per AWPA C20 consisting of an organic resin solution, relatively insoluble in water, thermally set in wood by kiln drying, that

does not bleed through or otherwise adversely affect finishes. Do not use colorants in solution to distinguish treated lumber from untreated lumber.

- C. Fire-Performance Characteristics: Provide materials identical to those tested for the following fire-performance characteristics, per ASTM test methods indicated, by UL or other testing and inspecting organizations acceptable to authorities having jurisdiction. Identify treated lumber with classification marking of inspecting and testing organization in the form of separable paper label or, where required by authorities having jurisdiction, of imprint on lumber surfaces that will be concealed from view after installation.
 - 1. Surface Burning Characteristics: Not exceeding values indicated below, tested per ASTM E 84 for 30 minutes with no evidence of significant progressive combustion and subjected to standard rain test ASTM D 2898-Method A.
 - a. Flame Spread: 25.
 - b. Smoke Developed: 50.
- D. Discard treated plywood that does not comply with requirements of referenced woodworking standard. Do not use warped, bowed, discolored, or otherwise damaged or defective plywood.
- E. Available Products: Subject to compliance with requirements, products that may be incorporated in the work include but are not limited to the following:
 - 1. Organic Resin-Based Formulation (Exterior Type):
 - a. "NCX"; Koppers Co., Inc.
 - b. "Exterior Fire-X"; Hoover Universal Wood Preserving Division.

PART 3 - EXECUTION

3.1 FRAMING

- A. Apply preservative to wood in contact or close proximity with concrete.
- B. Erect wood framing members level and plumb.
- C. Place horizontal members laid flat, crown side-up.
- D. Construct framing members full length without splices.
- E. Double members at openings over 1 sq ft. Space short studs over and under opening to stud spacing.
- F. Construct double joist headers at floor and ceiling openings. Frame rigidly into joists.
- G. Construct double joists under wall studding.

- H. Bridge joists in excess of 8 feet span at mid-span members. Fit solid blocking at ends of members.
- 3.2 FURRING, BLOCKING AND GROUNDS
- A. Provide wherever shown and where required for attachment of other work. Form to shapes as shown and cut as required for true line and level of work to be attached. Coordinate location with other work involved.
 - B. Attach to substrates as required to support applied loading. Countersink bolts and nuts flush with surfaces, unless otherwise indicated. Build into masonry during installation of masonry work. Where possible, anchor to formwork before concrete placement.
 - C. Install plumb and level with closure strips at edges and openings. Shim with wood as required for tolerance of finished work.
 - D. Firestop all concealed spaces of wood stud walls, ceilings and floor levels at 10 foot intervals both vertically and horizontally.
 - E. Firestop all concealed vertical and horizontal spaces as occur at soffits, vents, stair stringers, pipes and similar openings in compliance with Title 24, Part 2, Section 708.
 - F. Firestopping shall consist of closely fitted wood blocks of 2 inch nominal thickness lumber of same width as framing members.
- 3.3 SHEATHING
- A. Secure wall sheathing perpendicular to wall studs, with ends staggered, over firm bearing.
- 3.4 FIELD QUALITY CONTROL
- A. Field inspection and testing will be performed under provisions of Section 01-4523.
- 3.5 TOLERANCES
- A. Framing Members: 1/4 inch maximum from true position.
 - B. Surface Flatness of Floor: 1/4 inch in 10 feet maximum.

END OF SECTION

SECTION 06-4000 - EXTERIOR ARCHITECTURAL WOODWORK
PART 1 - PART 1 - GENERAL

1.1 1.1 RELATED DOCUMENTS

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

1.2 1.2 SUMMARY

- A. This Section includes the following:

1. Exterior Siding and Soffit Boards
2. Exterior standing and running trim and Timber for Architectural Trellis / Sunshade

- B. Related Sections: The following sections contain requirements that relate to this section:

1. Division 6 Section "Rough Carpentry" for furring, blocking, and other carpentry that is not exposed to view.
2. Division 6 Section "Finish Carpentry" for carpentry exposed to view that is not specified in this section.
3. Division 6 Section "Interior Architectural Woodwork" for interior woodwork.
4. Division 8 Section "Flush Wood Doors" for doors specified by reference to architectural woodwork standards.
5. Division 9 Section "Painting" for back priming and finishing of exterior architectural woodwork.

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product data for each type of product and process specified in this section and incorporated into items of architectural woodwork during fabrication, finishing, and installation.
- C. Wood preservative treatment data from chemical treatment manufacturer. Include certification of chemical solution and affirming compliance with indicated treatment standard.
- D. Fire-retardant-treatment data for material impregnated by pressure process to reduce combustibility. Include certification by treating plant that treated materials comply with requirements.

- E. Shop drawings showing location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
 - 1. Apply "WIC Certified Compliance Label" to first page of shop drawings.
- F. Samples for verification purposes of the following:
 - 1. Lumber for transparent finish in form of exterior wood stain, 50 square inches, for each species, with one half of exposed surface finished with coating specified in Division 9 Section "Exterior Wood Stains."
 - 2. Lumber and panel products for factory-applied opaque finish, 8-1/2 inches by 11 inches for panels and 50 square inches for lumber, for each finish system and color, with one half of exposed surface finished with coating specified in Division 9 Section "Painting."
- G. Product certificates signed by woodwork manufacturer certifying that products comply with specified requirements.
- H. Qualification data for firms and persons specified in "Quality Assurance" article to demonstrate their capabilities and experience. Include list of completed projects with project names, addresses, names of Architects and Owners, and other information specified.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Firm experienced in successfully producing architectural woodwork similar to that indicated for this Project, with sufficient production capacity to produce required units without causing delay in the Work.
- B. Single-Source Fabrication and Installation Responsibility: Engage a qualified Manufacturer to assume undivided responsibility for woodwork specified in this section, including fabrication and installation.
- C. Installer Qualifications: Arrange for installation of architectural woodwork by a firm that can demonstrate successful experience in installing architectural woodwork items similar in type and quality to those required for this project.
- D. WIC Quality Standard: Comply with applicable requirements of "Manual of Millwork" published by Woodwork Institute of California (WIC) unless otherwise indicated. Issue WIC Certificates of Compliance certifying that items comply with WIC requirements for AWI grade indicated.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect woodwork during transit, delivery, storage, and handling to prevent damage, soilage, and deterioration.

1.6 PROJECT CONDITIONS

- A. Environmental Conditions: Obtain and comply with woodwork manufacturer's and Installer's coordinated advice for optimum temperature and humidity conditions for woodwork during its storage.
- B. Field Measurements: Where woodwork is indicated to be fitted to other construction, check actual dimensions of other construction by accurate field measurements before manufacturing woodwork; show recorded measurements on final shop drawings. Coordinate manufacturing schedule with construction progress to avoid delay of Work.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide materials that comply with requirements of the WIC woodworking standard for each type of woodwork and WIC quality grade indicated, unless otherwise indicated.
- B. General: Provide materials that comply with requirements of the AWI woodworking standard for each type of woodwork and quality grade indicated and, where the following products are part of woodwork, with requirements of the referenced product standards, that apply to product characteristics indicated:
 - 1. Softwood Plywood: PS 1.

2.2 FABRICATION, GENERAL

- A. Wood Moisture Content: Comply with requirements of referenced quality standard for moisture content of lumber in relation to relative humidity conditions existing during time of fabrication and in installation areas.
- B. Fabricate woodwork to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:
 - 1. Edges of solid wood (lumber) members less than 1 inch in nominal thickness: 1/16 inch.
 - 2. Edges of rails and similar members 1 inch or more in nominal thickness: 1/8 inch.
- C. Complete fabrication, including assembly, finishing, and hardware application, before shipment to project site to maximum extent possible. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
- D. Factory-cut openings, to maximum extent possible, to receive hardware, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Smooth edges of cutouts and seal edges with a water-resistant coating suitable for exterior applications.

2.3 2.3 PRESERVATIVE TREATMENT BY NONPRESSURE METHOD

- A. Treatment Standard: Comply with NWWDA I.S.4 for woodwork items indicated to receive water-repellent preservative treatment.
- B. Water-Repellent Preservative: NWWDA-tested and -accepted formulation containing 3-iodo-2-propynyl butyl carbamate (IPBC) as its active ingredient.
- C. Extent of Treatment: Treat each item of exterior woodwork regardless of species from which it is fabricated.

2.4 FASTENERS AND ANCHORS

- A. Screws: Select material, type, size, and finish required for each use. Comply with FS FF-S-111 for applicable requirements.
 - 1. For metal framing supports, provide screws as recommended by metal framing manufacturer.
- B. Nails: Provide the following of type and size required for each use. Comply with FS FF-N-105 for applicable requirements.
 - 1. Stainless steel nails.
 - 2. Aluminum nails.
 - 3. Either material indicated above.
- C. Anchors: Select material, type, size, and finish required by each substrate for secure anchorage. Provide nonferrous metal or hot-dip galvanized anchors and inserts as required for corrosion resistance. Provide toothed steel or lead expansion bolt devices for drilled-in-place anchors. Furnish inserts and anchors, as required, to be set into concrete or masonry work for subsequent woodwork anchorage.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Condition woodwork to average prevailing humidity conditions in installation areas before installation.
- B. Deliver concrete inserts and similar anchoring devices to be built into substrates well in advance of time substrates are to be built.
- C. Before installation of architectural woodwork, examine shop-fabricated work for completion and complete work as required, including back priming and removal of packing.

3.2 STORAGE AND HANDLING

- A. At the job site, redwood siding shall be kept completely under cover and off the ground.
- B. Water-proof coverings shall allow air to circulate between the covering and the siding.
- C. At contractors option redwood siding may be wrapped in moisture-proof paper at the sawmill and shall not be unwrapped until installation begins. Otherwise, protect siding from detrimental conditions that may affect final finish of material.

3.3 PRIMING PRIOR TO INSTALLATION

- A. A water repellent containing mildewcide shall be applied to all surfaces of redwood siding before construction as soon as material is delivered on site.
 - 1. Special care should be given to end grain
- B. All Redwood material shall either be back-primed on site.
 - 1. Exception: factory primed or pre-finished material certified by manufacturer may not require back priming.
- C. All cut ends in the course of construction shall be coated before installation.

3.4 INSTALLATION

- A. Quality Standard: Install woodwork to comply with WIC Section 26 for same grade specified in Part 2 of this section for type of woodwork involved.
- B. Install woodwork plumb, level, true, and straight with no distortions. Shim as required with concealed shims. Install to a tolerance of 1/8 inch in 8'-0" for plumb and level and with no variations in flushness of adjoining surfaces.
- C. Scribe and cut woodwork to fit adjoining work.
- D. Fire-Retardant-Treated Wood (Where called in specifications): Handle, store, and install fire-retardant-treated wood in compliance with recommendations of chemical treatment manufacturer including those for adhesives where required for installation.
- E. Preservative-Treated Lumber: Where cut or drilled in field, treat cut ends with preservative solution used in original treatment by brushing, spraying, dipping, or soaking.
- F. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation. Use fine finishing nails for exposed nailing, countersunk and filled flush with woodwork.
- G. Tongue and Groove Siding: Apply Tongue and groove siding with the groove edge down to assure a weather tight installation. Horizontally-applied tongue and groove siding shall be blind nailed at every stud, not exceeding 24 inches on center.

- H. Standing and Running Trim and Rails: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to the greatest extent possible. Stagger joints in adjacent and related members. Cope at returns and miter at corners, unless otherwise detailed on drawings.
- I. Refer to the Division 9 sections for back priming and final finishing of installed architectural woodwork.

3.5 ADJUSTMENT AND CLEANING

- A. Repair damaged and defective woodwork where possible to eliminate defects functionally and visually; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.
- B. Clean woodwork on exposed and semiexposed surfaces.

3.6 PROTECTION

- A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and installer, that ensure that woodwork is without damage or deterioration at time of Substantial Completion.

END OF SECTION

SECTION 06-4100 - INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Interior standing and running trim and rails.
 - 2. Wood cabinets (casework).
 - 3. Cabinet tops (countertops).
 - 4. Interior miscellaneous ornamental items.
 - 5. Interior door frames (jambs).
- B. Related Sections: The following sections contain requirements that relate to this section:
 - 1. Division 6 Section "Rough Carpentry" for furring, blocking, and other carpentry work that is not exposed to view.
 - 2. Division 6 Section "Finish Carpentry" for carpentry exposed to view that is not specified in this section.
 - 3. Division 8 Section "Flush Wood Doors" for doors specified by reference to architectural woodwork standards.
 - 4. Division 9 Section "Painting" for final finishing of installed architectural woodwork.

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product data for each type of product and process specified in this section and incorporated into items of architectural woodwork during fabrication, finishing, and installation.
- C. Shop drawings showing location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
 - 1. Apply WIC Certified Compliance Label to first page of shop drawings.

- D. Samples for initial selection purposes of the following in form of manufacturer's color charts consisting of actual units or sections of units showing full range of colors, textures, and patterns available for each type of material indicated.
 - 1. Plastic laminate.
- E. Samples for verification purposes of the following:
 - 1. Lumber with or for transparent finish, 50 square inches, for each species and cut, finished on one side and one edge.
 - 2. Lumber Veneer leaves representative of and selected from flitches to be used for transparent finished woodwork.
 - 3. Wood veneer faced panel products;, with or for transparent finish, 8-1/2 inches by 11 inches, for each species and cut with one half of exposed surface finished, with separate samples of unfaced panel product used for core.
 - 4. Corner pieces as follows:
 - a. Cabinet front frame joints between stiles and rail as well as exposed end pieces, 18 inches high by 18 inches wide by 6 inches deep.
 - b. Miter joints for standing trim.
 - 5. Exposed cabinet hardware, one unit of each type and finish.
- F. Product certificates signed by woodwork manufacturer certifying that products comply with Woodworkers Institute of California (WIC) standards.
- G. Qualification data for firms and persons specified in "Quality Assurance" article to demonstrate their capabilities and experience. Include list of completed projects with project names, addresses, names of Architects and Owners, and other information specified.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Firm experienced in successfully producing architectural woodwork similar to that indicated for this Project, with sufficient production capacity to produce required units without causing delay in the Work.
- B. Single-Source Responsibility: Arrange for production by a single firm of architectural woodwork with sequence matched wood veneers.
- C. Installer Qualifications: Arrange for installation of architectural woodwork by a firm that can demonstrate successful experience in installing architectural woodwork items similar in type and quality to those required for this project.

- D. WIC Quality Standard: Comply with applicable requirements of "Manual of Millwork" published by Woodwork Institute of California (WIC) unless otherwise indicated.
 - 1. WIC Quality Marking: Mark each unit of the following types of architectural woodwork with WIC Certified Compliance Label indicating quality grade required.
 - a. Casework.
 - b. Plastic laminate countertops.
- E. Hardware Coordination: Distribute copies of approved scheduled for cabinet hardware specified in Division 8 Section "Finish Hardware" to manufacturer of architectural woodwork; coordinate cabinet shop drawings and fabrication with hardware requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect woodwork during transit, delivery, storage, and handling to prevent damage, soilage, and deterioration.
- B. Do not deliver woodwork until painting, wet work, grinding, and similar operations that could damage, soil, or deteriorate woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas whose environmental conditions meet requirements specified in "Project Conditions."

1.6 PROJECT CONDITIONS

- A. Environmental Conditions: Obtain and comply with Woodwork Manufacturer's and Installer's coordinated advice for optimum temperature and humidity conditions for woodwork during its storage and installation. Do not install woodwork until these conditions have been attained and stabilized so that woodwork is within plus or minus 1.0 percent of optimum moisture content from date of installation through remainder of construction period.
- B. Field Measurements: Where woodwork is indicated to be fitted to other construction, check actual dimensions of other construction by accurate field measurements before manufacturing woodwork; show recorded measurements on final shop drawings. Coordinate manufacturing schedule with construction progress to avoid delay of Work.

PART 2 - PRODUCTS

2.1 HIGH PRESSURE DECORATIVE LAMINATE MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering high pressure decorative laminates which may be incorporated in the work include but are not limited to the following:
 - 1. Formica Corp.
 - 2. American Laminates.

3. Nevamar Corp.
4. or Approved Equal

2.2 MATERIALS

General: Provide materials that comply with requirements of the WIC woodworking standard for each type of woodwork and WIC quality grade indicated, unless otherwise indicated.

- A. Formaldehyde Emission Levels: Comply with formaldehyde emission requirements of each voluntary standard referenced below:
 - a. Medium Density Fiberboard: NPA 9.
 - b. Hardwood Plywood: HPMA FE.

2.3 FABRICATION, GENERAL

- A. Wood Moisture Content: Comply with requirements of referenced quality standard for moisture content of lumber in relation to relative humidity conditions existing during time of fabrication and in installation areas.
- B. Fabricate woodwork to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:
 1. Corners of cabinets and edges of solid wood (lumber) members less than 1 inch in nominal thickness: 1/16 inch.
 2. Edges of rails and similar members more than 1 inch in nominal thickness: 1/8 inch.
- C. Complete fabrication, including assembly, finishing, and hardware application, before shipment to project site to maximum extent possible. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
- D. Factory-cut openings, to maximum extent possible, to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Smooth edges of cutouts and, where located in countertops and similar exposures, seal edges of cutouts with a water-resistant coating.

2.4 STANDING AND RUNNING TRIM AND RAILS FOR TRANSPARENT FINISH

- A. Quality Standard: Comply with WIC Section 10 "Interior Trim."
- B. Backout or groove backs of flat trim members and kerf backs of other wide flat members, except for members with ends exposed in finished work.
- C. Assemble casings in plant except where limitations of access to place of installation require field assembly.

- D. Grade: Custom.
 - E. Lumber Species:
 - 1. American Cherry at Cabinet trim.
- 2.5 STANDING AND RUNNING TRIM AND RAILS FOR OPAQUE FINISH
- A. Quality Standard: Comply with WIC Section 10 "Interior Trim."
 - B. Grade: Custom.
 - C. Backout or groove backs of flat trim members and kerf backs of other wide flat members, except for members with ends exposed in finished work.
 - D. Assemble casings in plant except where limitations of access to place of installation require field assembly.
 - E. Lumber Species: American Cherry at window stools and tackwall trim.
- 2.6 WOOD CABINETS (CASEWORK) FOR TRANSPARENT FINISH
- A. Quality Standard: Comply with WIC Section 14 "Wood Casework."
 - B. Grade: Custom.
 - C. WIC Construction Style: Style B Face Frame.
 - D. WIC Construction Type: Type I multiple self-supporting units rigidly joined together. Conceal all vertical joints between units in the field with face frame.
 - D. Door and Drawer Front Style: Flush – Inset.
 - E. Wood Species for Exposed Surfaces, (exterior and Interior of casework): American Cherry.
 - 1. Grain Matching: Run and match grain vertically for drawer fronts, doors, and fixed panels.
 - 2. Matching of Veneer Leaves: Slip match.
 - 3. Veneer Matching Within Panel Face: Slip match.
 - F. Wood Species for Semiexposed Surfaces: Match species and cut indicated for exposed surfaces.
- 2.7 CABINET HARDWARE AND ACCESSORY MATERIALS
- A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets, except for items specified in Division 8 Section "Finish Hardware."
 - B. Cabinet Hardware Schedule:

- C. Acceptable Manufacturer: Salice, Knapp & Vogt, Builders Brass Works, Stanley, Grant or approved equal.
 - D. Hinges: Pair Stanley "F" series, 2 ½" full mortise - 5 barrel hinge with hospital tips, satin chrome.
 - E. Drawer Slides:
 - 1. Drawer depth 8" or less: Accuride #3832, 100 lb. full extension , steel ball bearing
 - 2. Drawer depth over 8": Accuride # 3025, 125 lb. full extension, steel ball bearing
 - F. Door & Drawer Pulls: Hafele Catalog # 109.80.401
 - G. Catches: Recessed magnetic catches – Hafele # 24643.758
 - H. Elbow catches – Hafele # 245.74.200
 - I. Rim locks: Haffel # 232.04.211 and 232.04.266
 - J. Shelf Standards: Grant #120 with #21 shelf support
 - K. All cabinets and drawers to have rim lock, satin Chrome plated, keyed different for each room.
 - L. Hardware Standard: Comply with ANSI/BHMA A156.9 "American National Standard for Cabinet Hardware" for items indicated by reference to BHMA numbers or referenced to this standard.
 - M. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with ANSI/BHMA A156.18 for BHMA code number indicated.
 - 1. Satin Chromium Plated, Brass or Bronze Base: BHMA 626.
 - N. For concealed hardware provide manufacturer's standard finish that complies with product class requirements of ANSI/BHMA A156.9.
- 2.8 ARCHITECTURAL CABINET TOPS (COUNTERTOPS)
- A. Quality Standard: Comply with applicable WIC Section indicated below:
 - 1. WIC Section 16 - "Laminated Plastic Countertops, Splashes and Wall Paneling."
 - B. Type of Top: High pressure decorative laminate complying with the following:
 - 1. Grade: Custom.
 - 2. Laminate Cladding for Horizontal Surface: High pressure decorative laminate as follows:

- a. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
 - 1) Provide selections made by Architect from manufacturer's full range of standard colors and finishes in the following categories:
 - a) Solid colors.
 - b) Patterns.
 - b. Grade: GP-50 (0.050-inch nominal thickness).
 - 3. Edge Treatment: Lumber edge for transparent finish matching wood species and cut on cabinet surfaces.
- 2.9 INTERIOR MISCELLANEOUS ORNAMENTAL ITEMS FOR TRANSPARENT FINISH
- A. Quality Standard: Comply with WIC Section 11 "Miscellaneous Interior Millwork."
 - B. Grade: Custom.
 - C. Lumber Species: Match species and cut indicated for other types of transparent finished architectural woodwork located in same areas of building unless otherwise indicated.
- 2.10 INTERIOR MISCELLANEOUS ORNAMENTAL ITEMS FOR OPAQUE FINISH
- A. Quality Standard: Comply with WIC Section 11 "Miscellaneous Interior Millwork."
 - B. Grade: Custom.
 - C. Lumber Species: Eastern white pine, sugar pine, or Idaho white pine.
- 2.11 INTERIOR DOOR FRAMES FOR OPAQUE FINISH
- A. Quality Standard: Comply with WIC Section 12 "Interior Jambs."
 - B. Grade: Custom.
 - C. Lumber Species: Eastern white pine, sugar pine, or Idaho white pine.
- 2.12 FASTENERS AND ANCHORS
- A. Screws: Select material, type, size, and finish required for each use. Comply with FS FF-S-111 for applicable requirements.
 - B. Nails: Select material, type, size, and finish required for each use. Comply with FS FF-N-105 for applicable requirements.
 - C. Anchors: Select material, type, size, and finish required by each substrate for secure anchorage. Provide nonferrous metal or hot-dip galvanized anchors and inserts on

inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed steel or lead expansion bolt devices for drilled-in-place anchors. Furnish inserts and anchors, as required, to be set into concrete or masonry work for subsequent woodwork anchorage.

2.13 FACTORY FINISHING OF INTERIOR ARCHITECTURAL WOODWORK

- A. Quality Standard: Comply with WIC Section 25, "Factory Finishing of Architectural Woodwork," unless otherwise indicated.
- B. General: The entire finish of interior architectural woodwork is specified in this section, regardless of whether factory applied or applied after installation.
 - 1. Factory Finishing: To the greatest extent possible, finish architectural woodwork at factory. Defer only final touch-up, cleaning, and polishing until after installation.
- C. Preparations for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces and similar preparations for finishing of architectural woodwork, as applicable to each unit of work.
- D. Transparent Finish for Open-Grain Woods: Comply with requirements indicated below for grade, finish system, staining, effect, and sheen, with sheen measured on 60 deg gloss meter per ASTM D 523.
 - 1. Grade: Custom.
 - 2. WIC Finish System #2: Water Reducible Acrylic Lacquer.
 - 3. Staining: To be selected by architect.
 - 4. Sheen: Dull satin 15-20 deg.
- E. Transparent Finish for Closed-Grain Woods: Comply with requirements indicated below for grade, finish system, staining, effect, and sheen.
 - 1. Grade: Custom.
 - 2. WIC Finish System #2: Water Reducible Acrylic Lacquer.
 - 3. Staining: to be selected by architect.
 - 4. Sheen: Dull satin 15-20 deg.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Condition woodwork to average prevailing humidity conditions in installation areas before installing.
- B. Deliver concrete inserts and similar anchoring devices to be built into substrates well in advance of time substrates are to be built.

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

3.2 INSTALLATION

- A. Quality Standard: Install woodwork to comply with WIC Section 26 for same grade specified in Part 2 of this section for type of woodwork involved.
- B. Install woodwork plumb, level, true, and straight with no distortions. Shim as required with concealed shims. Install to a tolerance of 1/8 inch in 8'-0" for plumb and level (including tops) and with no variations in flushness of adjoining surfaces.
- C. Scribe and cut woodwork to fit adjoining work and refinish cut surfaces or repair damaged finish at cuts.
- D. Anchor woodwork as indicated on drawings.
- E. Standing and Running Trim and Rails: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to the greatest extent possible. Stagger joints in adjacent and related members. Cope at returns and miter at corners.
- F. Cabinets: Install without distortion so that doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete the installation of hardware and accessory items as indicated. Maintain veneer sequence matching (if any) of cabinets with transparent finish.
- G. Tops: Anchor securely to base units and other support systems as indicated.
- H. Complete the finishing work specified in this section to whatever extent not completed at shop or before installation of woodwork.

3.3 ADJUSTMENT AND CLEANING

- A. Repair damaged and defective woodwork where possible to eliminate defects functionally and visually; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.
- B. Clean, lubricate, and adjust hardware.
- C. Clean woodwork on exposed and semiexposed surfaces. Touch up factory-applied finishes to restore damaged or soiled areas.

3.4 PROTECTION

- A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensures that woodwork is being without damage or deterioration at time of Substantial Completion.

END OF SECTION

SECTION 07-2100 - BUILDING INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Refer to Title-24 Compliance forms for minimum insulation values required for floor/foundation, wall, ceiling/roof installations for specific project.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Building insulation in batt form.
- B. Related Sections: The following sections contain requirements that relate to this section:
 - 1. Division 6 Section "Rough Carpentry".
 - 2. Division 7 Roofing Section indicated below for roof insulation specified as part of roofing construction:
 - a. "Metal Standing Seam Roofing."

1.3 DEFINITIONS

- A. Thermal Resistivity: Where the thermal resistivity of insulation products are designated by "r-values," they represent the reciprocal of thermal conductivity (k-values). Thermal conductivity is the rate of heat flow through a homogenous material exactly 1 inch thick. Thermal resistivities are expressed by the temperature difference in degrees F between the two exposed faces required to cause one BTU to flow through one square foot per hour at mean temperatures indicated.

1.4 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product data for each type of insulation product specified.
- C. Product test reports from and based on tests performed by qualified independent testing laboratory evidencing compliance of insulation products with requirements including r-values (aged values for plastic foam insulations), fire performance characteristics, perm ratings, water absorption ratings, and other properties, based on comprehensive testing of current products.

1.5 QUALITY ASSURANCE

- A. Fire Performance Characteristics: Provide insulation materials identical to those whose indicated fire performance characteristics have been determined per the ASTM test method indicated below, by UL or other testing and inspecting organizations acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing and inspecting organization.
 - 1. Surface Burning Characteristic: ASTM E 84.
 - 2. Fire Resistance Ratings: ASTM E 119.
 - 3. Combustion Characteristics: ASTM E 136.
- B. Single-Source Responsibility for Insulation Products: Obtain each type of building insulation from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's recommendations for handling, storage, and protection during installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- 1. Manufacturers of Glass Fiber Insulation:
 - a. Manville: Building Insulations Div., Manville Sales Corp.
 - b. Owens/Corning Fiberglas Corp.
 - c. Or Approved Equal

2.2 INSULATING MATERIALS

- A. General: Provide insulating materials that comply with requirements and with referenced standards.
 - 1. Preformed Units: Sizes to fit applications indicated, selected from manufacturer's standard thicknesses, widths, and lengths.
- B. Faced Mineral Fiber Blanket/Batt Insulation: Thermal insulation produced by combining mineral fibers of type described below with thermosetting resins to comply with ASTM C 665 for Type III, Class A (blankets with reflective vapor-retarder membrane facing with flame spread of 25 or less); foil-scrim-kraft or foil-scrim-polyethylene vapor-retarder membrane on one face, and as follows:
 - 1. Mineral Fiber Type: Fibers manufactured from glass to meet the insulating values designated on the drawings and required by government agencies having jurisdiction.

- a. 3 ½" thick unfaced glass fiber batts with an insulation value of R-13 at 2x 4 walls.
- b. 6" thick foil backed glass fiber batts with an insulating value of R-19 at 2 x 6 walls. Where cavity is less than 6" and wall is specified to be sheathed on both sides unfaced fiber batts may be used.
- c. Foiled backed fiber batts with an insulating value as delineated on drawings or specified on Title 24 Calculations at suspended, joisted ceilings or where indicated at bottom chord of trusses or Trust Joist System.
- d. Foil backed with extended tabs batten insulation with an insulating value as delineated on drawings or specified on Title 24 Calculations, installed at the underside of rafters where removable acoustical tiles and suspended ceiling occur below. Allow for venting above insulation for rafter bays.

2.3 AUXILIARY INSULATING MATERIALS

1. Plate: Zinc-plated steel, 0.106 inch thick.
 2. Pin: Copper-coated low carbon steel, fully annealed, 0.106 inches in diameter, length to suit depth of insulation indicated and, with washer in place, to hold insulation tightly to substrate behind insulation.
 3. Self-Locking Washer: Mild steel, 0.016 inch thick, size as required to hold insulation securely.
- B. Protection Board: Premolded, semi-rigid asphalt/fiber composition board, 1/4 inch thick, formed under heat and pressure, standard sizes.
- C. Eave Ventilation Troughs: Preformed rigid fiberboard or plastic sheets designed and sized to fit between roof framing members and to provide cross ventilation between insulated attic spaces and vented eaves.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions with Installer present, for compliance with requirements of the Sections in which substrates and related work are specified and to determine if other conditions affecting performance of insulation are satisfactory. Do not proceed with installation of insulation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of substances harmful to insulations or vapor retarders, including removal of projections that might puncture vapor retarders.

3.3 INSTALLATION, GENERAL

- A. 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. Extend insulation full thickness as indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions, and fill voids with insulation. Remove projections that interfere with placement.
- C. Apply a single layer of insulation of required thickness, unless otherwise shown or required to make up total thickness.

3.4 INSTALLATION OF GENERAL BUILDING INSULATION

- A. Apply insulation units to substrate by method indicated, complying with manufacturer's recommendations. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
- B. Seal joints between closed-cell (nonbreathing) insulation units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.
- C. Set vapor retarder faced units with vapor retarder to warm side of construction, except as otherwise indicated. Do not obstruct ventilation spaces, except for firestopping.
 - 1. Tape joints and ruptures in vapor retarder, and seal each continuous area of insulation to surrounding construction to ensure airtight installation.
- D. Set reflective, foil-faced units accurately with not less than 0.75-inch air space in front of foil as indicated.

3.5 PROTECTION

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

END OF SECTION

SECTION 07-2500 - VAPOR RETARDER

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Vapor Retarders: Materials to make slabs-on-grade water vapor-resistant and air tight. 1.02

1.2 RELATED DOCUMENTS

- A. Section 01-6110 - CAL-Green Standards
- B. Section 01-6116 - Volatile Organic Compound (VOC) Content Restrictions
- C. Section 03-3000 - Cast-in-Place Concrete.
- D. Section 07 9200 - Joint Sealants: Sealant materials and installation techniques.

1.3 DEFINITIONS

- A. Weather Barrier: Assemblies that form either water-resistive barriers, air barriers, or vapor retarders.
- B. Vapor Retarder: Air tight barrier made of material that is relatively water vapor impermeable, to the degree specified, with sealed seams and with sealed joints to adjacent surfaces.
 - 1. Water Vapor Permeance: For purposes of conversion, $57.2 \text{ ng}/(\text{Pa s sq m}) = 1 \text{ perm.}$
- C. Water-Resistive Barrier: Water-shedding barrier made of material that is moisture-resistant, to the degree specified, intended to be installed to shed water without sealed seams.

1.4 REFERENCE STANDARDS

- A. ASTM E 154 - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover
- B. Manufacturer's recommendations and specifications.
- C. ASTM D 1709 - Standard Test Methods for Impact Resistance of Plastic Film by the Free-Falling Dart Method
- D. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials.
- E. ASTM E1643 Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
- F. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.

- G. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials.
- H. California Code of Regulations, Title 24, Part 2, California Building Code (CBC), International Building Code, with California Amendments.
- I. California Code of Regulations, Title 24, Part 11 California Green Building Standards Code, "CAL-Green".

1.5 SUBMITTALS

- A. See Section 01-3300 - Submittals, for submittal procedures.
- B. Product Data: Provide data on material characteristics, performance criteria, and limitations.
- C. CAL-GREEN VOC Submittals: For adhesives sealants, fillers, coatings and primers, documentation including printed statement of VOC contents, comply with limits specified in related section.
- D. Below Grade Vapor Retarder Test Data: Submit independent third party test data for all listed performance values to show compliance with this specification. All test data for review shall be as published and released for publication by the authors without restriction of distribution.
 - 1. Summary of test results as described in ASTM E 1745.
 - a. Certify that all mandatory ASTM E1 745 testing has been performed on a single production roll per ASTM E1745 Section 8.1. Test reports must specifically state that sampling and testing of materials are in strict accordance with the requirements of the standard.
 - 2. Manufacturer's samples and literature.
 - 3. Manufacturer's installation instructions for placement, seaming and penetration repair instructions.
- E. Shop Drawings: For air-barrier and weather-resistive barrier assemblies; provide drawings of special joint conditions.
 - 1. Show locations and extent of air barrier and weather-resistive barrier. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.
 - 2. Include details of interfaces with other materials that form part of air barrier and weather-resistive barrier including related cladding, sealants and flashings.
 - 3. Provide project-specific details customized to this project's conditions. Manufacturer's standard details alone are not acceptable.
- F. Manufacturer's Installation Instructions: Indicate preparation, installation methods, and storage and handling criteria.

- G. Qualification Data: For Installer, Include list of ABAA-certified installers and supervisors employed by the Installer, who work on Project

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
 - 1. Installer shall be licensed by ABAA according to ABAA's Quality Assurance Program and shall employ ABAA-certified installers and supervisors on Project.
- B. Preinstallation Conference: Conduct conference at Project site after approval of complete submittal to comply with requirements in Division I Section "Project Coordination Meetings." Review requirements for air barrier, including surface preparation specified under other Sections, substrate condition and pretreatment, temporary weather protection, forecasted weather conditions, special details and sheet flashings, installation procedures, testing and inspection procedures, and protection and repairs.
 - 1. Review air-barrier requirements and installation, special details, mockups, air-leakage and bond testing, air-barrier protection, and work scheduling that covers air barriers.

1.7 FIELD CONDITIONS

- A. Maintain temperature and humidity recommended by the materials manufacturers before, during and after installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. VOC Limits for adhesives sealants, fillers and primers. Comply with limits specified in Section 01 6116,
- B. General: The air barrier assembly shall be capable of performing as a continuous vapor-permeable air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air-barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, tie-ins to adjacent waterproofing, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.
- C. Air-Barrier Assembly Air Leakage: Less than 0.0008 cfm/sq. ft. of surface area at 1.57 lbf/sq. ft. (0.004 L/s x sq. m of surface area at 75 Pa), when tested according to ASTM E 2357,
- D. Building Envelope shall be constructed with a continuous air barrier to control air leakage into, or out of the conditioned space. An air barrier shall also be provided for interior partitions between conditioned space and space designed to maintain temperature or humidity levels which differ from those in the conditioned space by

more than 50% of the difference between the conditioned space and design ambient conditions. The air barrier shall have the following characteristics:

1. Continuous, with all joints made airtight
2. Capable of withstanding positive and negative combined design wind, fan and stack pressures on the envelope without damage or displacement, and shall transfer the load to the structure. It shall not displace adjacent materials under full load.
3. Durable or maintainable.
4. The air barrier shall be joined in an airtight and flexible manner to the air barrier material of adjacent systems, allowing for the relative movement of systems due to thermal and moisture variations and creep. Connection shall be made between:
 - a. Foundation and walls.
 - b. Walls and windows or doors.
 - c. Different wall construction and cladding assemblies.
 - d. Wall and roof.
 - e. Wall and roof over unconditioned space.
 - f. Walls, floor and roof across construction, control and expansion joints.
 - g. Walls, floors and roof to utility, pipe and duct penetrations.
5. All penetrations of the air barrier and paths of air infiltration/exfiltration shall be made airtight

2.2 VAPOR RETARDER MATERIALS (AIR BARRIER AND WATER-RESISTIVE)

- A. Under-Slab Vapor Retarder/Barrier Sheet 15 mil, single ply extruded polyolefin, ASTM E 1745, performance classification A, B, and C;
 1. Water vapor permeance, ASTM E 154 or E 96 procedure B: 0.009 perm maximum.
 2. Tensile strength ASTM D 882 or ASTM E154, sec. 9; 45 lb/in.
 3. 0.01 or less perm vapor performance per ASTM E 154 Section 8, 11, 12 and 13; 0.0054 WVTR water vapor permeance per ASTM F 1249;
 4. Minimum puncture resistance, ASTM D 1709, Method B: 2200 grams.
 5. Products:

- a. Epro Waterproofing Systems; ECOSHIELD-E15, 15-mil thick Sheet Membrane Vapor Retarder: www.eproserv.com.
 - b. Stego Industries, LLC, San Diego, CA; Stego Wrap Vapor Barrier, 15 mils: www.stegoindustries.com.
 - c. W.R Meadows, PERMINATOR, 15-mil thick, www.meadows.com.
 - d. REEF Industries, Inc., Griffolyn® Reinforced Vapor Protection, VAPORGUARD®, www.reefindustries.com.
 - e. Substitutions: See Section 016000 - Product Requirements.
- B. Adhesives, sealants and plastic cement: Types recommended by manufacturer to suit application and for compliance with referenced standards.
- C. Sealing Tape: Two-sided tape; 4 inch wide black seaming tape with release liner, perm rating not less than vapor retarder, complying with ASTM E 1643 - Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill under Concrete Slabs; types recommended by manufacturer to suit application.
- D. Detail Tape and/or patch membrane for Concrete Adhesion:
1. Type recommended by manufacturer tape and/or membrane detail strip and/or membrane to mechanically lock vapor retarder to concrete.
 2. Permeance: Comply with ASTM F1249.
 3. Peel Adhesion: Comply with PSTC 101
 4. Tensile Strength: Comply with ASTM E 154, Sec. 9
 5. Puncture Resistance: Comply with ASTM D 1709
 6. Product Stego; Crete Claw Tape; www.stego.com.
- E. Vapor Retarder Stakes:
1. Product Vaporstake, LLC; Polyvinyl Black VaporStake™: www.vaporstake.com
 - a. Solid Plastic construction: ASTM E1643-11 (sec. 8.4 & 8.6) and ACI 302.2R-06
 - b. Use with Vapor Retarders: ASTM E 1745-09
 - c. Recycled content 100%
 - d. Size: Length for application and diameter recommended by manufacturer for application.

2.3 ACCESSORIES

- A. Thinners and Cleaners: As recommended by material manufacturer, meeting VOC requirements specified.
- B. Primers, Cleaners, and Other Sealant Materials: As recommended by sealant manufacturer, appropriate to application, and compatible with adjacent materials, meeting VOC requirements specified.
- C. Pre-molded boots: Size as required for snug fit around utility piping or other penetrating elements, as recommended and manufactured by sheet material manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces and conditions are ready to accept the work of this section.

3.2 PREPARATION

- A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.
- B. Clean and prime substrate surfaces to receive sealants and fluid-applied membranes and self-adhered flashirigs in accordance with manufacturer's instructions.

3.3 INSTALLATION

- A. Install materials in accordance with manufacturer's instructions.
- B. Vapor Retarders: Install continuous air tight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.
- C. Apply sealants and adhesives within recommended application temperature ranges. Consult manufacturer if temperature is out of this range.

3.4 INSTALLATION- VAPOR RETARDER UNDER CONCRETE SLAB-ON-GRADE

- A. Install materials in accordance with manufacturer's instructions and ASTM E 1643-98.
 - 1. Unroll Vapor Retarder membrane with the longest dimension parallel with the direction of the concrete pour.
 - 2. Extend vapor barrier over footings and grade beams to a distance acceptable to the structural engineer or stop at impediments such as dowels and waterstops.
 - 3. Seal vapor barrier to footing/grade beam with double sided tape, termination bar, or both.
 - 4. Lay-out sheets to minimize quantity of joints.

- a. Lap edge 6 -inches minimum and end joints 12 -inches minimum and continuously seal with joint tape.
 5. Apply tape to a clean and dry vapor retarder membrane.
 6. Terminate vapor retarder membrane per manufacturer's recommendations along perimeter; at footers, vertical walls, and against penetrations.
 - a. Seal perimeter with continuous mastic bead along foundation walls.
 - b. Seal barrier joints with tape.
 - B. No penetration of the Vapor Retarder membrane is allowed except for reinforcing steel and permanent utilities.
 1. Seal all penetrations (including pipes) with field-assembled boots per manufacturer's instructions.
 2. Where forms are used, provide Vapor Stakes to hold forms in place.
 - a. Penetrate vapor Retarder with stake.
 - b. Treat stake as pipe penetration.
 - c. Leave stake permanently in concrete.
 - d. Using a power saw, cut the stake off above the seal, but below the concrete finished surface not higher than elevation of horizontal reinforcing.
 - e. The lower portion of the vapor stake remains in place, permanently plugging the penetration.
 - C. Refer to Section 033000 "Cast-in-Place Concrete" for installation coordination requirements.
 - D. Repair damaged areas by cutting patches of Vapor Barrier/Retarder, overlapping damaged area 6 -inches and taping all four sides with tape.
 1. Do not use concrete adhesion tape to repair penetrations.
 - E. Where differential settlement is possible, adhere the vapor retarder at building perimeter and in a grid pattern every 4-feet on-center with integrally bonded detail tape for concrete adhesion.
- 3.5 PROTECTION
- A. Protect under-slab vapor retarder sheets from puncture during installation. Patch punctures before proceeding with subsequent construction.
 1. NOTE: SCREEDING STAKES DRIVEN THROUGH RETARDER must be repaired per membrane manufacturer's recommendation.

- B. Install runway planks in construction traffic lanes until slabs are poured.

3.6 FIELD QUALITY CONTROL

- A. Do not cover installed weather barriers until required inspections have been completed.
- B. Obtain approval of installation procedures by the weather barrier manufacturer based on a mock-up installed in place, prior to proceeding with remainder of installation.
- C. Under-slab Vapor Retarder Membrane: Conduct a visual inspection, in the presence of the Architect/Engineer, of the entire Retarder installation the day before pouring concrete. Make all necessary corrections prior to placing concrete.
- D. Take digital photographs of each portion of the installation prior to covering up.

END OF SECTION

SECTION 07-2633 - WATER EMISSIONS BARRIER FOR FLOORS

PART 1 - GENERAL

1.1 SUMMARY

- A. Epoxy type, environmentally safe, 100 percent solids, water vapor emission and alkalinity control coating.

1.2 RELATED REQUIREMENTS

- A. Section 01-4523 Testing Laboratory Services.
- B. Section 01-6116 "Volatile Organic Compounds (VOV).
- C. Section 03 3000 "Cast-in-Place Concrete" for Concrete slab substrate.
- D. Division 07 Section specifying floor moisture and pH testing.
 - 1. Owner to engage an Independent laboratory firm to perform testing of all concrete slabs (on grade and elevated) in accordance with ASTM F-2170, no sooner than 45 days prior to the installation of the finished flooring, test all floors scheduled to receive adhered floor coverings, such as carpet, resilient tile, resilient sheet goods, rubber tile, cork tile, ceramic tile and porcelain tile.
- E. Division 09 Sections specifying concrete floor surface preparation.
- F. Division 09 Floor Covering Sections, for installation requirements and to verify compatibility with the floor covering manufacturer's adhesives.

1.3 REFERENCED STANDARDS

- A. California Code of Regulations, Title 24, Part 2, California Building Code (CBC), International Building Code, with California Amendments.
- B. California Code of Regulations, Title 24, Part 11 California Green Building Standards Code, "CAL-Green".
- C. American Concrete Institute:
 - 1. ACI 318 - Building Code Requirements for Structural Concrete.
- D. ASTM International:
 - 1. ASTM C109 - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. Cube Specimens).
 - 2. ASTM D1308 - Standard Test Method for Effort of Household Chemicals on Clear and Pigmented Organic Finishes.
 - 3. ASTM D1653-03(2008) Standard Test Methods for Water Vapor Transmission of Organic Coating Films

4. ASTM D7234-12 - Standard Test Method for Pull-Off Adhesion Strength of Coatings on Concrete Using Portable Pull-Off Adhesion Testers
 5. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.
 6. ASTM E1155 Standard Test Method for Determining FF Floor Flatness and FI Floor Levelness Numbers
 7. ASTM F2170-09 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
- E. International Concrete Repair Institute (ICRI) Guideline No. 03732- Selecting and Specifying Concrete; Surface Preparation for Sealers, Coatings and Polymer Overlays.
- F. EPA Method 24 VOC Content Testing.

1.4 DEFINITIONS

- A. Water Vapor Emission Control Coating -A sequence of products applied on a concrete floor to isolate moisture and high pH in the concrete from adhesive and finish floor covering.
- B. Water Vapor Emission Control Barrier: Coating applied on concrete floor that acts as the primary barrier to moisture movement.
- C. Underlayment Trowelable or pourable patching/leveling compounds to which the finish floor covering is adhered. Underlayment is installed on top of the Water Vapor Emission Control Barrier.

1.5 SUBMITTALS

- A. Product Data: For each type of product indicated, demonstrate compliance with specified attributes.
1. Include detailed installation requirements, spread rates, joint and crack treatment and final barrier surfaces for floor coverings.
 2. ASTM Reports: Certified laboratory reports for specified ASTM performance.
 3. Environmental: Manufacturer certified letter for material VOC content
 4. Extended Warranty Certificate: Manufacturers standard 15 year warranty for manufacturing defects and on site material performance. Warranty shall not list ACI-318 compliance exclusions.
 5. Field Documents: Manufacturers written acceptance of on site conditions including environmental conditions, concrete mix design, admixtures, concrete salts, sub slab vapor barrier, curing methods, concrete surface strength prior to application.
 6. Pail Labels: Collect and submit each original pail label of Water Vapor Emission Control Coating installed. Copies are not acceptable.

7. Post-Testing: Tensile pull-off testing results per ASTM D7234 performed by Owner's Testing Agency prior to floor covering installation.
- B. Shop Drawings: Floor Plans, indicating areas of installation, sequencing, and total area of installation in square feet.
- C. Manufacturer Certification: Provide letterhead documentation of complete review of concrete mix designs, admixtures, sub-slab vapor retarder installation and curing methods with written acceptance prior to installation.
- D. Installer Proof of Qualification: Factory licensed, approved or certified applicator certificate signed by the manufacturer.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer shall have not less than five years experience in manufacturing floor moisture mitigation systems. The products shall be specifically formulated and marketed to reduce concrete floor moisture vapor interaction with resilient floor coverings and for pH control.
- B. Installer Qualifications: Installer shall have not less than five years experience installing the selected fluid based coating systems, shall be trained by the manufacturer, experienced in surface preparation and application of the material and shall be subject to inspection and control by the manufacturer.
- C. Pre-installation Testing
 1. Document floor and building conditions are within acceptable limits of temperature, relative humidity, and concrete condition before proceeding with product application.
 2. File a pre-installation checklist with the manufacturer and receive written confirmation of approval to proceed to support manufacturer's 10-year warranty.
- D. Product Performance:
 1. Manufacturer shall provide independent laboratory test reports documenting the following:
 2. Water vapor transmission by ASTM E96 (water method) or ASTM D1653 indicating a maximum 0.1 perms net for coating on concrete.
 3. Warrant no loss in moisture-resistance properties for a period of ten years of exposure to continuous water contact and pH greater than 10 after final cure.
- E. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and moisture mitigation system application workmanship.
 1. Mockup area of at least 200 sq ft in location approved by Architect / Owner.
 2. Do not proceed with work until mockup workmanship and underlayment surface appearance are approved by manufacturer's representative and Owner's representative.

3. Mockup bond tests: Owner's Testing Agency will perform tensile bond tests in triplicate on mockup, no sooner than 72 hours after installation is completed, according to ASTM D7234 through entire Water Vapor Emission Control Coating into concrete substrate. Comply with the following-
 - a. No cohesive failure of leveling underlayment with at least 200 psi, or tensile failure in concrete substrate with no inter-layer or intra-layer failure of Water Vapor Emission Control Coating.
 - b. If failure occurs, determine cause and method(s) to avoid further unacceptable work. Remove and re-apply mock-up area as required to produce acceptable work Do not proceed with installation of Water Vapor Emission Control Coating until bond test results meet requirements above and are acceptable to Water Vapor Emission Control Coating manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to the job site in their original unopened containers, clearly labeled with the manufacturer's name and brand designation.
- B. Store products in an approved ventilated dry area; protect from dampness, freezing, and direct sun light Do not store in areas with temperatures in excess of manufacturer's written instructions.
- C. Handle product in a manner that will prevent breakage or leakage of containers and damage to products.
- D. Use products before manufacturer's expiration dates.

1.8 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits required by moisture mitigation system manufacturer. Do not install products under environmental conditions outside manufacturer's limits.
- B. Do not apply Water Vapor Emission Control Coating to unprotected surfaces or when moisture is present on the surface of the concrete.
- C. Do not apply Water Vapor Emission Control Coating when air or floor temperature is lower than 50 degrees F (10 degrees C) or expected to fall below this temperature within 24 hours from time of application.
- D. Install Water Vapor Emission Control Coating only when concrete floor surface temperature is a least 5 degrees Fahrenheit above the dewpoint temperature of the air over the floor. Maintain and document coated floor surface temperature at least 5 degrees Fahrenheit above air dewpoint temperature for at least 24 hours after application.
- E. Allow continuous ventilation and air movement at all times during application and curing process of the moisture mitigation system.
- F. Protect work to prevent damage that will affect performance and the finished underlayment surface.

1.9 WARRANTY

- A. Extended Warranty: Warranty shall provide, at Owners option, repair or replacement of the Water Vapor Emission Control Coating and flooring damaged due to failure of the Water Vapor Emission Control Coating during the warranty period. Warranty definition of damage shall include at least the following:
 - 1. Distress of flooring caused by moisture including but not limited to
 - a. Adhesive deterioration resulting in loss of flooring bond to the floor;
 - b. Formation of bubbles, mole trails, lumps, bumps, seam separation, or other significant displacement that interferes with the intended use of the flooring;
 - 2. Distress of the Water Vapor Emission Control Coating including but not limited to
 - a. Deformation of patching/leveling compounds installed under the Water Vapor Emission Control Coating;
 - b. Adhesive or cohesive failure of Water Vapor Emission Control Coating components;
 - c. Distress of underlayment above the Water Vapor Emission Control Coating such as delamination, disbanding, expansion, chemical reaction, or other deformation or displacement that interferes with the intended use of the flooring.
- B. Water Vapor Emission Control Coating Warranty coverage shall commence on the date of completion of flooring installation.
- C. Warranty shall include the replacement of Water Vapor Emission Control Coating, flooring system, patching compounds, installation accessories flooring materials and labor costs.
 - 1. Warranty shall not exclude or become void due to non-conformance to ACI-318 parameters, dew-point, concrete salts, admixtures, resin and silicate surface treatments or cohesive substrate failure in the concrete surface due to normal concrete movement Installation of Water Vapor Emission Control Coating indicates acceptance of site conditions.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. Non-corrosive, low viscosity, high gloss, microbial resistant, moisture-alkaline resistant coating to suppress, control and mechanically restrict water emission and pH level of concrete substrates for compliance with subsequent floor coverings or coating materials.
- B. Coating product must contain 100% epoxy resin solids. Products based on silicate chemistry, potassium, sodium, lithium, and similar formulations or water-based acrylics are not acceptable and will be rejected.

- C. Barrier Coating Requirements: it is the intent of this section and the drawings to require a complete barrier system. Any items not specifically noted but necessary for a complete barrier system shall be provided under this section.
 - 1. Coating shall be compatible with all types of floor covering products, no system failures due to improper installations and contain no water/alkaline soluble compounds.
 - 2. Coating shall have a sufficient density to reduce water vapor transmission, avoid water vapor damage to other adhered systems and resistant to most commonly encountered acids/solvents in case of topical exposure (spills).
 - 3. Coating shall be resistant to mold, mildew and biological growth when applied to prepared substrates

2.2 PERFORMANCE REQUIREMENTS

- A. Moisture and Alkalinity: Barrier shall remain tolerant to alkalinity of 14 pH per ASTM D1308 and to 100% relative humidity per ASTM F2170.
- B. Water Vapor Transmission:
 - 1. Manufacturer shall provide independent laboratory test reports documenting the following:
 - 2. Water vapor transmission by ASTM E96 (water method) or ASTM D1653 indicating a maximum 0.1 perms net for coating on concrete.
 - 3. Warrant no loss in moisture-resistance properties for a period of ten years of exposure to continuous water contact and pH greater than 10 after final cure.

2.3 WATER VAPOR EMISSION CONTROL COATING

- A. Source Limitations: Provide materials approved by one Water Vapor Emission Control Coating manufacturer including moisture-resistant concrete patching and leveling compounds for use under Water Vapor Emission Control Coating, primers, coatings, sand, and underlayment leveling/patching compounds.
- B. Basis of Design: VAP 12000 by Koster Waterproofing Systems. Subject to compliance with requirements specified in this section, provide one of the following products:
 - 1. VAP 12000 by Koster Waterproofing Systems, <<http://www.kosterusa.com/>>.
 - 2. AC Tech ® 2170 System: by Allied Construction Technologies, Inc. (757) 855-5100.
 - 3. VaporTight SG3 by Aquafin, <<http://www.aquafin.net/>>.
 - 4. MC Ultra by Ardex, www.ardexamericas.com <<http://www.ardexamericas.com/>>.
 - 5. Substitutions: See Section 01-6100.

- C. Single Coat System: 2-component, VOC Compliant, 100% solids epoxy formulated as a vapor barrier against high moisture and alkalinity in concrete substrates. Apply at manufacturer's recommended rate, minimum average 15-mils (0.015-in.), to provide maximum 0.1 net perms (grains/hr/sq ft/in. Hg) water vapor transmission. Manufacturer's approved bonding agent/primer. Manufacturer's approved cementitious leveling underlayment
- D. Two-Coat System: 2-component, VOC Compliant, 100% solids epoxy formulated as a vapor barrier against high moisture and alkalinity in concrete substrates. Apply at manufacturer's recommended rate two coats with sand broadcast to rejection on the second coat. Apply minimum average 8-mils (0.015-in.) per coat to provide maximum 0.1 net perms (grains/hr/sq ft/in. Hg) water vapor transmission. Manufacturer's approved sand. Manufacturer's approved cementitious leveling underlayment.
- E. Water Vapor Emission Control Coating: Epoxy resins and other chemical compounds; 100 % solids, specifically formulated chemicals and resins to provide the following properties. Coating product must contain 100% epoxy resin solids.
 - 1. Products based on silicate chemistry, potassium, sodium, lithium, and similar formulations or water-based acrylics are not acceptable and will be rejected.
 - 2. Solid Content 100%
 - 3. VOC, mixed: 10 g/L
 - 4. Flash Point 200° F
 - 5. Penn Rating, ASTM E96: Not to exceed 0.09 grains/ sq.ft /hour in Hg.
 - 6. ASTM E 96, Water Vapor Transmission (wet methods) Performance shall be documented by an independent testing laboratory at a minimum 97% for water vapor transmission reduction compared to untreated concrete.
 - 7. ASTM D 1308; Insensitivity to alkaline environment up to, and including, pH 14 in a 14 day bath test.
 - 8. Certify acceptance and exposure to continuous topical water exposure after final cure.
 - 9. System must be able to perform as required with ASTM F2170 RH Probe readings of 100%.
- F. Patching / Leveling Compounds: By Coating manufacturer, Self-Leveling type recommended to suit conditions indicated. Formulated primarily of calcium aluminate or portland hydraulic cements, minimum compressive strength 3,000 psi at 28 days when tested in accordance with ASTM C109. Patching / Leveling compounds that rely primarily on gypsum for their cementing properties shall not be used.
- G. Self-Leveling Primer: By Coating manufacturer, type recommended to suit conditions indicated.

2.4 ACCESSORIES

- A. Crack Repair Compounds:

1. Roadware 10-minute Concrete Mender. Manufacturer: Roadware Inc, 381 Bridgepoint Way, South St Paul, MN 55075,651-457-6122, www.concretemender.com
2. Sikadur 35 H-Mod LV. Manufacturer: Sika Corp., 201 Polito Ave, Lyndhurst, NJ 07071, 800-933-7452 www.sikaconstruction.com
3. Substitutions: See Section 01-6100.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify under slab vapor barrier meets ASTM E1745 Class A performance and concrete is placed directly onto barrier. Concrete water to cement ratio shall not exceed 0.50.
 1. Site Verification: Verify substrate conditions are acceptable for a warranted system.
- B. Verify items which penetrate substrate to receive coating are securely installed.
- C. Surfaces shall be free of water, rain, snow and frost.

3.2 PREINSTALLATION TESTING

- A. Moisture and pH Testing: As specified in related Section 090512.
 1. Conduct relative humidity testing in accordance with ASTM F2170 and alkalinity-pH testing methods specified.

3.3 PREPARATION

- A. Surface Preparation for Sealers: Verify concrete cleaned by shot blasting or other mechanical abrasion as specified in related section to an ICRI CSP-3 to CSP-4 profile. Verify removal of dirt, oils, films, and other materials detrimental to sealer application.
- B. Protection: Mask and protect walls, equipment from adjacent work and finishes during installation process.
- C. If floor develops areas of surface roughness greater than ICRI CSP-4 during preparation, apply patching/leveling compound in those areas and re-abrade to produce specified profile. Excessively rough concrete cannot be adequately sealed at specified moisture mitigation coating application rates.
- D. Cleaning Broom-sweep and vacuum slab surfaces to remove contaminants.
- E. Do not acid etch surface. Do not apply water to surface.
- F. Joints & Cracks: Fill cracks, construction joints, sawcut control joints, and surface irregularities with crack repair compound.

1. Route cracks with 4 to 6-inch diameter x 0.060-inch diamond abrasive wheel to not more than 1-1/8 to 1-1/4-inch depth. Clean by vacuum to remove dust and residue.
 2. Mix and apply crack repair compound according to manufacturers instructions using gravity feed.
 3. Fill cracks to within 1/8-inch. of surface, add sand and apply additional crack repair compound to saturate sand and slightly overfill crack.
 4. Scrape or lightly grind flush after curing to provide a level surface for Water Vapor Emission Control Coating.
 5. Fill cracks completely to stabilize against concrete movement and to provide moisture barrier.
- G. Concrete Fiber Reinforcement, if present after shot blasting, shall be burned off, scraped and vacuumed, leaving no fibers protruding from the concrete surface.

3.4 INSTALLATION

- A. Apply Water Vapor Emission Control Coating where relative humidity and alkalinity tests do not meet flooring manufacturers requirements for floor finishes:
- B. Apply Water Vapor Emission Control Coating based on relative humidity and alkalinity test results in strict compliance with the manufacturers written instructions.
- C. Water Vapor Emission Control Coating System Application:
1. Coverage rates are dependent on the surface texture and porosity of the substrate.
 2. Apply sufficient coating to achieve the manufacturers recommended minimum film thickness using manufacturer's recommended squeegee or roller. Periodically check application rate and wet film thickness. Follow manufacturer's recommended curing times.
 3. Two-coat system: Apply sand broadcast to rejection into second coat according to manufacturers written instructions. After curing, remove excess sand by sweeping and vacuuming.
- D. Cementitious Underlayment System:
1. Self-Leveling Cementitious Underlayment
 - a. One-coat Water Vapor Emission Control Coating without sand broadcast, apply primer to coating. Do not exceed manufacturers recommended application rate and film thickness. Thicker primer can lead to cracking of underlayment. Allow manufacturer's specified cure time. Do not exceed manufacturer's specified open time. Mix and pour the underlayment product on the floor and disperse with the approved spreader, followed by smoothing the material with the approved smoother. Wear cleated shoes to avoid leaving marks.

- b. Two-coat Water Vapor Emission Control Coating system with sand broadcast, apply self leveling cementitious underlayment directly to clean, sand-broadcast second coat Mix and pour the underlayment product on the floor and disperse with the approved spreader, followed by smoothing the material with the approved smoother. Wear cleated shoes to avoid leaving marks.
 - c. Do not exceed maximum application thickness specified by underlayment manufacturer. Provide a smooth, uninterrupted, level finish without bumps, clumps, depressions, or other defects that would reflect through applied resilient sports flooring.
 - d. Floor finish shall be flat to within 1/8-inch. in 10 ft, and as measured by ASTM E1155. Provide Ff of 50 and FI of 30.
2. Inspect and Repair defects:
- a. Inspect hardened underlayment for flatness.
 - b. Lightly sand flat any bumps in the underlayment Unhydrated or partially hydrated clumps of underlayment cement shall be removed by carefully chiseling and patching with compatible trowel-applied patching compound recommended by underlayment manufacturer. Do not penetrate the moisture mitigation coating.
 - c. Fill low spots with compatible trowel-applied patching compound recommended by underlayment manufacturer. Sand smooth to remove trowel marks.
- E. Allow surfaces to cure and re-apply additional coats as required to form a uniform control layer.

3.5 FIELD QUALITY CONTROL

- A. Manufacturer and installer to guarantee installed Water Vapor Emission Control Coating is compatible with all specified floor coverings. -
- B. Post-Installation Testing: Owner's Testing Agency to perform the following testing:
 1. Tensile bond tests: Perform tensile bond tests in triplicate, at the same rate as Relative Humidity testing specified in related section, no sooner than 72 hours after installation is completed, according to ASTM D7234 through entire Water Vapor Emission Control Coating into concrete substrate. Comply with the following-
 - a. No cohesive failure of leveling underlayment with at least 200 psi, or tensile failure in concrete substrate with no inter-layer or intra-layer failure of Water Vapor Emission Control Coating.
 2. Repair failed test locations at no cost to Owner and re-test to demonstrate compliance.

3.6 PROTECTION

- A. Protect each coat from damage due to traffic, topical water and contaminants during required cure period until acceptance by related floor covering section.

END OF SECTION

SECTION 07-6200 - MISC. SHEET METAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Metal counter flashing and base flashing.
 - 2. Metal wall flashing and expansion joints.
 - 3. Miscellaneous sheet metal accessories.
- B. Roofing accessories installed integral with roofing membrane are specified in roofing system sections as roofing work.
- C. Roof accessory units of premanufactured, set-on type are specified in Division 7 Section "Roof Accessories."

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product data, Flashing, Sheet Metal, and Accessories: Manufacturer's technical product data, installation instructions and general recommendations for each specified sheet material and fabricated product.
- C. Samples of the following flashing, sheet metal, and accessory items:
 - 1. 8-inch-square samples of specified sheet materials to be exposed as finished surfaces.
 - 2. 12-inch-long samples of factory-fabricated products exposed as finished work. Provide complete with specified factory finish.
- D. Shop drawings showing layout, profiles, methods of joining, and anchorages details, including major counterflashings, trim/fascia units, gutters, downspouts, scuppers, and expansion joint systems. Provide layouts at 1/4-inch scale and details at 3-inch scale.

1.4 PROJECT CONDITIONS

- A. Coordinate work of this section with interfacing and adjoining work for proper sequencing of each installation. Ensure best possible weather resistance and durability of work and protection of materials and finishes.

PART 2 - PRODUCTS

2.1 SHEET METAL FLASHING AND TRIM MATERIALS

- A. Zinc-Coated Steel: Commercial quality with 0.20 percent copper, ASTM A 526 except ASTM A 527 for lock-forming, G90 hot-dip galvanized, mill phosphatized where indicated for painting; 0.0359-inch thick (20 gage) except as otherwise indicated.
- B. Stainless Steel: AISI Type 302/304, complying with ASTM A 167, 2D annealed finish, soft, except where harder temper required for forming or performance; 0.0156-inch thick (28 gage) except as otherwise indicated.
- C. Sheet Aluminum: ASTM B 209, alloy 3003, temper H14, AA-C22A41 clear anodized finish; 0.032-inch thick (20 gage) except as otherwise indicated.
- D. Extruded Aluminum: Manufacturer's standard extrusions of sizes and profiles indicated, 60063-T52, AA-C22A41 clear anodized finish; 0.080-inch minimum thickness for primary legs of extrusions.

2.2 MISCELLANEOUS MATERIALS AND ACCESSORIES:

- A. Solder: For use with steel or copper, provide 50 - 50 tin/lead solder (ASTM B 32), with rosin flux.
- B. Solder: For use with stainless steel, provide 60 - 40 tin/lead solder (ASTM B 32), with acid-chloride type flux, except use rosin flux over tinned surfaces.
- C. Fasteners: Same metal as flashing/sheet metal or other non-corrosive metal as recommended by sheet manufacturer. Match finish of exposed heads with material being fastened.
- D. Bituminous Coating: SSPC - Paint 12, solvent-type bituminous mastic, nominally free of sulfur, compounded for 15-mil dry film thickness per coat.
- E. Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, non-drying, nonmigrating sealant.
- F. Elastomeric Sealant: Generic type recommended by manufacturer of metal and fabricator of components being sealed and complying with requirements for joint sealants as specified in Division 7 Section "Joint Sealers."
- G. Adhesives: Type recommended by flashing sheet manufacturer for waterproof/weather-resistant seaming and adhesive application of flashing sheet.
- H. Paper Slip Sheet: 5-lb. rosin-sized building paper.
- I. Metal Accessories: Provide sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of work, matching or compatible with material being installed, noncorrosive, size and gage required for performance.
- J. Gutter and Conductor-Head Guards: 20-gage bronze or nonmagnetic stainless steel mesh or fabricated units, with selvaged edges and noncorrosive fasteners. Select materials for compatibility with gutters and downspouts.

2.3 FABRICATED UNITS

- A. General Metal Fabrication: Shop-fabricate work to greatest extent possible. Comply with details shown and with applicable requirements of SMACNA "Architectural Sheet Metal Manual" and other recognized industry practices. Fabricate for waterproof and weather-resistant performance, with expansion provisions for running work, sufficient to permanently prevent leakage, damage, or deterioration of the work. Form work to fit substrates. Comply with material manufacturer instructions and recommendations for forming material. Form exposed sheet metal work without excessive oil-canning, buckling, and tool marks, true to line and levels indicated, with exposed edges folded back to form hems.
- B. Seams: Fabricate nonmoving seams in sheet metal with flat-lock seams. For metal other than aluminum, tin edges to be seamed, form seams, and solder. Form aluminum seams with epoxy seam sealer; rivet joints for additional strength where required.
- C. Expansion Provisions: Where lapped or bayonet-type expansion provisions in work cannot be used or would not be sufficiently water/weatherproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).
- D. Sealant Joints: Where movable, nonexpansion type joints are indicated or required for proper performance of work, form metal to provide for proper installation of elastomeric sealant, in compliance with SMACNA standards.
- E. Separations: Provide for separation of metal from noncompatible metal or corrosive substrates by coating concealed surfaces at locations of contact, with bituminous coating or other permanent separation as recommended by manufacturer/fabricator.
- F. Aluminum Extrusion Units: Fabricate extruded aluminum running units with formed or extruded aluminum joint covers for installation behind main members where possible. Fabricate mitered and welded corner units.

PART 3 - EXECUTION

3.1 INSTALLATION REQUIREMENTS

- A. General: Except as otherwise indicated, comply with manufacturer's installation instructions and recommendations and with SMACNA "Architectural Sheet Metal Manual." Anchor units of work securely in place by methods indicated, providing for thermal expansion of metal units; conceal fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weatherproof.
- B. Underlayment: Where stainless steel or aluminum is to be installed directly on cementitious or wood substrates, install a slip sheet of red rosin paper and a course of polyethylene underlayment.
- C. Bed flanges of work in a thick coat of bituminous roofing cement where required for waterproof performance.

- D. Install counterflashing in reglets, either by snap-in seal arrangement or by welding in place for anchorage and filling reglet with mastic or elastomeric sealant, as indicated and depending on degree of sealant exposure.
- E. Nail flanges of expansion joint units to curb nailers, at maximum spacing of 6 inches o.c. Fabricate seams at joints between units with minimum 3-inch overlap, to form a continuous, waterproof system.

3.2 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces, removing substances that might cause corrosion of metal or deterioration of finishes.
- B. Protection: Advise Contractor of required procedures for surveillance and protection of flashings and sheet metal work during construction to ensure that work will be without damage or deterioration other than natural weathering at time of Substantial Completion.

END OF SECTION 07-6200

SECTION 07-9200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes joint sealants for the following locations:
1. Exterior joints in vertical surfaces and nontraffic horizontal surfaces as indicated below:
 - a. Control and expansion joints in cast-in-place concrete.
 - b. Perimeter joints between materials listed above and frames of doors and windows.
 - c. To make building watertight.
 - d. To fill an exposed joint between materials which do not fit tightly together
 2. Exterior joints in horizontal traffic surfaces as indicated below:
 - a. Control, expansion, and isolation joints in cast-in-place concrete slabs.
 - b. Tile control and expansion joints.
 - c. Joints between different materials listed above.
 - d. Other joints as indicated.
 3. Interior joints in vertical surfaces and horizontal nontraffic surfaces as indicated below:
 - a. Perimeter joints of exterior openings where indicated.
 - b. Tile control and expansion joints.
 - c. For sound isolation in partitions and ceilings
 - d. Other joints as indicated.
 4. Interior joints in horizontal traffic surfaces as indicated below:
 - a. Control and expansion joints in cast-in-place concrete slabs.
 - b. Other joints as indicated.

- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 7 Section "Flashing and Sheet Metal" for sealing joints related to flashing and sheet metal for roofing.
 - 2. Division 8 "Glass and Glazing" for sealants used in glazing.
 - 3. Division 9 Section "Gypsum Drywall" for sealing concealed perimeter joints of gypsum board partitions to reduce sound transmission.
 - 4. Division 9 Section "Tile" for sealing tile joints.

1.3 REFERENCES

- A. Manufacturer's recommendations and specifications.
- B. ASTM C 834 - Standard Specification for Latex Sealants.
- C. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants.
- D. ASTM C 1193 - Standard Guide for Use of Joint Sealants.
- E. ASTM D 1667 - Standard Specification for Flexible Cellular Materials--Vinyl Chloride Polymers and Copolymers (Closed-Cell Foam).
- F. BAAQMD 8-51 - Bay Area Air Quality Management District Regulation 8, Rule 51, Adhesive and Sealant Products; www.baaqmd.gov.

1.4 SYSTEM PERFORMANCE REQUIREMENTS

- A. Provide elastomeric joint sealants that have been produced and installed to establish and to maintain watertight and airtight continuous seals without causing staining or deterioration of joint substrates.
- B. Design Requirements
 - 1. Sealing building envelope
 - a. Seal typical building joints with non-sag type sealant.
 - b. Seal indicated floor joints with self-leveling or slope grade self leveling type sealant.
- C. Performance Requirements
 - 1. Building envelope:
 - a. Make watertight and weathertight.
 - b. Exterior work that does not remain watertight and all work which does not retain all properties inherent in the product as stipulated by the manufacturer will be considered faulty

1.5 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product data from manufacturers for each joint sealant product required.
 - 1. Certification by joint sealant manufacturer that sealants plus the primers and cleaners required for sealant installation comply with local regulations controlling use of volatile organic compounds.
- C. Samples for initial selection purposes in form of manufacturer's standard bead samples, consisting of strips of actual products showing full range of colors available, for each product exposed to view.
- D. Samples for verification purposes of each type and color of joint sealant required. Install joint sealant samples in 1/2-inch-wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- E. Certificates from manufacturers of joint sealants attesting that their products comply with specification requirements and are suitable for the use indicated.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced Installer who has completed joint sealant applications similar in material, design, and extent to that indicated for Project that have resulted in construction with a record of successful in-service performance.
- B. Single Source Responsibility for Joint Sealant Materials: Obtain joint sealant materials from a single manufacturer for each different product required.
- C. Product Testing: Provide comprehensive test data for each type of joint sealant based on tests conducted by a qualified independent testing laboratory on current product formulations within a 24-month period preceding date of Contractor's submittal of test results to Architect.
 - 1. Test elastomeric sealants for compliance with requirements specified by reference to ASTM C 920. Include test results for hardness, stain resistance, adhesion and cohesion under cyclic movement (per ASTM C 719), low-temperature flexibility, modulus of elasticity at 100 percent strain, effects of heat aging, and effects of accelerated weathering.
- D. Field-Constructed Mock-Ups: Prior to installation of joint sealants, apply elastomeric sealants as follows to verify selections made under sample submittals and to demonstrate aesthetic effects as well as qualities of materials and execution:
 - 1. Joints in field-constructed mock-ups of assemblies specified in other Sections that are indicated to receive elastomeric joint sealants specified in this Section.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multicomponent materials.
- B. Store and handle materials in compliance with manufacturer's recommendations to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.8 PROJECT CONDITIONS

- A. Environmental Conditions: Do not proceed with installation of joint sealants under the following conditions:
 - 1. When ambient and substrate temperature conditions are outside the limits permitted by joint sealant manufacturer.
 - 2. When ambient and substrate temperature conditions are outside the limits permitted by joint sealant manufacturer or below 40 deg F (4.4 deg C).
 - 3. When joint substrates are wet.
- B. Joint Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than allowed by joint sealant manufacturer for application indicated.
- C. Joint Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with their adhesion are removed from joint substrates.

1.9 SEQUENCING AND SCHEDULING

- A. Sequence installation of joint sealants to occur not less than 21 nor more than 30 days after completion of waterproofing, unless otherwise indicated.

1.10 WARRANTY

- A. See Section 01700 - Closeout Procedures, for additional warranty requirements.
- B. Correct defective work within a five year period after Date of Substantial Completion.
- C. Warranty: Include coverage for installed sealants and accessories which fail to achieve airtight seal and watertight seal, exhibit loss of adhesion or cohesion, or do not cure.
- D. Provide manufacturer's 5 year standard material warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURES

- A. Polyurethane Sealants:
 - 1. Pecora Corporation: www.pecora.com.

2. Oegussa Building Systems/Sonneborn: www.chemrex.com.
3. Sika AG: www.sika.com.
4. Tremco, A BFGoodrich Specialty Chemicals Company

B. Acrylic Emulsion Latex Sealants:

1. OAP, www.dap.com.
2. Pecora Corporation: www.pecora.com.
3. Oegussa Building Systems/Sonneborn: www.chemrex.com.

C. Substitutions: See Section 01600 - Product Requirements.

2.2 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, joint fillers, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
- B. Colors: Provide color of exposed joint sealants to comply with the following:
 1. Provide selections made by Architect from manufacturer's full range of standard colors for products of type indicated.
- C. Sealants and Primers - General: Provide only products having lower volatile organic compound (VOC) content than required by the more stringent of the South Coast Air Quality Management District Rule NO.1168.

2.3 GENERAL PURPOSE EXTERIOR SEALANT:

- A. Polyurethane; ASTM C 920, Grade NS, Class 25, Uses M, G, and A; multi-component.
 1. Product:
 - a. "NP-2" manufactured by Sonneborn.
 - b. "Sikaflex 2C" manufactured by Sika.
 - c. Dymeric 240 FC" manufactured by Tremco
 2. Applications: Use for:
 - a. Control, expansion, and soft joints in masonry.
 - b. Joints between concrete and other materials.
 - c. Joints between metal frames and other materials.

- d. Other exterior joints for which no other sealant is indicated.
3. Color: Standard colors matching finished surfaces. Provide minimum of 40 standard selection choices, when custom color to match is noted, use Sonneborn Sealant Color Matching System. Allow for minimum of five color selections at exterior, and five more at interior, including custom matches.
 - a.
- B. General Purpose Exterior Sealant: Polyurethane; ASTM C 920, Grade NS, Class 25, Uses M, G, and A; single component.
 1. Product:
 - a. "NP-1" manufactured by Sonneborn.
 - b. "Sikaflex 1 A" manufactured by Sika.
 - c. "Dymonic FC" manufactured by Tremco.
 2. Applications: Use for:
 - a. Joints between metal frames and other materials.
 - b. Other exterior joints for which no other sealant is indicated.
 3. Color: Provide standard sealant color choices for selection by architect. Allow for a minimum of five color selections total.
- C. Exterior Metal Lap Joint Sealant: Polyurethane; ASTM C 920, Grade NS, Class 25, Uses M, G, and A;
 1. Product:
 - a. "NP-1" manufactured by Sonneborn. 2. Product: "Sikaflex 1A" manufactured by Sika.
 - b. "Dymeric 240 FC" manufactured by Tremco.
 2. Applications: Use for:
 - a. Concealed sealant bead in sheet metal work.
 - b. Concealed sealant bead in siding overlaps.
- D. General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C 834, Type OP, Grade NF single component, paintable.
 1. Products
 - a. "Sonolac" manufactured by Sonneborn.
 - b. "DAP 230" by DAP.

- c. "Pecora AC20" by Pecora.
 2. Applications: Use for:
 - a. Interior wall and ceiling control joints.
 - b. Interior joints between door and window frames and wall surfaces.
 - c. Other interior joints for which no other type of sealant is indicated.
 3. Color: Provide standard sealant color choices for selection by architect. Allow for a minimum of five color selections total.
- E. Tile Sealant: White silicone; ASTM C 920, Uses I, M and A; single component, mildew resistant.
 1. Applications: Use for:
 - a. Joints between plumbing fixtures and floor and wall surfaces.
 - b. Joints between kitchen and bath countertops and wall surfaces.
- F. Acoustical Sealant: Synthetic rubber, single component.
 1. Product
 - a. Tremco "Acoustical Sealant"
- G. Exterior or Interior Horizontal Expansion Joint Sealant: Polyurethane, self-leveling; ASTM C 920, Grade P, Class 25, Uses T, M and A; single component.
 1. Products
 - a. SL-2 Slope Grade or Self Leveling Sealant" manufactured by Sonneborn.
 - b. "Sikaflex 2C SL" manufactured by Sika.
 - c. "Vulkem 245" manufactured by Tremco.
 2. Applications: Use for:
 - a. Expansion joints in floors.
 - b. Joints in sidewalks and vehicular paving.
 3. Color
 - a. Standard colors matching finished surfaces.
- H. Foam Sealant:

1. Product
 - a. "Touch'n Seal RX" as manufactured by Convenience Products, Fenton, MO.
- I. Sealer Tape:
 1. Product
 - a. Inmont "Presstite #579.6"
 - b. 3M "Seam Sealer Tape"

2.4 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming in any way joint substrates and adjacent nonporous surfaces, and formulated to promote optimum adhesion of sealants with joint substrates.
- C. Joint Backing: Round foam rod compatible with sealant; ASTM D 1667, closed cell PVC; oversized 30 to 50 percent larger than joint width.
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint sealant performance. Do not proceed with installation of joint sealants until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with recommendations of joint sealant manufacturer and the following requirements:
 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and

compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

2. Clean concrete, masonry, unglazed surfaces of ceramic tile, and similar porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.
 3. Remove laitance and form release agents from concrete.
 4. Clean metal, glass, porcelain enamel, glazed surfaces of ceramic tile, and other nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
- B. Joint Priming: Prime joint substrates where indicated or where recommended by joint sealant manufacturer based on preconstruction joint sealant-substrate tests or prior experience. Apply primer to comply with joint sealant manufacturer's recommendations. Confine primers to areas of joint sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint sealant manufacturer's printed installation instructions applicable to products and applications indicated, except where more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations of ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Acoustical Sealant Application Standard: Comply with recommendations of ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.
- D. Installation of Sealants: Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability. Install sealants at the same time sealant backings are installed.
- E. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- F. Install joint backing to achieve a neck dimension no greater than 1/3 of the joint width.

- G. Install bond breaker where joint backing is not used.
- H. Tooling of Nonsag Sealants: Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated, to eliminate air pockets, and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.
- I. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- J. Provide flush joint configuration, per Figure 5B in ASTM C 1193, where indicated.
 - 1. Use masking tape to protect adjacent surfaces of recessed tooled joints.
- K. Installation of Preformed Foam Sealants: Install each length of sealant immediately after removing protective wrapping, taking care not to pull or stretch material, and to comply with sealant manufacturer's directions for installation methods, materials, and tools that produce seal continuity at ends, turns, and intersections of joints. For applications at low ambient temperatures where expansion of sealant requires acceleration to produce seal, apply heat to sealant in conformance with sealant manufacturer's recommendations.

3.4 CLEANING

- A. Clean off excess sealants or sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so that and installations with repaired areas are indistinguishable from original work.

END OF SECTION

SECTION 08-1113 - STANDARD STEEL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following products manufactured in accordance with SDI Recommended Standards:
 - 1. Doors: Seamless, hollow or composite construction standard steel doors for interior and exterior locations.
 - 2. Frames: Pressed steel frames for doors, transoms, sidelights, mullions, interior glazed panels, and other interior and exterior openings of following type:
 - a. Welded unit type.
 - 3. Assemblies: Provide standard steel door and frame assemblies as required for the following:
 - a. Labeled and fire rated.
 - b. Door lites.
- B. Shop Prime doors and frames to be compatible with Field applied Special coating (Tnemec or approved Equal).
- C. Painting primed steel doors and frames is specified in Division 9 Section "Special Coatings."
- D. Wood doors are specified in another Division 8 Section.
- E. Door hardware is specified in another Division 8 Section.

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product data for each type of door and frame specified, including details of construction, materials, dimensions, hardware preparation, core, label compliance, sound ratings, profiles, and finishes.
- C. Shop drawings showing fabrication and installation of standard steel doors and frames. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, location and installation requirements

of door and frame hardware and reinforcements, and details of joints and connections. Show anchorage and accessory items.

1. Provide schedule of doors and frames using same reference numbers for details and openings as those on contract drawings.
- D. Label Construction Certification: For door assemblies required to be fire-rated and exceeding limitations of labeled assemblies, submit manufacturer's certification that each door and frame assembly has been constructed to conform to design, materials and construction equivalent to requirements for labeled construction.

1.4 QUALITY ASSURANCE

- A. Provide doors and frames complying with Steel Door Institute "Recommended Specifications Standard Steel Doors and Frames" ANSI/SDI-100 and as herein specified.
- B. Fire-Rated Door Assemblies: Units that comply with NFPA 80, are identical to door and frame assemblies whose fire resistance characteristics have been determined per ASTM E 152 and which are labeled and listed by UL, Factory Mutual, Warnock Hersey, or other testing and inspecting organization acceptable to authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering standard steel doors and frames which may be incorporated in the work include; but are not limited to, the following:
 1. Standard Steel Doors and Frames:
 - a. Fenestra Corp.
 - b. Steelcraft Manufacturing Co.
 - c. Or approved equal, see Section 01-6100 for substitutions

2.2 MATERIALS

- A. Galvanized Steel Sheets: Zinc-coated carbon steel sheets of commercial quality, complying with ASTM A 526, or drawing quality, ASTM A 642, hot dipped galvanized in accordance with ASTM A 525, with A60 or G60 coating designation, mill phosphatized.
- B. Supports and Anchors: Fabricate of not less than 18-gage sheet steel; galvanized where used with galvanized frames.

- C. Inserts, Bolts, and Fasteners: Manufacturer's standard units. Where items are to be built into exterior walls, hot-dip galvanize in compliance with ASTM A 153, Class C or D as applicable.

2.3 DOORS

- A. Provide metal doors of types and styles or grades and models indicated on drawings or schedules.
 - 1. Interior Doors: ANSI/SDI-100, Grade II, heavy-duty, Model 3 or 4, minimum 18-gage cold-rolled sheet steel faces.
 - 2. Exterior Doors: ANSI/SDI-100, Grade III, extra heavy-duty, Model 4, minimum 16-gage galvanized steel faces.
- B. Door Louvers: Provide sightproof stationary louvers for interior doors where indicated, constructed of inverted V-shaped or Y-shaped blades formed of 24-gage cold-rolled steel set into minimum 20-gage steel frame.

2.4 FRAMES

- A. Provide metal frames for doors, transoms, sidelights, borrowed lights, and other openings, of types and styles as shown on drawings and schedules. Conceal fastenings, unless otherwise indicated. Fabricate frames of minimum 16-gage cold-rolled steel.
 - 1. Fabricate frames with mitered, coped, or welded corners.
 - 2. Form exterior frames from 16-gage galvanized steel.
- B. Door Silencers: Except on weatherstripped frames, drill stops to receive 3 silencers on strike jambs of single-door frames and 2 silencers on heads of double-door frames.
- C. Plaster Guards: Provide minimum 26-gage steel plaster guards or mortar boxes at back of hardware cutouts where mortar or other materials might obstruct hardware operation and to close off interior of openings.

2.5 DOORS WITH LITES:

- A. Glazing Gaskets:
 - 1. Compression type design, replaceable, molded or extruded, of neoprene or ethylene propylene diene monomer (EPDM).
 - 2. Conform to ASTM C509 or C864.
 - 3. Profile and hardness as required to maintain uniform pressure for watertight seal.
 - 4. Provide in manufacturer's standard black color.
- B. Weatherstripping:

1. Wool pile conforming to AAMA 701.2; or extruded EPDM elastomeric conforming to ASTM C509 or C864.
 2. Provide EPDM or vinyl-blade gasket weatherstripping in bottom door rail, adjustable for contact with threshold.
- C. Internal Sealants: Types recommended by sealant manufacturer.
- D. "Anti-Walk" Edge Blocking: "W" shaped EPDM blocks for use in keeping glazing material stationary under vibration or seismic loading.
- E. Baffles (at weep holes): Type as recommended by system manufacturer and shown in published installation instructions.

2.6 FABRICATION

- A. Fabricate steel door and frame units to be rigid, neat in appearance and free from defects, warp or buckle. Wherever practicable, fit and assemble units in manufacturer's plant. Clearly identify work that cannot be permanently factory-assembled before shipment, to assure proper assembly at project site. Comply with ANSI/SDI-100 requirements.
1. Internal Construction: Manufacturer's standard honeycomb, polyurethane, polystyrene, unitized steel grid, vertical steel stiffeners, or rigid mineral fiber core with internal sound deadener on inside of face sheets where appropriate in accordance with SDI standards.
 2. Clearances: Not more than 1/8 inch at jambs and heads except between non-fire-rated pairs of doors not more than 1/4 inch. Not more than 3/4 inch at bottom.
- B. Fabricate exposed faces of doors and panels, including stiles and rails of nonflush units, from only cold-rolled steel.
- C. Tolerances: Comply with SDI 117 "Manufacturing Tolerances Standard Steel Doors and Frames."
- D. Fabricate frames, concealed stiffeners, reinforcement, edge channels, louvers and moldings from either cold-rolled or hot-rolled steel.
- E. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat or oval heads for exposed screws and bolts.
- F. Hardware Preparation: Prepare doors and frames to receive mortised and concealed hardware in accordance with final Door Hardware Schedule and templates provided by hardware supplier. Comply with applicable requirements of ANSI A115 Series Specifications for door and frame preparation for hardware.
- G. Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied hardware may be done at project site.
- H. Locate hardware as indicated on final shop drawings or, if not indicated, in accordance with "Recommended Locations for Builder's Hardware on Standard Steel Doors and Frames," published by Door and Hardware Institute.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install standard steel doors, frames, and accessories in accordance with final shop drawings, manufacturer's data, and as herein specified.
- B. Placing Frames: Comply with provisions of SDI-105 "Recommended Erection Instructions For Steel Frames," unless otherwise indicated.
 - 1. Except for frames located at existing concrete, masonry or drywall installations, place frames prior to construction of enclosing walls and ceilings. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders leaving surfaces smooth and undamaged.
- C. Door Installation: Fit hollow metal doors accurately in frames, within clearances specified in ANSI/SDI-100.

3.2 ADJUST AND CLEAN

- A. Prime Coat Touch-up: Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer.
- B. Protection Removal: Immediately prior to final inspection, remove protective plastic wrappings from prefinished doors.
- C. Final Adjustments: Check and readjust operating hardware items, leaving steel doors and frames undamaged and in complete and proper operating condition.

END OF SECTION

SECTION 08-1416 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to of this section.

1.2 SUMMARY:

- A. Extent and location of each type of flush wood door is indicated on drawings and in schedules.
- B. Types of doors required include the following:
 - 1. Solid core flush wood doors with wood veneer faces.

1.3 SUBMITTALS:

- A. Product Data: Door manufacturer's technical data for each type of door, including details of core and edge construction, trim for openings and louvers, and factory-finishing specifications.
- B. Shop Drawings: Submit shop drawings indicating location and size of each door, elevation of each kind of door, details of construction, location and extent of hardware blocking, fire ratings, requirements for factory finishing and other pertinent data.
 - 1. For factory-premachined doors, indicate dimensions and locations of cutouts for locksets and other cutouts adjacent to light and louver openings.
- C. Samples: Submit samples, 1-0" square or as indicated, for the following:
 - 1. Doors for Treatment Finish: Door faces with solid wood edging representing typical range of color and grain for each species of veneer and solid lumber required.
 - 2. Factory-Finished Doors: Each type of factory finish required.
 - 3. Metal Louvers: Blade and frame in 6" lengths, for each material and finish required.
 - 4. Metal Frames for Light Openings: Metal light frames in 6" lengths; for each material, type and finish required.

1.4 QUALITY ASSURANCE:

- A. Quality Standards: Comply with the following standards:
 - 1. NWWDA Quality Standard: I.S.1 "Industry Standard for Wood Flush Doors", of National Wood Window and Door Association (NWWDA).

2. WIC Quality Standard: "Manual of Millwork" including "Section 20 - Doors" of Woodwork Institute of California (WIC) for requirements in the door grade comparable to AWI grade indicated and exceeding those in other referenced standards.
 - B. Fire-Rated Wood Doors: Provide wood doors which are identical in materials and construction to units tested in door and frame assemblies per ASTM E 152 and which are labeled and listed for ratings indicated by UL, Warnock Hersey or other testing and inspection agency acceptable to authorities having jurisdiction.
 1. Oversize Fire-Rated Wood Doors: For door assemblies exceeding sizes of tested assemblies, provide manufacturer's certificate in stating that doors conform to all standard construction requirements of tested and labeled fire door assemblies except as to size.
 - C. Manufacturer: Obtain doors from a single manufacturer.
- 1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING:
- A. Protect doors during transit, storage and handling to prevent damage, soiling and deterioration. Comply with requirements of referenced standards and recommendations of NWWDA pamphlet "How to Store, Handle, Finish, Install, and Maintain Wood Doors", as well as with manufacturer's instructions.
 - B. Identify each door with individual opening numbers which correlate with designation system used on shop drawings for door, frames and hardware, using temporary, removable or concealed markings.
- 1.6 PROJECT CONDITIONS:
- A. Conditioning: Do not deliver or install doors until conditions for temperature and relative humidity have been stabilized and will be maintained in storage and installation areas during remainder of construction period to comply with the following requirements applicable to project's geographical location:
 1. Referenced WIC quality standard including "Section 1 - General Information - Technical Bulletin".
- 1.7 WARRANTY:
- A. General: Warranties shall be in addition to, and not a limitation of, other rights the Owner may have under the Contract Documents.
 - B. Door Manufacturer's Warranty: Submit written agreement on door manufacturer's standard form signed by Manufacturer, Installer and Contractor, agreeing to repair or replace defective doors which have warped (bow, cup or twist) or that show telegraphing of core construction in face veneers, or do not conform to tolerance limitations of referenced quality standards.
 1. Warranty shall also include reinstallation which may be required due to repair or replacement of defective doors where defect was not apparent to hanging.
 2. Warranty shall be in effect during following period of time after date of Substantial Completion.

3. Solid Core Interior Doors:
 - a. Life of installation.
- C. Contractor's Responsibilities: Replace or refinish doors where Contractor's work contributed to rejection or to voiding of manufacturer's warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering door which may be incorporated in the work include, but are not limited to, the following:
 1. Solid Core Doors with Wood Veneer Faces:
 - a. Algoma Hardwoods, Inc.
 - b. Buell Door Company.
 - c. Or Approved Equal

2.2 INTERIOR FLUSH WOOD DOORS:

- A. Solid Core Doors for Transparent Finish: Comply with the following requirements:
 1. Faces: Cherry, plain sliced.
 2. W.I.C. Grade: Custom.
 3. Construction: SLC-5 or SLC-7 (Glued block core, 5- or 7-ply).

2.3 LOUVERS AND LIGHT FRAMES:

- A. Wood Louvers: Door manufacturer's standard solid wood louvers, unless otherwise indicated, and of size indicated.
- B. Metal Louvers: Size, type and profile shown and fabricated from the following:
 1. Steel: 20-gage, galvanized and factory primed for paint finish.
- C. Metal Frames for Light Openings in Fire Doors: Manufacturer's standard frame formed of 18-gage cold-rolled steel, factory-primed, and approved for use in door of fire-rating indicated.
- D. Wood Beads for Light Openings in Fire Doors: Manufacturer's standard fire-rated wood-veneer beads matching veneer species of door faces.

2.4 FABRICATION:

- A. Fabricate flush wood doors to produce doors complying with following requirements:

1. In sizes indicated for job-site fitting.
 2. Factory-prefit and premachine doors to fit frame opening sizes indicated with the following uniform clearances and bevels:
 - a. Comply with tolerance requirements of WIC for prefitting. Comply with final hardware schedules and door frame shop drawings and with hardware templates.
 - b. Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before proceeding with factory premachining.
 - B. Metal Astragals: Premachine astragals and formed steel edges for hardware where required for pairs of fire-rated doors.
 - C. Transom and Side Panels: Fabricate matching panels with same construction, exposed surfaces and finish as specified for associated doors.
 1. Fixed Transom Panels: Fabricate fixed panels with solid lumber transom bottom rail and door top rail, both rabbeted as indicated, and factory-installed springbolts for concealed attachment into jambs of metal door frames.
 - D. Openings: Cut and trim openings through doors to comply with applicable requirements of referenced standards for kind(s) of doors required.
 1. Light Openings: Trim openings with moldings of material and profile indicated.
 2. Louvers: Factory install louvers in prepared openings.
 - E. Exterior Doors: Treat exterior doors at factory with water repellent after manufacturing has been completed.
 1. Provide manufacturer's standard metal flashing at top of outswinging units.
- 2.5 FACTORY FINISHING:
- A. General: Comply with referenced AWI quality standard including Section 1500 "Factory Finishing".
 - B. Prefinish wood doors at factory.
 - C. Transparent Finish: Comply with requirements indicated for grade, finish system, staining effect and sheen.
 1. WIC Grade: Custom.
 2. Finish: Manufacturer's standard finish with performance requirements comparable to either AWI System #2 catalyzed lacquer or AWI System #3 alkyd urea conversion varnish.

3. Staining: To be selected by Architect from Manufactures full range of finishes.
4. Effect: Filled finish.
5. Sheen: Satin-medium rubbed effect.

PART 3 - EXECUTION

3.1 EXAMINATION:

- A. Examine installed door frames prior to hanging door:
 1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with plumb jambs and level heads.
 2. Reject doors with defects.
- B. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION:

- A. Hardware: For installation see Division-8 "Finish Hardware" section of these specifications.
- B. Manufacturer's Instructions: Install wood doors to comply with manufacturer's instructions and of referenced AWI standard and as indicated.
 1. Install fire-rated doors in corresponding fire-rated frames in accordance with requirements of NFPA No. 80.
- C. Job-Fit Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted with fire-rated doors. Machine doors for hardware. Seal cut surfaces after fitting and machining.
 1. Fitting Clearances for Non-Rated Doors: Provide 1/8" at jambs and heads; 1/16" per leaf at meeting stiles for pairs of doors; and 1/8" from bottom of door to top of decorative floor finish or covering. Where threshold is shown or scheduled, provide 1/4" clearance from bottom of door to top of threshold.
 2. Fitting Clearances for Fire-Rated Doors: Comply with NFPA 80.
 3. Bevel non-rated doors 1/8" in 2" at lock and hinge edges.
 4. Bevel fire-rated doors 1/8" in 2" in lock edge; trim stiles and rails only to extent permitted by labeling agency.
- D. Prefit Doors: Fit to frames for uniform clearance at each edge.
- E. Factory-Finished Doors: Restore finish before installation, if fitting or machining is required at the job site.

F. Field-Finished Doors: Refer to the following for finishing requirements:

1. Division-9 Section "Exterior Wood Stains".

3.3 ADJUSTING AND PROTECTION:

A. Operation: Rehang or replace doors which do not swing or operate freely.

B. Finished Doors: Refinish or replace doors damaged during installation.

C. Protect doors as recommended by door manufacturer to assure that wood doors will be without damage or deterioration at time of Subsequent Completion.

END OF SECTION

SECTION 08-1418 - FLUSH F.R.P. DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to of this section.
- B. Section 08710 Door Hardware

1.2 SUMMARY:

- A. Extent and location of each type of Fiberglass reinforced polyester (FRP) flush doors is indicated on drawings and in schedules.
- B. Types of doors required include the following:
 - 1. Fiberglass reinforced polyester (FRP) flush doors with aluminum frames.

1.3 PERFORMANCE REQUIREMENTS

- A. General: Provide door assemblies that have been designed and fabricated to comply with specified performance requirements, as demonstrated by testing manufacturer's corresponding standard systems.
- B. Air Infiltration: For single a single door 3'0" x 7"0", the test specimen shall be tested in accordance with ASTM 283-91 @ pressure differential of 6.24 PSF. Door shall not exceed .90 CFM per linear foot of perimeter crack.
- C. Water Resistance: For single a single door 3'0" x 7"0", the test specimen shall be tested in accordance with ASTM 331 @ pressure differential of 7.50 PSF. Door shall not have any water leakage.
- D. Single door with single point latching:
 - 1. Uniform Static Load, ASTM E330: Plus or minus 75 pounds per square foot.
 - 2. Forced Entry Test, 300 Pound Load Applied, SFBC 3603.2 (b)(5): Passed.
 - 3. Cyclic Load Test, SFBC P.A. 203: Plus or minus 53 pounds per square foot.
 - 4. 4. Large Missile Impact Test , SFBC P.A. 201: Passed.
- E. Thermal Transmission, Exterior Doors, U-Value, AAMA 1503.01: Maximum of 0.09 BTU/hr x sf x degrees F.
- F. Surface Burning Characteristics, FRP Doors and Panels, ASTM E 84:
 - 1. Flame Spread: Maximum of 170, Class C.

2. Smoke Developed: Maximum of 390, Class C.
- G. Surface Burning Characteristics, Class A Option On Interior Faces of FRP Exterior Panels and Both Faces of FRP Interior Panels, ASTM E 84:
1. Flame Spread: Maximum of 15.
 2. Smoke Developed: Maximum of 310.
- H. Impact Strength, FRP Doors and Panels, Nominal Value, ASTM D 256: 15.0 foot-pounds per -inch of notch.
- I. Tensile Strength, FRP Doors and Panels, Nominal Value, ASTM D 638: 14,000 psi.
- J. Flexural Strength, FRP Doors and Panels, Nominal Value, ASTM D 790: 21,000 psi.
- K. Water Absorption, FRP Doors and Panels, Nominal Value, ASTM D 570: 0.20 percent after 24 hours.
- 1.4 SUBMITTALS:
- A. Comply with Section 01330 - Submittal Procedures.
 - B. Product Data: Submit manufacturer's product data, including description of materials, components, fabrication, finishes, and installation.
 - C. Shop Drawings: Submit manufacturer's shop drawings, including elevations, sections, and details, indicating dimensions, tolerances, materials, fabrication, doors, panels, framing, hardware schedule, finish, options, and accessories.
 - D. Samples:
 1. Door: Submit manufacturer's sample of door showing face sheets, core, framing, finish, hardware, options, and accessories.
 2. Color: Submit manufacturer's samples of standard colors of doors and frames.
 - E. Test Reports: Have available certified test reports from qualified independent testing agency indicating doors comply with specified performance requirements.
 - F. Manufacturer's Project References: Submit list of successfully completed projects including project name and location, name of architect, and type and quantity of doors manufactured.
 - G. Maintenance Manual: Submit manufacturer's maintenance and cleaning instructions for doors, including maintenance and operating instructions for hardware.
 - H. Warranty: Submit manufacturer's standard warranty.
- 1.5 QUALITY ASSURANCE:

- A. Manufacturer's Qualifications: Continuously engaged in manufacturing of doors of similar type to that specified, with a minimum of 10 years successful experience.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING:

- A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Storage: Store materials in clean, dry area indoors in accordance with manufacturer's instructions.
- C. Handling: Protect materials and finish from damage during handling and installation.

1.7 WARRANTY:

- A. Warrant doors, frames, and factory hardware against failure in materials and workmanship, including excessive deflection, faulty operation, defects in hardware installation, and deterioration of finish or construction in excess of normal weathering.
- B. Warranty Period: Ten years starting on date of shipment. In addition, a limited lifetime warranty covering: failure of corner joinery, core deterioration, delamination or bubbling of door skin.
- C. Contractor's Responsibilities: Replace or refinish doors where Contractor's work contributed to rejection or to voiding of manufacturer's warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Special-Lite, Inc, Decatur, Michigan (800) 821-6531 www.special-lite.com.
- B. Or Approved Equal

2.2 FRP FLUSH DOORS

- A. Model: SL-20 Flush Doors with SpecLite3 fiberglass reinforced polyester (FRP) face sheets.
- B. Construction:
 - 1. Door Thickness: 1-3/4 inches.
 - 2. Stiles and Rails: Aluminum Alloy 6063-T5, minimum of 2-5/16-inch depth.
 - 3. Corners: Mitered.
 - 4. Provide joinery of 3/8-inch diameter full-width tie rods through extruded splines top and bottom as standard tubular shaped stiles and rails reinforced to accept hardware as specified.

5. Securing Internal Door Extrusions: 3/16" angle blocks and hex-type nuts for joinery. Welds, glue, or other methods are not acceptable.
6. Furnish extruded stiles and rails with integral reglets to accept face sheet and lock it into place to permit flush appearance.
7. Rail caps or other face sheet capture methods are not acceptable.
8. Extrude top and bottom rail legs for interlocking continuous weather bar.
9. Meeting Stiles: Nylon brush weatherstripping.
10. Bottom of Door: Install bottom weather bar, with nylon brush weatherstripping, into extruded interlocking edge of bottom rail.

C. Face Sheet:

1. Material: Sandstone Textured FRP, 0.120-inch thickness. Abuse-resistant engineered surface.
2. Texture: Sandstone.
3. Colors: Color to be selected by Architect.

D. Core:

1. Material: Poured-in-place polyurethane foam.
2. Density: Minimum of 5 pounds per cubic foot.
3. R-Value: Minimum of 11.

E. Cutouts:

1. Manufacture doors with cutouts for required vision lites, louvers, and panels.
2. Factory install manufacturer's vision lites, louvers, and panels.

F. Hardware:

1. Premachine doors at factory in accordance with templates from specified hardware manufacturers and hardware schedule. Install panics, locks and hinges at the factory. Reinforce doors for closers, pull handles, push, pull and kickplates and door holders.

2.3 MATERIALS

A. Aluminum Members:

1. Extrusions: ASTM B 221.
2. Sheet and Plate: ASTM B 209.

3. Alloy and Temper: As required by manufacturer for strength, corrosion resistance, application of required finish, and control of color.
- B. Components: Door and frame components from same manufacturer.
- C. Fasteners:
1. Material: Aluminum, nonmagnetic stainless steel, or other noncorrosive metal.
 2. Compatibility: Compatible with items to be fastened.
 3. Exposed Fasteners: Screws with finish matching items to be fastened.

2.4 FABRICATION

- A. Sizes and Profiles: Required sizes for door and frame units, and profile requirements shall be as indicated on the drawings.
- B. Coordination of Fabrication: Field measure before fabrication and show recorded measurements on shop drawings.
- C. Assembly:
1. Complete cutting, fitting, forming, drilling, and grinding of metal before assembly.
 2. Remove burrs from cut edges.
- D. Welding: Welding of doors or frames is not acceptable.
- E. Fit:
1. Maintain continuity of line and accurate relation of planes and angles.
 2. Secure attachments and support at mechanical joints with hairline fit at contacting members.

2.5 ARCHITECTURAL PANELS

- A. FRP Panels:
1. Model: SL-20 Sandstone textured face sheets.
 2. Thickness: 1-inch
- B. Face Sheets:
1. Material: .120-inch thickness. Abuse-resistant engineered surface.

2. Texture: Sandstone.
 3. Color: To be selected by Architect
- C. Insulated 1" Speclite3 FRP Panels:
1. Insulated Panels: Two 0.120-inch minimum thickness sheets.
 2. Core: Foamed polyurethane core of a minimum of 5 pounds per cubic foot density.
 3. Form components to function as single unit.
 4. U-Value: Minimum of 0.13 for 1-inch panels.

2.6 ALUMINUM DOOR FRAMING SYSTEMS

- A. Tubular Framing:
1. Size and Type: As indicated on the drawings.
 2. Materials: Aluminum Alloy 6063-T5, 1/8-inch minimum wall thickness.
 3. Applied Door Stops: 0.625-inch high, with screws and weatherstripping.
 4. Frame Members: Box type with 4 enclosed sides. Open back framing is not acceptable. Provide radius profile at hinge side of double acting doors.
 5. Caulking: Caulk joints before assembling frame members.
 6. Joints:
 - a. Secure joints with fasteners.
 - b. Provide hairline butt joint appearance.
 7. Field Fabrication: Field fabrication of framing using stick material is not acceptable.
 8. Applied Stops: For side, transom, and borrowed lites and panels, with fasteners exposed on interior or unsecure portion only. Applied stops will incorporate pressure gasketing for weathering seal. Reinforce with solid bar stock fill for all frame hardware attachments.
 9. Hardware:
 - a. Premachine and reinforce frame members for hardware in accordance with manufacturer's standards and hardware schedule.
 - b. Factory install hardware.
 10. Anchors:

- a. Anchors appropriate for wall conditions to anchor framing to wall materials.
- b. Minimum of 5 anchors on jambs up to 7'-4" height, and 1 additional anchor for each additional foot of frame. Use 1/4" x 20 zinc plated screws, imbedded in subframe at least 1-1/2".
- c. Secure head and sill members of transom, side lites, and similar conditions.

2.7 HARDWARE

- A. Hinges: Continuous Hinge, Model SL-24 HD by Select, supplied by this section.
- B. Preps: Install, locks and hinges at the factory. Reinforce doors for closers, Pull handles, Push, pull and kickplates, door holders and pivot hinges where specified. Prepare doors and frames at factory for hinges, locksets, exit devices, stops/holders, pivot hardware using manufacturer's current templates.

2.8 LOUVERS

- A. Type: Aluminum, inverted Y-type, fixed blade, 12 inches minimum from bottom of door.
- B. Finish: See section 2.10
- C. Installation: Factory installed into standard vision lite kit. Exterior side of louver to be free of fasteners.
- D. Insect screen.

2.9 ALUMINUM FINISHES

- A. All anodized finished to be at least a Class I finish, 0.7 mils thick.
- B. Anodized: Frames, louvers , vision lites and door edges.
- C. Color: To be selected by the architect from the manufacturers clear, standard or optional selections.
 1. Clear 215 R1, AA-M10C12C22A41.
 2. Standard or Optional color , AA-M10C12C22A44.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive doors. Notify Architect of conditions that would adversely affect installation or subsequent utilization of doors. Do not proceed with installation until unsatisfactory conditions are corrected.

3.2 PREPARATION

- A. Ensure openings to receive frames are plumb, level, square, and in tolerance.

3.3 INSTALLATION

- A. Install doors in accordance with manufacturer's instructions. Doors and frames to be installed by Factory approved installers.
- B. Install doors plumb, level, square, true to line, and without warp or rack.
- C. Anchor frames securely in place.
- D. Separate aluminum from other metal surfaces with bituminous coatings or other means approved by Architect.
- E. Set thresholds in bed of mastic and backseal.
- F. Install exterior doors to be weathertight in closed position.
- G. Repair minor damages to finish in accordance with manufacturer's instructions and as approved by Architect.
- H. Remove and replace damaged components that cannot be successfully repaired as determined by Architect.

3.4 FIELD QUALITY CONTROL

- A. Manufacturer's Field Services: Manufacturer's representative shall provide technical assistance and guidance for installation of doors.

3.5 ADJUSTING

- A. Adjust doors, hinges, and lock sets for smooth operation without binding.

3.6 CLEANING

- A. Clean doors promptly after installation in accordance with manufacturer's instructions.
- B. Do not use abrasive cleaning materials or methods that would damage finish.

3.7 PROTECTION

- A. Protect installed doors to ensure that, except for normal weathering, doors will be without damage or deterioration at time of substantial completion.

END OF SECTION

SECTION 08-3113 - ACCESS DOORS AND PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes access doors for installation in the following types of construction:
 - 1. Gypsum drywall.
 - 2. Ceramic tile.
- B. Provide fire-rated access doors where indicated or scheduled.
- C. Provide painted steel access doors where access required at Gypsum Board or similar construction.
- D. Provide Stainless steel perforated frames and recessed faced doors to receive thin-set tile face finish at ceramic tile walls.

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
 - 1. Product data in form of manufacturer's technical data and installation instructions for each type of access door assembly, including setting drawings, templates, instructions, and directions for installation of anchorage, devices.
 - a. Include complete schedule, including types, general locations, sizes, wall and ceiling construction details, finishes, latching or locking provisions, and other data pertinent to installation.
 - 2. Shop drawings showing fabrication and installation of customized access doors and frames, including details of each frame type, elevations of door design types, anchorage and accessory items.
 - 3. Samples, 3 inches by 5 inches minimum size, of each panel face material showing factory-finished color and texture.

1.4 QUALITY ASSURANCE

- A. Single-Source Responsibility: Obtain access doors for entire project from one source from a single manufacturer.

- B. Fire-Resistance Ratings: Wherever a fire-resistance classification is indicated, provide access door assembly with panel door, frame, hinge, and latch from manufacturer listed in Underwriters Laboratories, Inc.'s "Building Materials Directory" for rating shown.
 - 1. Provide UL label on each fire-rated access door.
- C. Size Variations: Obtain Architect's acceptance of manufacturer's standard size units, which may vary slightly from sizes indicated.
- D. Coordination: Furnish inserts and anchoring devices that must be built into other work for installation of access doors. Coordinate delivery with other work to avoid delay.

1.5 PROJECT CONDITIONS

- A. Verification: Obtain specific locations and sizes for required access doors from trades requiring access to concealed equipment, and indicate on submittal schedule.
- B. Special-Size Access Doors: Use where required or requested; indicate on schedule.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering access doors that may be incorporated in the work include, but are not limited to, the following:
 - 1. Karp Associates, Inc.
 - 2. Milcor, Inc.
 - 3. Nystrom, Inc.
 - 4. or approved Equal

2.2 MATERIALS AND FABRICATION

- A. General: Furnish each access door assembly manufactured as an integral unit, complete with all parts, and ready for installation.
- B. Steel Access Doors and Frames: Fabricate units of continuous welded steel construction unless otherwise indicated. Grind welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of support shown.
- C. Frames: Fabricate from 16-gage steel.
 - 1. Fabricate frame with exposed flange nominal 1-inch wide around perimeter of frame for units installed in the following construction:
 - a. Exposed concrete.

- b. Drywall finish.
 2. Fabricate frame with concealed flange frame for units installed in the following construction:
 - a. Ceramic Tile.
 3. For gypsum drywall or gypsum veneer plaster, furnish perforated frames with drywall bead.
 4. For ceramic tile, furnish perforated frames and recessed faced doors to receive thin-set tile face finish.
- D. Flush Panel Doors: Fabricate from not less than 14-gage sheet steel, with concealed spring hinges or concealed continuous piano hinge set to open 175 degrees. Finish with manufacturer's factory-applied prime paint and Field Paint to match adjacent surface.
 1. For fire-rated units, provide manufacturer's standard insulated flush panel/doors, with continuous piano hinge and self-closing mechanism.
- E. Recessed Panel Doors: Fabricate from not less than 18-gage sheet steel with face of panel formed to provide recess below surface of applied finish. Reinforce panel as required to prevent buckling. Finish with manufacturer's factory-applied prime paint
 1. Furnish recessed panels for concealed installation where access is required in ceramic tile wainscots or walls.
- F. Locking Devices: Furnish flush, screwdriver-operated cam locks of number required to hold door in flush, smooth plane when closed.
 1. Provide one cylinder lock per access door. Furnish 2 keys per lock. Key all locks alike, unless otherwise scheduled.
 2. For recessed panel doors, provide access sleeves for each locking device. Furnish plastic grommets and install in holes cut through finish.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with manufacturer's instructions for installation of access doors.
- B. Coordinate installation with work of other trades.
- C. Where access panels are required at ceramic tile walls, coordinate location of access doors and adjacent wall grout layout so ceramic faced door grout line align with adjacent surface layout.
- D. Set frames accurately in position and securely attach to supports with face panels plumb or level in relation to adjacent finish surfaces.

3.2 ADJUST AND CLEAN

- A. Adjust hardware and panels after installation for proper operation.
- B. Remove and replace panels or frames that are warped, bowed, or otherwise damaged.

END OF SECTION

SECTION 08-7100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes items known commercially as finish or door hardware that are required for swing, sliding, and folding doors, except special types of unique hardware specified in the same sections as the doors and door frames on which they are installed.
- B. This Section includes the following:
 - 1. Hinges.
 - 2. Spring hinges.
 - 3. Lock cylinders and keys.
 - 4. Lock and latch sets.
 - 5. Bolts.
 - 6. Exit devices.
 - 7. Push/pull units.
 - 8. Closers.
 - 9. Overhead holders.
 - 10. Miscellaneous door control devices.
 - 11. Door trim units.
 - 12. Protection plates.
 - 13. Weatherstripping for exterior doors.
 - 14. Sound stripping for interior doors.
 - 15. Astragals or meeting seals on pairs of doors.
 - 16. Thresholds.
- C. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 6 Section "Interior Architectural Woodwork" for cabinet hardware.
 2. Division 8 Section "Standard Steel Doors and Frames" for silencers integral with hollow metal frames.
 3. Division 8 Section "Flush Wood Doors" for factory prefitting and factory premachining of doors for door hardware.
- D. Products furnished but not installed under this Section include:
1. Final replacement cores and keys to be installed by Owner.

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification sections.
- B. Product data including manufacturers' technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
- C. Final hardware schedule coordinated with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 1. Final Hardware Schedule Content: Based on hardware indicated, organize schedule into "hardware sets" indicating complete designations of every item required for each door or opening. Include the following information:
 - a. Type, style, function, size, and finish of each hardware item.
 - b. Name and manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of each hardware set cross referenced to indications on Drawings both on floor plans and in door and frame schedule.
 - e. Explanation of all abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for hardware.
 - g. Door and frame sizes and materials.
 2. Submittal Sequence: Submit final schedule at earliest possible date particularly where acceptance of hardware schedule must precede fabrication of other work that is critical in the Project construction schedule. Include with schedule the product data, samples, shop drawings of other work affected by door hardware, and other information essential to the coordinated review of schedule.
 3. Keying Schedule: Submit separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks has been fulfilled.

- D. Samples of each type of exposed hardware unit in finish indicated and tagged with full description for coordination with schedule. Submit samples prior to submission of final hardware schedule.
 - 1. Samples will be returned to the supplier. Units that are acceptable and remain undamaged through submittal, review, and field comparison process may, after final check of operation, be incorporated in the Work, within limitations of keying coordination requirements.
- E. Templates for doors, frames, and other work specified to be factory prepared for the installation of door hardware. Check shop drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

1.4 QUALITY ASSURANCE

- A. Single Source Responsibility: Obtain each type of hardware (latch and lock sets, hinges, closers, etc.) from a single manufacturer.
- B. Supplier Qualifications: A recognized architectural door hardware supplier, with warehousing facilities in the Project's vicinity, that has a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that employs an experienced architectural hardware consultant (AHC) who is available to Owner, Architect, and Contractor, at reasonable times during the course of the Work, for consultation.
 - 1. Require supplier to meet with Owner to finalize keying requirements and to obtain final instructions in writing.
- C. Fire-Rated Openings: Provide door hardware for fire-rated openings that complies with NFPA Standard No. 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed and are identical to products tested by UL, Warnock Hersey, FM, or other testing and inspecting organization acceptable to authorities having jurisdiction for use on types and sizes of doors indicated in compliance with requirements of fire-rated door and door frame labels.

1.5 PRODUCT HANDLING

- A. Tag each item or package separately with identification related to final hardware schedule, and include basic installation instructions with each item or package.
- B. Packaging of door hardware is responsibility of supplier. As material is received by hardware supplier from various manufacturers, sort and repackage in containers clearly marked with appropriate hardware set number to match set numbers of approved hardware schedule. Two or more identical sets may be packed in same container.
- C. Inventory door hardware jointly with representatives of hardware supplier and hardware installer until each is satisfied that count is correct.
- D. Deliver individually packaged door hardware items promptly to place of installation (shop or Project site).

- E. Provide secure lock-up for door hardware delivered to the Project, but not yet installed. Control handling and installation of hardware items that are not immediately replaceable so that completion of the Work will not be delayed by hardware losses both before and after installation.

1.6 MAINTENANCE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Butts and Hinges:
 - a. Hager Hinge Co.
 - b. Stanley Hardware, Div. Stanley Works.
 - c. Or approved equal
2. Continuous hinges
 - a. Pemko
 - b. Or approved equal
3. Cylinders and Locks: (District Standard No Substitute)
 - a. Schlage Lock, Div. Ingersoll-Rand Door Hardware Group.
4. Flush Bolts: (District Standard No Substitute)
 - a. Glynn-Johnson Corp.
5. Exit/Panic Devices: (District Standard No Substitute)
 - a. Von Duprin, Div. Ingersoll-Rand Door Hardware Group.
6. Push/Pull Units:
 - a. Hager Hinge Co.
 - b. H. B. Ives, A Harrow Company.
 - c. Or approved equal.
7. Overhead Closers:
 - a. Norton Door Controls, Div. Yale Security Inc.
 - b. LCN
8. Coordinators, (District Standard No Substitute)
 - a. Glynn-Johnson Corp.
9. Dust proof strikes: (District Standard No Substitute)

- a. Glynn-Johnson Corp.
- 10. Kick, Mop, and Armor Plates:
 - a. H. B. Ives, A Harrow Company.
 - b. Triangle Brass Manufacturing Company (Trimco).
 - c. Or approved equal
- 11. Door Stripping and Seals:
 - a. Hager Hinge Co.
 - b. National Guard Products, Inc.
 - c. Pemko Manufacturing Co., Inc.
 - d. Or approved equal
- 12. Thresholds:
 - a. National Guard Products, Inc.
 - b. Pemko Manufacturing Co., Inc.
 - c. Or approved equal
- 13. Astragals:
 - a. Hager Hinge Co.
 - b. National Guard Products, Inc.
 - c. Pemko Manufacturing Co., Inc.
 - d. Or approved equal
- 14. Stops
 - a. Glynn-Johnson Corp.
 - b. Or Approved equal

2.2 SCHEDULED HARDWARE

- A. Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of finish hardware are indicated in the "Hardware Schedule" at the end of this Section. Products are identified by using hardware designation numbers of the following:
 - 1. Manufacturer's Product Designations: The product designation and name of one manufacturer are listed for each hardware type required for the purpose

of establishing minimum requirements. Provide either the product designated or, where more than one manufacturer is specified under the Article "Manufacturers" in Part 2 for each hardware type, the comparable product of one of the other manufacturers that complies with requirements.

2. ANSI/BHMA designations used elsewhere in this Section or in schedules to describe hardware items or to define quality or function are derived from the following standards. Provide products complying with these standards and requirements specified elsewhere in this Section.

- a. Butts and Hinges: ANSI/BHMA A156.1.
- b. Bored and Preassembled Locks and Latches: ANSI/BHMA A156.2.
- c. Exit Devices: ANSI/BHMA A156.3.
- d. Door Controls - Closers: ANSI/BHMA A156.4.
- e. Auxiliary Locks and Associated Products: ANSI/BHMA A156.5.
- f. Architectural Door Trim: ANSI/BHMA A156.6.
- g. Template Hinge Dimensions: ANSI/BHMA A156.7.
- h. Door Controls - Overhead Holders: ANSI/BHMA A156.8.
- i. Interconnected Locks and Latches: ANSI/BHMA A156.12.
- j. Mortise Locks and Latches: ANSI/BHMA A156.13.
- k. Sliding and Folding Door Hardware: ANSI/BHMA A156.14.
- l. Closer Holder Release Devices: ANSI/BHMA A156.15.
- m. Auxiliary Hardware: ANSI/BHMA A156.16.
- n. Self-Closing Hinges and Pivots: ANSI/BHMA A156.17.
- o. Materials and Finishes: ANSI/BHMA A156.18.

2.3 MATERIALS AND FABRICATION

- A. Base Metals: Produce hardware units of basic metal and forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness, but in no case of lesser (commercially recognized) quality than specified for applicable hardware units by applicable ANSI/BHMA A156 series standards for each type of hardware item and with ANSI/BHMA A156.18 for finish designations indicated. Do not furnish "optional" materials or forming methods for those indicated, except as otherwise specified.
- B. Fasteners: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation. Do not provide hardware that has been prepared for self-tapping sheet metal screws, except as specifically indicated.

- C. Furnish screws for installation with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match hardware finish or, if exposed in surfaces of other work, to match finish of this other work as closely as possible including "prepared for paint" surfaces to receive painted finish.
- D. Provide concealed fasteners for hardware units that are exposed when door is closed except to the extent no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work unless their use is the only means of reinforcing the work adequately to fasten the hardware securely. Where thru-bolts are used as a means of reinforcing the work, provide sleeves for each thru-bolt or use sex screw fasteners.

2.4 HINGES, BUTTS, AND PIVOTS

- A. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
 - 1. Out-Swing Exterior Doors: Nonremovable stainless steel pins.
 - 2. Out-Swing Corridor Doors with Locks: Nonremovable pins.
 - 3. Interior Doors: Nonrising pins.
 - 4. Tips: Flat button and matching plug, finished to match leaves, except where hospital tip (HT) indicated.
- B. Hinge Height - Doors upto 41" to be 4 ½" inches
- C. Width – Sufficient to clear frame and trim when door is swung to 180 degrees.
- D. Provide number of hinges indicated but not less than 3 hinges per door leaf for doors 90 inches or less in height and one additional hinge for each 24 inches of additional height.
 - 1. Fire-Rated Doors: Not less than 3 hinges per door leaf for doors 86 inches or less in height with same rule for additional hinges.

2.5 CONTINUOUS HINGES

- A. As Manufactured by Pemko or Approved Equal. UL rated as required.

2.6 LOCK CYLINDERS AND KEYS

- A. Heavy Duty Cylindrical locks and latches: Schlage "D" Series as scheduled with "Sparta" lever handles with return within ½" of door. Exterior Locksets to be provided with vandlgard.
- B. Construct lock parts as follows:
 - 1. Locking Spindle: Stainless Steel, interlocking design

2. Latch retractors: forged steel. Balance of inner parts: Corrosion resistant plated steel or stainless steel.
3. Lever trim: Accessible design, independent operation, spring cage supported, minimum 2" clearance from lever mid-point to door face.
4. Locks shall be of such construction that when locked, the door may be opened from within by using lever without the use of a key or special knowledge.
5. Vandlgard Function: 5 year warranty, outside lever is disengaged, when in the locked mode.
6. Rosettes: Minimum 3- 7/16" diameter for coverage of ANSI/DHI A115. 18, 1994 door preparation, through-bolt lugs on both spring cages to fully engage . this pattern.
7. Springs: Full compression type-
8. Strikes: 16 gage curved steel, bronze or brass with 1" deep box construction, lips of sufficient Jength to c]ear trim and protect clothing.

C. Keying

1. Review the keying system with the Owner and provide the type required (master, grandmaster or great-grandmaster), either new or integrated with Owner's existing system.
2. Equip locks with cylinders for interchangeable-core pin tumbler inserts. Furnish only temporary inserts for the construction period, and remove these when directed.
 - a. provide final cores and keys directly to Owner.
3. Comply with Owner's instructions for masterkeying and, except as otherwise indicated, provide individual change key for each lock that is not designated to be keyed alike with a group of related locks.
4. Permanently inscribe each key with number of lock that identifies cylinder manufacturer's key symbol, and notation, "DO NOT DUPLICATE."
5. Key Material: Provide keys of nickel silver only.
6. Key Quantity: Furnish two (2) keys with each lock and six (6) master keys of each type. Master keys shall be delivered to the Owner in person or by registered mail. Receipts shall be required in both cases and turned over to the Architect.

2.7 EXIT DEVICES

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

1. Provide certification by independent testing laboratory that specified devices have completed over 1,000,000 cycles and still perform in accordance to ANSI/BHMA A156.3 -1994.
2. All internal parts shall be of cold-rolled steel with zinc dichromate coating.
3. Mechanism case shall have an average thickness of .140".
4. Compression spring engineering.
5. Non-handed basic device design with center case interchangeable with all functions.
6. All devices shall have quiet return fluid dampeners.
7. All latchbolts shall be deadlocking with 3/4" throw and have a self-lubricating coating to reduce friction and wear.
8. Device push bar must release when a force of 32 pounds, or less, of pressure is applied when a force of 250 pounds is applied to the door.
9. Device shall bear UL label for fire and/or panic as may be required.
10. All surface strikes shall be roller type and utilize a plate underneath to prevent movement.
11. Lever Trim: "Breakaway" design, forged brass or bronze escutcheon With a minimum of .130" thickness, match lockset lever design.
12. Removable Mullions: Removable with single turn of building key. Securely reinstalled without need for key.
13. Furnish glass bead kits for vision lites where required.
14. All Exit Devices to be sex-bolted to the doors.
15. Devices shall comply with UBC Standard 10-4 and shall be mounted between 30" and 44" above finished floor surface. The unlatching force shall not exceed 15 lbs. applied in the direction of travel. Panic hardware shall comply with CBC Section 1003.3.1.9
16. All devices to be double keyed with classroom security indicator.

2.8 CLOSERS:

- A. Norton as scheduled. Place closers inside building, stairs, room, etc.
 1. Furnish flat rectangular type closers with covers and listed finish for each location.
 - a. Mounted closer to allow maximum opening of all doors

2. Size all closers in accordance with manufacturer's recommendations and good standard practice. All closers shall be the products of a single manufacturer .
3. Provide all closers with adjustable backcheck as a standard feature, which at out swinging exterior doors, become effective at 45 degrees, allowing door to swing 180 degrees. All closers shall incorporate a spring which allows for a 50% increase in power.
4. Drop brackets are required at narrow head rails.
5. Closers shall be adjusted to operate with the minimum amount of opening force and still close and latch the door and not exceed 5 lbs. for interior doors, 5 lbs. for exterior doors and 15 lbs. for fire-rated doors if allowed by authority having jurisdiction otherwise 5 lbs. Reference CBC Sections 1133B.2.1, 1133B.2.5, 1133B2.5.1 & 1003.3.1,8.
6. Closer shall be adjusted to provide at least 3 seconds to move from a 70% open position to 3 inches from the latch, measured to the landing edge of the door.
7. Provide sex-bolted or through bolt mounting for all door closers.

2.9 PUSH/PULL UNITS

- A. Concealed Fasteners: Provide manufacturer's special concealed fastener system for installation, thru-bolted for matched pairs but not for single units.

2.10 MISCELLANEOUS MATERIALS

- A. Flush Bolts & Dust Proof Strikes: Glynn-Johnson as scheduled.
 1. Automatic Flush Bolts shall be of the low operating force design. Utilize the top bolt only model for interior doors where applicable and as permitted by testing procedures.
 2. Manual flush bolts only permitted on storage or mechanical openings as scheduled.
 3. Provide dust proof strikes at openings using bottom bolts .
- B. Coordinators: Glynn-Johnson as scheduled e.
 1. Coordinator shall be a 1-5/8" wide by 5/8" high aluminum channel with the length variable to the door opening. It shall have a safety mechanism which will allow the active door to close first if under extreme pressure.
- C. Door Stops: Glynn-Johnson as scheduled.
 1. Unless otherwise noted in Hardware Sets, provide wall type with appropriate fasteners. Where wall type cannot be used, provide floor type. If neither can be used, provide overhead type.

2. Floor stops shall not be located in the path of travel and at a maximum of 4" from walls or partitions.
 3. Overhead stops shall be made of stainless steel and non-plastic mechanisms and finished metal end caps. Field-changeable hold-open, friction and stop-only functions.
- D. Protection Plates: Fabricate either kick, armor, or mop plates with three beveled edges. Provide kick plates in size and location indicated in drawings. Sizes of armor and mop plates shall be listed in the Hardware Schedule. Furnish with machine or wood screws of bronze or stainless to match other hardware.
- E. Lock Protectors: Lock astragals shall be provided with internal threaded fasteners for flat head machine screws. No hex head or carriage bolt fasteners will be permitted. Must be through bolted to door. Field verify lock protectors will fit on doors prior to fabricating.
- F. Thresholds: As Scheduled and per details.
1. Thresholds shall not exceed 1/2" in height, with a beveled surface of 1:2 maximum slope.
 2. Set thresholds in a full bed of butyl-rubber or polyisobutylene mastic sealant complying with requirements in Division 7 "Thermal and Moisture Protection".
 3. Use 1/4" fasteners, red-head flat-head sleeve anchors (SS/FHSL).
 4. Thresholds shall comply with CBC Section 1133B.2.4.1.
- G. Rain Drips: Provide rain drips at the heads of all exterior doors where there is not a sufficient building overhang to protect the opening.
- H. Door Shoes & Door Top Caps; Provide door shoes at all exterior wood doors and top caps at all exterior out-swing doors.
- I. Silencers: Furnish silencers for interior hollow metal frames, 3 for single doors, 2 for pairs of doors. Omit where sound or light seals occurs, or for fire-resistive-rated door assemblies.

2.11 WEATHERSTRIPPING AND SEALS

- A. General: Provide continuous weatherstripping on exterior doors and smoke, light, or sound seals on interior doors where indicated or scheduled. Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.
- B. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strip is easily replaceable and readily available from stocks maintained by manufacturer.
- C. Seals: Sponge silicone gasketing to meet ASTM E 283- 1984 test standards. Provide silicone gasket at all rated and exterior doors.

1. Weatherstripping at Door Bottoms: Provide threshold consisting of contact-type resilient insert and metal housing of design and size scheduled.

2.12 HARDWARE FINISHES

- A. Match items to the manufacturer's standard color and texture finish for the latch and lock sets.
- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware.
- C. The designations used in schedules and elsewhere to indicate hardware finishes are those listed in ANSI/BHMA A156.18, "Materials and Finishes," including coordination with the traditional U.S. finishes shown by certain manufacturers for their products.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Mount hardware units at heights indicated in following applicable publications, except as specifically indicated or required to comply with governing regulations and except as otherwise note on the drawings or directed by Architect.
 1. Mount door levers, push and pull plates as indicated on drawings.
 2. "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute.
 3. NWWDA Industry Standard I.S.1.7, "Hardware Locations for Wood Flush Doors."
- B. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Where cutting and fitting is required to install hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation or application of surface protection with finishing work specified in the Division 9 Sections. Do not install surface-mounted items until finishes have been completed on the substrates involved.
- C. Set units level, plumb, and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- D. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
- E. Set thresholds for exterior doors in full bed of butyl-rubber or polyisobutylene mastic sealant complying with requirements specified in Division 7 Section "Joint Sealers."
- F. Weatherstripping and Seals: Comply with manufacturer's instructions and recommendations to the extent installation requirements are not otherwise indicated.

3.2 ADJUSTING, CLEANING, AND DEMONSTRATING

- A. Adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate freely and smoothly or as intended for the application made.
 - 1. Where door hardware is installed more than one month prior to acceptance or occupancy of a space or area, return to the installation during the week prior to acceptance or occupancy and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.
- B. Clean adjacent surfaces soiled by hardware installation.
- C. Instruct Owner's personnel in the proper adjustment and maintenance of door hardware and hardware finishes.
- D. Six-Month Adjustment: Approximately six months after the date of Substantial Completion, the Installer, accompanied by representatives of the manufacturers of latchsets and locksets and of door control devices, and of other major hardware suppliers, shall return to the Project to perform the following work:
 - 1. Examine and re-adjust each item of door hardware as necessary to restore function of doors and hardware to comply with specified requirements.
 - 2. Consult with and instruct Owner's personnel in recommended additions to the maintenance procedures.
 - 3. Replace hardware items that have deteriorated or failed due to faulty design, materials, or installation of hardware units.
 - 4. Prepare a written report of current and predictable problems (of substantial nature) in the performance of the hardware.

5.

3.3 HARDWARE SCHEDULE

A. General: Provide hardware for each door to comply with requirements of Section "Door Hardware," and Hardware Groups as follows:

Hardware Group # 1 – Exterior Exit Door				
Quantity	Item	Manufacturer	Product No.	Finish
3	Hinges	Hager	BB1168	619
1	Entrance Security Lock	Schlage	ND92PD SPA	619
1	Closer	LCN	4040XP-EDA	689E
1	Stop & Hold	Ives	FS495	630
1	Kick Plate	Ives	8400	
1	Vandal Resistant trim	Ives	LG13	630
1	Threshold	Pemko	1665	A
1	Door Sweep	Pemko	216BDCFG	
1	Weatherstripping	Pemko	303AS	

Hardware Group # 2 – Restroom - Re-use existing doors and hardware
--

END OF SECTION

SECTION 08-9119 - FORMED METAL LOUVERS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Formed-Metal Louvers:

1. Horizontal stationary louver.
2. Horizontal stationary louver installed with hinged framed

1.2 RELATED SECTIONS

- A. Section 05-5000 - Metal Fabrications.
- B. Section 07-9200 - Joint Sealants.
- C. Section 09-9000 - Painting.

1.3 REFERENCES

A. Air Movement and Control Association International (AMCA):

1. AMCA 500-L - Laboratory Methods of Testing Louvers for Rating.
2. AMCA 501 - Application Manual for Air Louvers.
3. AMCA 511 - Certified Ratings Program - Product Rating Manual for Air Control Devices.
4. AMCA 512 - AMCA Listing Label Program. Water and Air Certification.

B. ASTM International (ASTM):

1. ASTM A 653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
2. ASTM A 666 - Standard Specification for Annealed or Cold Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
3. ASTM A 788 - Standard Specification for Steel Forgings, General Requirements.
4. ASTM B 26 - Standard Specification for Aluminum Alloy Sand Castings.
5. ASTM B 209 - Standard Specification for Aluminum and Aluminum Alloy Sheet and Plate.
6. ASTM B 221 - Standard Specification for Aluminum and Aluminum Alloy Rolled or Cold Finished Bar, Rod, and Wire.

7. ASTM C 578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.
 8. ASTM C 612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation.
 9. ASTM D822 - Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.
 10. ASTM D 1187 - Standard Specification for Asphalt Base Emulsions for Use as Protective Coatings for Metal.
 11. ASTM D4214 - Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films.
 12. ASTM D2244 - Standard Test Method for Calculation of Color Differences From Instrumentally Measured Color Coordinates.
 13. ASTM E 90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
 14. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
 15. ASTM E 413 - Classification for Rating Sound Insulation.
- C. American Architectural Manufacturer's Association (AAMA).
1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.
 2. AAMA 2603 - Voluntary Specification. Performance Requirements and Test Procedures For. Pigmented Organic Coatings on Aluminum Extrusions.
 3. AAMA 2604 - High Performance Organic Coatings on Architectural Extrusions and Panels.
 4. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum.
 5. National Association of Architectural Metal Manufacturers (NAAMM): Metal Finishes Manual for Architectural and Metal Products.
 6. Sheet Metal and Air Conditioning Contractors' National Association (SMACNA): Architectural Sheet Metal Manual.
- 1.4 DEFINITIONS
- A. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section, unless otherwise defined in this Section or in referenced standards.
 - B. Drainable-Blade Louver: Louver designed to collect and drain water to exterior at sill by means of gutters in front edges of blades and channels in jambs and mullions.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's data sheets for each product and assembly specified.
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Cleaning methods.
- C. Shop Drawings: For units and accessories. Include plans; elevations; sections; and details showing profiles, angles, and spacing of elements. Show unit dimensions related to wall openings and adjacent construction; free area for each size indicated for louvers; profiles of frames at jambs, heads, and sills; anchorage and when applicable hinged and locking details. Identify locations where each type is to be installed.
 - 1. Verify openings by field measurements before fabrication and indicate measurements on Shop Drawings.
- D. Product Certificates:
 - 1. Air Performance: Certificates signed by Air Movement and Control Association International Inc (AMCA) certifying that the manufacturer's stock units are tested in accordance with AMCA Standard 500 and are licensed to bear the AMCA Certified Ratings Seal in accordance with AMCA Standard 511.
 - 2. Water Penetration: Certificates signed by Air Movement and Control Association International Inc (AMCA) certifying that the manufacturer's stock units are tested in accordance with AMCA Standard 500 and are licensed to bear the AMCA Certified Ratings Seal in accordance with AMCA Standard 511.
 - 3. Weather Louver Effectiveness: Certificates signed by Air Movement and Control Association International Inc (AMCA) certifying that the manufacturer's stock units are tested in accordance with AMCA Standard 500-L99, Section 8.3.2 - Wind Driven Rain Water Penetration Test, and are licensed to bear the AMCA Certified Ratings Seal in accordance with AMCA Standard 511.
 - 4. Provide AMCA Certification - Water, Air for louvers as scheduled.
- E. Samples for Verification: For each finish specified, two samples representing actual finishes specified; prepared on Samples of same thickness and material indicated for final Work. Where finishes involve normal color and texture variations, include Sample sets showing the full range of variations expected.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Minimum 5 years manufacturing similar products. The manufacturer shall have implemented a program for the management of quality

objectives, continual improvement, and monitoring of customer satisfaction to assure that customer needs and expectations are met.

- B. Source Limitations: Obtain products through one source from a single manufacturer where alike in one or more respects regarding type, design, or factory-applied color finish.
- C. Welding Standards: As follows:
- D. Comply with AWS D1.3, "Structural Welding Code - Sheet Steel."
- E. AMCA Standard 500-L: Air performance, water penetration and air leakage ratings shall be determined in accordance with Air Movement and Control Association International Inc (AMCA) Standard 500, "Laboratory Methods of Testing Louvers for Rating."
- F. SMACNA Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" recommendations for fabrication, construction details, and installation procedures.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store and handle materials and products in strict compliance with manufacturer's instructions and recommendations and industry standards.
- B. Store products indoors in manufacturer's or fabricator's original containers and packaging, with labels clearly identifying product name and manufacturer. Protect from damage.
- C. Handling: Protect materials and finishes during handling and installation to prevent damage.

1.8 SEQUENCING AND SCHEDULING

- A. Field Measurements: Verify openings and adjacent construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating products without field measurements. Coordinate construction to ensure that actual opening dimensions correspond to established dimensions.
 - 2. Coordinate Setting Drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

1.9 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.10 WARRANTY

- A. Manufacturer's Warranty: Provide manufacturer's standard limited warranty for louver systems for a period of 1 year from date of installation, no more than 18 months after shipment from manufacturing plant. When notified in writing from the Owner of a manufacturing defect, manufacturer shall promptly correct deficiencies without cost to the Owner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: AiroLite Co.
- B. Ruskin Manufacturing
- C. Or Approved Equal

2.2 LOUVERS, GRILLES AND VENTS - GENERAL.

- A. Louver shall be of welded construction and furnished with bird screen, insect screen, sill pans, supports, installation hardware and finishes as specified or required for a complete installation.
- B. The supporting structure shall be designed to accommodate the point loads transferred by the louvers when subject to the design wind loads.
- C. Performance Requirements:
 - 1. Structural Performance: Provide products capable of withstanding the effects of loads and stresses from wind and normal thermal movement without evidencing permanent deformation of components including blades, frames, and supports; noise or metal fatigue caused by component rattle or flutter; or permanent damage to fasteners and anchors.
 - a. Temperature Change (Range): 120 degrees F (67 degrees C), ambient; 180 degrees F (100 degrees C), material surfaces.
 - 2. Air-Performance, Water-Penetration, and Air-Leakage Ratings: Provide louvers complying with performance requirements indicated, as demonstrated by testing manufacturer's stock units 48 inches (1220 mm) wide by 48 inches (1220 mm) high. Test units according to AMCA 500.
 - a. Perform testing on unpainted, cleaned, degreased units.
 - b. Perform water-penetration testing on louvers without screens.
- D. Fabrication:
 - 1. Maintain equal louver blade spacing to produce uniform appearance.
 - 2. Fabricate frames, including integral sills for louvers, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining materials' tolerances, and perimeter sealant joints.

3. Include supports, anchorages, and accessories required for complete assembly.
4. Louvers shall be of welded construction.

2.3 FORMED-METAL LOUVERS

- A. AMCA Seal: Mark units with AMCA Certified Ratings Seal.
- B. Formed-Metal Louvers: Horizontal Stationary Louvers as manufactured by The Airo-lite Co. or equal
 1. Product: When called on plans install with continuous and lockable from interior to provide access to service or replace equipment.

2.4 MESH AT LOUVERS AND GRILLES INTO ATTICS AND CONCEALED SPACES

- A. Provide metal mesh to rear of vents/ louvers /grilles with a minimum opening of 1/16 inch and maximum of 1/8 inch to meet SFM standards to prevent flames and burning ember intrusion.

2.5 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish units after assembly.

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

- A. Prepare substrates and openings using methods recommended by manufacturer for achieving best result for substrates under project conditions.
- B. Do not proceed with installation until substrates and nailers have been prepared using the methods recommended by the manufacturer and deviations from manufacturer's recommended tolerances are corrected. Commencement of installation constitutes acceptance of conditions.
- C. If preparation is the responsibility of another installer, notify Architect in writing of deviations from manufacturer's recommended installation tolerances and conditions.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
 1. Locate and place units level, plumb, and at indicated alignment with adjacent work.
 2. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.

3. Form closely fitted joints with exposed connections accurately located and secured.
 4. Provide perimeter reveals and openings of uniform width for sealants and joint fillers as indicated on Drawings.
 5. Repair finishes damaged by cutting, welding, soldering, and grinding. Restore finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory, make required alterations, and refinish entire unit or provide new units.
 6. Protect galvanized and nonferrous-metal surfaces from corrosion or galvanic action by applying a heavy coating of bituminous paint on surfaces that will be in contact with concrete, masonry, or dissimilar metals.
- B. Install with continuous hinged frame and interior locking bolts where called on plans for equipment replacement access.
- C. Install concealed gaskets, flashings, joint fillers, and insulation, as installation progresses, where weathertight joints are required. Comply with Division 7 Section "Joint Sealants" for sealants applied during installation.

3.3 ADJUSTING, CLEANING AND PROTECTION

- A. Test operation of adjustable louvers and adjust as needed to produce fully functioning units that comply with requirements.
- B. Protect products from damage until completion of project. Use temporary protective coverings where needed and approved by manufacturer. Remove protective covering at the time of Substantial Completion.
- C. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 09-0511 - PREPARATION OF CONCRETE FOR FINISH FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Mechanical cleaning of new concrete floor surfaces for application of the following finishes:
 - a. Sealers.
 - b. Coatings.

1.3 RELATED REQUIREMENTS

- A. Section 01-6116 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 01-6110 - CalGreen Design Requirements.
- C. Section 03-3000 - Cast-In-Place Concrete for concrete floor slabs.
- D. Section 07-2633 - Water Vapor Emission Barrier for Flooring.
- E. Division 9 Sections for applied floor finishes.

1.4 REFERENCES

- A. California Code of Regulations, Title 24, Part 11 California Green Building Standards Code, "CAL-Green".
- B. California Code of Regulations, Title 24, Part 2, California Building Code (CBC), International Building Code 2012, with 2013 California Amendments.

1.5 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."
 - 1. Review conditions affecting substrate preparation.
 - 2. Review procedures that will be used for substrate preparation.
 - 3. Require attendance by Water Vapor Emission Control and Finish Flooring installers to review preparation requirements of floor finish product and flooring adhesive manufacturers

1.6 SUBMITTALS

- A. Product Data: For each type of mechanical cleaning equipment used on the project.
- B. Informational Submittals
 - 1. Qualification Data: For Installer performing surface preparation.
 - 2. Field quality-control reports.
 - a. Submit report of observations.
 - b. Certify installation is complete in accordance with manufacturer's instructions.
 - c. Indicate supplementary instructions provided for Project specific conditions.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained in the use of the equipment and techniques required to produce the specified results.
- B. Mockups: Provide field mockups to set quality standards for surface preparation execution and for preconstruction testing.
 - 1. Provide mockup of typical surface preparation, minimum 100 sq. ft. area. Coordinate required size with requirements for preconstruction testing.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work when undisturbed at time of Substantial Completion.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify new concrete floors have cured minimum 28 days.
- B. Examine substrates, with Installer (s) present, for compliance with requirements for surface contamination, damage, and other conditions affecting performance of the Work.
- C. Examine substrate to determine repairs required to restore substrate surface to be within tolerances required for floor finishes specified in other sections, prior to completing Work of this section.

- D. Examine substrate to verify surfaces prepared in accordance with this section will be suitable for application of finishes specified in other sections.
- E. Prepare written report, endorsed by Installer, listing conditions detrimental to performance with recommendations for methods and materials required to correct conditions before proceeding with work of this section.
- F. Proceed with surface preparation only after unsatisfactory conditions have been corrected. 1. Proceeding with surface preparations indicates acceptance of surfaces and conditions of substrate.

3.2 SURFACE PREPARATION EQUIPMENT

- A. Mechanical Cleaning Equipment Automatic, dry shot blast type, self contained capable of recycling blast materials and collecting surface abrasions.

3.3 SURFACE PREPARATION

- A. Mechanically clean concrete substrate and create surface profile in existing concrete substrate in accordance with ASTM D 4259.
 - 1. Mechanically clean concrete substrate to remove surface and penetrating contaminants to produce a surface profile of ICRI CSP 3 minimum, and greater as required by coating manufacturer in related sections, all in accordance with ICRI Technical Bulletin No. 03732.
 - 2. Acceptable substrate surfaces will be free of laitance, oil, grease, flooring adhesive, paint, and other surface contaminants capable of affecting bond of specified floor finishes to concrete substrate.
- B. Repair surface irregularities after cleaning.
 - 1. Fill bugholes, spalls, cracks, deteriorated joints and other surface damage exposed or created as a result of substrate cleaning operations flush with adjacent surfaces to provide sound substrate for specified floor finish.
- C. Dry broom or vacuum clean concrete substrates immediately before application of specified floor finishes in accordance with ASTM D 4258 to remove loose materials on substrate surface.

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing and inspecting agency to perform the following field tests and inspections and prepare test reports:
 - 1. Visual inspection of completed substrate preparation to verify contamination is removed.
 - 2. Visual inspection of completed substrate preparation to verify surface profile matches ICRI profile required for specified coating or finish, using ICRI standard rubber mold for visual comparison.
 - 3. Prepare field quality control report Clearly indicate the locations, extents, and conditions of areas where surface preparation does not conform to specified

profile and cleanliness. Document observed conditions with digital photographs.

4. Repeat inspections when additional surface preparation for unsatisfactory conditions indicated in the previous field quality control report

3.5 PROTECTION

- A. Protect prepared concrete substrates from contamination. Reclean substrates that are contaminated by construction operations prior to installation of specified floor finishes.

END OF SECTION

SECTION 09-2900 - GYPSUM WALLBOARD SYSTEM

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work included: Provide gypsum drywall and accessories where shown on the drawings, as specified herein, and as needed for a complete and proper installation.
 - 1. Related work: Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of -these Specifications.

1.2 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen thoroughly trained and experienced in the necessary crafts and completely familiar with the specified requirements and methods needed for proper performance of the work of this Section.

1.3 SUBMITTALS

- A. Comply with pertinent provisions of Section 01340.
 - 1. Product data: Within 75 calendar days after the Contractor has received the Owner's Notice to Proceed, submit: Materials list of items proposed to be provided under this Section;
 - 2. Manufacturer's specifications and other data needed to prove compliance with , the specified requirements;
- B. Mock-ups:
 - 1. At the site, provide a mock-up gypsum wallboard panel.
 - a. Make the panel approximately 4'-0" square.
 - b. Provide one mock-up panel for each gypsum wallboard finish used on the Work.
 - c. The mock-ups may not be used as part of the Work.
 - d. Revise as necessary.
 - 2. The mock-up panels will be used as the standard of comparison with the remainder of the work of this Section for the purpose of acceptance or rejection.
 - 3. Completely demolish and remove mock-up from the job site upon completion and acceptance of the work of this Section.

1.4 JOB CONDITIONS

- A. Areas to receive gypsum board shall be examined for defects and irregularities and no gypsum board shall be applied to defective or irregular surfaces until after suitable corrections have been made. Gypsum board shall not be installed until the building is closed in, weatherproofed, and permanent or temporary heat is available.

1.5 STANDARDS

- A. All materials and installation shall be in strict accordance with manufacturer's directions and insofar as any portion is applicable, the manufacturer's printed instructions are hereby made a direct part of this specification.
- B. All materials of each gypsum wallboard system shall be from the same manufacturer, i.e., gypsum wallboard, adhesive, accessories, joint compound, etc., and shall have manufacturer's recommendation for use in the system.

1.6 PRODUCT HANDLING

- A. Comply with pertinent provisions of Section 01640.
- B. Gypsum board materials shall be delivered and stored in a dry, covered space and protected from moisture. Material shall be covered with plastic sheets until ready for installation.

PART 2 - PRODUCTS

2.1 GYPSUM WALLBOARD

- 1. General: Provide gypsum wallboard complying with ASTM Standard C 36-87 (Fed Spec SS-L-30D), in 48" widths and in such lengths as will result in a minimum of joints.
- 2. Regular wallboard: Provide type III, grade R, class 1, (ASTM C 36-87), 5/8" thick except as may be shown otherwise on the Drawings.
- 3. Fire-retardant wallboard: Provide type III, grade X, class 1, (ASTM C 36-87), 5/8" thick.
- 4. Hi-impact - Mold Resistant wallboard: Abuse Resistance Level 2 or better, except level 1 for indentation, (ASTM C1629) Mold resistance (ASTMD3273) ; 5/8" thick.
- B. Acceptable manufacturer:
 - 1. U.S.G. Gypsum Wallboard
 - 2. Georgia Pacific Gypsum
 - 3. National Gypsum Company
 - 4. Or equal approved by architect.

2.2 METAL TRIM

- A. Form from zinc-coated steel not lighter than 26 gage, complying with Fed Spec QQ-S-775, type I, class D or E.
 - 1. Casing beads: Provide channel-shapes with an exposed wing, and with a concealed wing not less than 7/8" wide.
 - 2. The exposed wing may be covered with paper cemented to the metal, but shall -be suitable for joint treatment.
- B. Comer beads: Provide angle shapes with wings not less than 1-1/8" wide and perforated for nailing and joint treatment.
 - 1. Edge beads for use at perimeter of ceilings: Provide angle shapes with wings not less than 3/4 " wide .
 - 2. Provide concealed wing perforated for nailing, and exposed wing edge folded flat.
 - 3. Exposed wing may be factory finished in white color.

2.3 JOINTING SYSTEM

- A. Provide a jointing system, including reinforcing tape and compound, designed as a system to be used together and as recommended for this use by the manufacturer of the gypsum wallboard approved for use on this Work.
- B. Jointing compound may be used for finishing if so recommended by its manufacturer.

2.4 FASTENING DEVICES

- A. For fastening gypsum wallboard in place on metal studs and metal channels, use flat-head screws, shouldered, specially designed for use with power-driven tools, not less than 1-5/8" long, with self-tapping threads and self-drilling points.
- B. For fastening gypsum wallboard in place on wood, use not less than 1-5/8" long type G bugle-head screws.

2.5 ACCESS DOORS

- A. In partitions and ceilings installed under this Section, provide doors where required for access to mechanical installations and electrical installations.
- B. Types:
 - 1. see Section 8-3113 – Access Doors

2.6 TACK BOARD SUBSTRATE

- A. Acceptable products:

1. FlameSpec manufactured by Celotex Blue Ridge fiber board, subsidiary of WR Meadows
 2. Microe Mineral Fiber board 300 manufactured by USG.
 3. Equal products of other manufacturers when approved by the Architect.
- B. Provide tack board base where tackable wall surfaces are indicated. Tack board – substrate shall be 1/2" x 4' x 8'. Tape all joints. One side shall have a smooth, laminated quality surface.
1. Substrate Characteristics:
 - a. Thickness 1/2"
 - b. Flame Spread: 20, per ASTM E 84
 - c. Smoked Developed: 30, per ASTM E 84
 - d. Classification: Class A, per NFPA

2.7 OTHER MATERIALS

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the review of the Architect.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. General

1. Install the gypsum wallboard in accordance with the Drawings and with the separate boards in moderate contact but not forced into place.
2. At internal and external corners, conceal the cut edges of the boards by the overlapping covered edges of the abutting boards.
3. Stagger the boards so that corners of any four boards will not meet at a common point except in vertical corners.
4. Ceilings: Install the gypsum wallboard to ceilings with the long dimension of the wallboard at right angles to the supporting members.

5. Wallboard may be installed with the long dimension parallel to supporting members that are spaced 16" on centers when attachment members are provided at end joints.

B. Walls and Ceilings

1. Install the gypsum wallboard to studs at right angles to the furring or framing members.
2. Make end joints, where required, over framing or furring members.
3. Attaching: Drive the specified screws with clutch-controlled power screwdrivers, spacing the screws 12" on centers at ceilings and 16" on centers at walls.
4. Where framing members are spaced 24" apart on walls space screws 12" on centers.
5. Attach double layers in accordance with the pertinent codes and the manufacturer's recommendations.
6. Attach to wood as required by governmental agencies having jurisdiction.
7. Access doors: By careful coordination with the Drawings and with the trades involved, install the specified access doors where required.
8. Anchor firmly into position, and align properly to achieve an installation flush with the finished surface.

3.3 JOINT TREATMENT

1. General: Inspect areas to be joint treated, verifying that the gypsum wallboard fits snugly against supporting framework.
2. In areas where joint treatment and compound finishing will be performed, maintain a temperature of not less than 55 degrees for 24 hours prior to commencing the treatment, and until joint and finishing compounds have dried.
3. Apply the joint treatment and finishing compound by machine or hand tool.
4. Provide a minimum drying time of 24 hours between coats, with additional drying time in poorly ventilated areas.
5. Embedding compounds: Apply to gypsum wallboard joints and fastener heads in a thin uniform layer.
6. Spread the compound not less than 3" wide at joints, center the reinforcing tape in the joint, and embed the tape in the compound. Then spread a thin layer of compound over the tape.

7. After this treatment has dried, apply a second coat of embedding compound to joints and fastener heads, spreading in a thin uniform coat to not less than 6" wide at joints, and feather edged.
8. Sandpaper between coats as required.
9. When thoroughly dry, sandpaper to eliminate ridges and high points.
10. Finishing compounds: After embedding compound is thoroughly dry and has been completely sanded, apply a coat of finishing compound to joints and fastener heads.
11. Feather the finishing compound to not less than 12" wide.
12. When thoroughly dry, sandpaper to obtain a uniformly smooth surface, taking care to not scuff the paper surface of the wallboard.

3.4 CORNER TREATMENT

- A. Internal corners: Treat as specified for joints, except fold the reinforcing tape; lengthwise through the middle and fit neatly into the corner.
 1. External corners: Install the specified corner bead, fitting neatly over the corner and securing with the same type fasteners used for installing the wallboard.
 2. Space the fasteners approximately 6" on centers, and drive through the wallboard into the framing or furring member.
 3. After the corner bead has been secured into position, treat the corner with joint compound and reinforcing tape as specified for joints, feathering the joint compound out from 8" to 10" on each side of the corner.

3.5 OTHER METAL TRIM

1. General: The Drawings do not purport to show all locations and requirements for metal trim.
2. Carefully study the Drawings and the installation, and provide all metal trim normally recommended by the manufacturer of the gypsum wallboard approved for use in this Work.

3.6 WALL AND CEILING FINISH

- A. At concealed areas, plenums provide a Level 1 finish; all joints and interior angles shall have tape embedded in joint compound. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable.
- B. At surfaces where moisture resistant gypsum board is to be used as a backing board for tile provide a Level 2 finish; all joints and interior angles shall have tape embedded in joint compound and one separate coat of joint compound applied over all joints, angles, fasteners heads, and accessories. surface shall be free of excess joint compound. Tool marks and ridges are acceptable.

- C. At surfaces where light textures and flat paint are scheduled provide a Level 4 finish; all joints and interior angles shall have tape embedded in joint compound and three separate coats of joint compound applied over all joints, angles, fasteners heads, and accessories. All joint compound shall be smooth and free of tool marks and ridges. Prepare the surface to be coated with a primer/sealer prior to the application of final finishes. Do not use gloss or semi-gloss paint over this assembly.
- D. At surfaces where gloss or semi-gloss paint or wall covering are scheduled or where severe lighting conditions occur provide a Level 5 finish; all joints and interior angles , shall have tape embedded in joint compound and three separate coats of joint compound applied over all joints, angles, fasteners heads, and accessories. A thin skim coat of joint compound, or a material manufactured especially for this purpose, shall be applied to the entire surface. The surface shall be smooth and free from tool marks and ridges. Prepare the surface to be coated with a primer / sealer prior to the application of final finishes. Provide a smooth texture free surface for areas scheduled to receive wall covering. For areas to receive gloss or semi-gloss paint smooth walls or a light texture may be scheduled.
- E. For all areas required to receive a textured finish; Submit samples to Architect for approval. Do not begin work until the wall texture sample has been approved by the Architect. Samples shall not be done on the finished walls.

3.7 WALL AND CEILING FINISH SCHEDULE

AREA	FINISH
Concealed spaces	Fire tape
Flat Painted areas	“Orange Peel” light spray
Gloss or Semi-gloss painted areas	“Orange Peel” light spray
Acoustical Tile – Non rated condition	No Finish necessary
Acoustical Tile – rated condition	Fire Tape

3.8 CLEANING UP

- A. In addition to other requirements for cleaning, use necessary care to prevent scattering gypsum wallboard scraps and dust, and to prevent tracking gypsum and joint finishing compound onto floor surfaces.
- B. At completion of each segment of installation in a room or space, promptly pick up and remove from the working area all scrap, debris, and surplus material of this Section.

END OF SECTION

SECTION 09-6543 - LINOLEUM TILE FLOORING

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.
- B. Section 01-4525 Testing Concrete Floor for Moisture and PH
- C. Section 07-2633 Water Emmissions Control for Flooring

1.2 SUMMARY

- A. This Section includes the following:
 - 1. MCT: 13" x 13" Linoleum Floor Tiles
 - 2. Modular Floor Tiles 10"x10", 10"x20", 20" x 20"
- B. Resilient wall base, reducer strips, and other accessories installed with resilient floor tiles are specified in Division 9 Section "Resilient Wall Base and Accessories."

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product data for each type of product specified.
 - 1. Certification by tile manufacturer that products supplied for tile installation comply with local regulations controlling use of volatile organic compounds (VOC's).
- C. Samples for verification purposes in full-size tiles of each different color and pattern of resilient floor sheet or tile specified, showing full range of variations expected in these characteristics.
- D. Product certificates, in lieu of laboratory test reports when permitted by Architect, signed by manufacturer certifying that each product complies with requirements.
- E. Maintenance data for resilient floor sheet goods and tile, to include in Operating and Maintenance Manual specified in Division 1.

1.4 QUALITY ASSURANCE

- A. Single-Source Responsibility for Floor sheet goods and Tile: Obtain each type, color, and pattern of tile from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.

- B. Fire Performance Characteristics: Provide resilient floor tile with the following fire performance characteristics as determined by testing products per ASTM test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.

- 1. Critical Radiant Flux: 0.45 watts per sq. cm or more per ASTM E 648.
- 2. Smoke Density: Less than 450 per ASTM E 662.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver tiles and installation accessories to Project site in original manufacturer's unopened cartons and containers each bearing names of product and manufacturer, Project identification, and shipping and handling instructions.
- B. Store flooring materials in dry spaces protected from the weather with ambient temperatures maintained between 50 deg F (10 deg C) and 90 deg F (32 deg C).
- C. Store tiles on flat surfaces. Move tiles and installation accessories into spaces where they will be installed at least 48 hours in advance of installation.

1.6 PROJECT CONDITIONS

- A. Maintain a minimum temperature of 70 deg F (21 deg C) in spaces to receive sheet goods or tiles for at least 48 hours prior to installation, during installation, and for not less than 48 hours after installation. After this period, maintain a temperature of not less than 55 deg F (13 deg C).
- B. Do not install shet good or tiles until they are at the same temperature as the space where they are to be installed.
- C. Close spaces to traffic during tile installation.

1.7 SEQUENCING AND SCHEDULING

- A. Install tiles and accessories after other finishing operations, including painting, have been completed.
- B. Do not install tiles over concrete slabs until the slabs have cured and are sufficiently dry to bond with adhesive as determined by tile manufacturer's recommended bond and moisture test.

1.8 EXTRA MATERIALS

- A. Deliver extra materials to Owner. Furnish extra materials matching products installed as described below, packaged with protective covering for storage and identified with labels clearly describing contents.
 - 1. Furnish not less than 10% of sheet goods for each type specified.
 - 2. Furnish not less than one box for each 50 boxes or fraction thereof, of each class, wearing surface, color, pattern and size of resilient floor tile installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
1. Forbo Industries, Inc. (Basis of Design Standard)
 2. or approved equal, see Section 01-6100 for Product Substitution

2.2 RESILIENT FLOORING

- A. General: All resilient flooring to have a minimum Coefficient of friction of no less than 0.5.
- B. Resilient Tiles
1. Shall be Forbo Marmoleum "Real," 33 cm x 33 cm x 2.5 mm (13" x 13" x 1/10"), or equal product of comparable quality, utility and appearance and as approved by the Architect. Patterns shall be as selected by the Architect from manufacturer's full range.
 - a. Flammability Class I in accordance with test procedure ASTM E-648 /NFP A 253
 - b. Less than 450 in Flaming Mode as per AS1M E-662/NFP A 258.
 - c. Residual Indentation: Static load limit 150 psi.
 - d. Patterns shall be as selected by the Architect from manufacturer's full range.
- C. Modular Resilient Tiles
1. Shall be Forbo Marmoleum Modular 25 cm x 25 cm x 2.5 mm (10" x 10" x 1/10"), 25 cm x 50 cm x 2.5 mm (10" x 20" x 1/10"), 50cm x 50 cm x 2.5 mm (20" x 20" x 1/10") or equal product of comparable quality, utility and appearance and as approved by the Architect. Patterns shall be as selected by the Architect from manufacturer's full range.
 - a. Flammability Class I in accordance with test procedure ASTM E-648 /NFP A 253
 - b. Less than 450 in Flaming Mode as per ASTM E-662/NFP A 258.
 - c. Residual Indentation: Static load limit 150 psi.
 - d. Patterns shall be as selected by the Architect from manufacturer's full range.
- D. Resilient Base:

1. 4" Burke Rubber or approved equal; top set at resilient and toe-less at carpeted areas. Color as selected from standard plain color range (white excepted). Base shall be standard lengths with a minimum of 2'-0" length at corner. Furnish pre-molded external corners.

2.3 INSTALLATION ACCESSORIES

- A. Fluid-applied water vapor retarder necessary to achieve slab moisture content required by flooring manufacturer and product recommended by manufacturer.
- B. Concrete Slab Primer: Nonstaining type as recommended by flooring manufacturer.
- C. Trowelable Underlayments and Patching Compounds: Latex-modified, portland-cement-based formulation provided or approved by tile manufacturer for applications indicated.
- D. Adhesives (Cements): Water-resistant type recommended by tile manufacturer to suit resilient floor tile products and substrate conditions of up to 10 lbs per 1,000 square feet and concrete internal relative humidity of 95%.
- E. Metal Edge Strips: Extruded aluminum with mill finish of width shown, of height required to protect exposed edge of tiles, and in maximum available lengths to minimize running joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. General: Examine areas where installation of resilient flooring will occur, with Installer present, to verify that substrates and conditions are satisfactory for tile installation and comply with tile manufacturer's requirements and those specified in this Section.
- B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:
 1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials whose presence would interfere with bonding of adhesive. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by tile manufacturer.
 2. Finishes of subfloors comply with tolerances and other requirements specified in Division 3 Section "Cast-In-Place Concrete" for slabs receiving resilient flooring.
 3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits of any kind.
- C. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Comply with manufacturer's installation specifications to prepare substrates indicated to receive tile or sheet goods

- B. Use trowelable leveling and patching compounds per tile manufacturer's directions to fill cracks, holes, and depressions in substrates.
- C. Remove coatings, including curing compounds, and other substances that are incompatible with flooring adhesives and that contain soap, wax, oil, or silicone, by using a terrazzo or concrete grinder, a drum sander, or a polishing machine equipped with a heavy-duty wire brush.
- D. Broom or vacuum clean substrates to be covered by tiles immediately before tile installation. Following cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust.
- E. Apply concrete slab water sealer or primer, if recommended by flooring manufacturer, prior to applying adhesive. Apply according to manufacturer's directions.

3.3 TESTING FOR MOISTURE

- A. See procedures in Section 01-4523.

3.4 INSTALLATION

- A. General: Comply with tile manufacturer's installation directions and other requirements indicated that are applicable to each type of tile installation included in Project.
- B. Lay out tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths at perimeter that equal less than one-half of a tile. Install tiles square with room axis, unless otherwise indicated.
- C. Match tiles for color and pattern by selecting tiles from cartons in same sequence as manufactured and packaged, if so numbered. Cut tiles neatly around all fixtures. Discard broken, cracked, chipped, or deformed tiles.
 - 1. Lay tiles with grain running in one direction.
 - 2. Lay tiles in pattern with respect to location of colors, patterns, and sizes as indicated on Drawings and Finish Schedule.
- D. Where demountable partitions and other items are indicated for installing on top of finished tile floor, install tile before these items are installed.
- E. Scribe, cut, and fit tiles to butt tightly to vertical surfaces, permanent fixtures, built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings.
- F. Extend tiles into toe spaces, door reveals, closets, and similar openings.
- G. Maintain reference markers, holes, or openings that are in place or plainly marked for future cutting by repeating on finish flooring as marked on subfloor. Use chalk or other nonpermanent marking device.
- H. Adhere tiles to flooring substrates without producing open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, or other surface

imperfections in completed tile installation.

- I. Use full spread of adhesive applied to substrate in compliance with tile manufacturer's directions including those for trowel notching, adhesive mixing, and adhesive open and working times.
- J. Hand roll tiles where required by tile manufacturer.

3.5 CLEANING AND PROTECTION

- A. Perform the following operations immediately after completing tile installation:
 - 1. Remove visible adhesive and other surface blemishes using cleaner recommended by tile manufacturers.
 - 2. Sweep or vacuum floor thoroughly.
 - 3. Do not wash floor until after time period recommended by resilient floor tile manufacturer.
 - 4. Damp-mop tile to remove black marks and soil.
- B. Protect flooring against mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods indicated or recommended by tile manufacturer.
 - 1. Apply protective floor polish or coating to tile surfaces that are free from soil, visible adhesive, and surface blemishes recommended by the manufacturer.
 - a. Coordinate manufacturers recommended product with Owner's maintenance service.
 - 2. Do not move heavy and sharp objects directly over tiles. Place plywood or hardboard panels over tiles and under objects while they are being moved. Slide or roll objects over panels without moving panels.
- C. Clean tiles not more than 4 days prior to dates scheduled for inspections intended to establish date of Substantial Completion in each area of Project. Clean tiles using method recommended by manufacturer.
 - 1. Reapply floor polish after cleaning.

END OF SECTION

SECTION 09-6800 - CARPETING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Sheet Carpet
 - 2. Installation

1.2 RELATED REQUIREMENTS

- A. Section 01-4525 - Testing Concrete Floor Moisture & pH Testing.
- B. Section 03-3000 - Cast in Place Concrete.
- C. Section 07-2633 - Water Emission Barrier for Flooring.
- D. Section 09-0511 - Preparation of Concrete for finish floor.
- E. Section 01-6110 - CalGreen Standards
- F. Section 01-6116 - Volatile Organic Compound (VOC) Restrictions
- G. Section 09-6543 - Linoleum Tile Flooring.

1.3 SUBMITTALS

- A. Shop Drawings showing the extent of carpet, seam direction of carpet, and accessories shall be submitted to Architect for approval prior to installation. Should also indicate columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet. Copy of approved shop drawings to be available on job site during installation.
- B. Carpet schedule using same room designations indicated on drawings.
- C. Product Data: Provide data on specified products, describing physical and performance characteristics, sizes, patterns, colors available, and method of installation.
- D. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial color selection.
- E. Verification Samples: Submit two 18" x 18" samples illustrating color and pattern for each carpet material specified.
- F. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- G. Maintenance Data: Include maintenance procedures, recommendations for maintenance materials and equipment, and suggested schedule for cleaning.

H. Warranty.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications

1. Company specializing in manufacturing specified carpet/backing with minimum 5 years documented experience.
2. Upon request, manufacturer to provide representative to assist in project start-up and to inspect installation while in process and upon completion. Representative will notify designated contact if any installation instructions are not followed.
3. Single Source Responsibility: Obtain each type of carpet from one source and by a single manufacturer.

B. Installer Qualifications

1. Flooring contractor must be certified by the carpet manufacturer prior to bid.
2. Flooring contractor to be a specialty contractor normally engaged in this type of work and shall have prior experience in the installation of these types of materials.
3. Certify payment of Prevailing Wage Rates to the installers.
4. Flooring contractor possessing Contract for the carpet installation shall not sub-contract the labor without written approval of the Project Manager.
5. Flooring contractor will be responsible for proper product installation, including floor testing and preparation as specified by the carpet manufacturer and JOB CONDITIONS herein.
6. Flooring contractor to provide Owner a written installation warranty that guarantees the completed installation to be free from defects in materials and workmanship for a period of one year after job completion.
7. Flooring contractor to provide Owner a written recycling warranty that guarantees the old carpet to be 100% recycled and the Flooring contractor will provide a certificate of recycling to the Owner in close out documents.

1.5 DELIVERY, STORAGE, & HANDLING

- A. Deliver materials to the site in manufacturer's original packaging listing manufacturer's name, product name, identification number, and related information.
- B. Store in a dry location, between 60 degrees F and 80 degrees F and a relative humidity below 65%. Protect from damage and soiling. Stack carpet rolls horizontally on a flat surface, stacked no higher than two rolls.

- C. Make stored materials available for inspection by the Owner's representative.
- D. Store materials in area of installation for minimum period of 48 hours prior to installation.

1.6 PROJECT CONDITIONS

- A. Sub-floor preparation is to include all required work to prepare the existing floor for installation of the product as specified in this document and Manufacturer's installation instructions.
- B. All material used in sub-floor preparation and repair shall be recommended by the carpet manufacturer and shall be chemically and physically compatible with the carpet system being bid.
- C. Maintain minimum 65 degrees F ambient temperature and 65% Relative Humidity for 72 hours prior to, during, and 48 hours after installation.
- D. Do not install carpet until space is enclosed and weatherproof, wet-work in space is completed and nominally dry, work above ceilings is complete, and ambient temperature and humidity conditions are and will be continuously maintained at values near those indicated for final occupancy.

1.7 EXTRA MATERIALS

- A. Provide additional 5% of each type, color, and pattern furnished; product to be rolled and bound. Coordinate storage location with owner.
- B. Deliver all unused carpet and large scraps to Owner for "attic stock." Dispose of scraps less than 2 square foot in area or less than 8" in width.

1.8 CARPET WARRANTY

- A. Warranty to be sole source responsibility of the Manufacturer. Second source warranties and warranties that involve parties other than the carpet manufacturer are unacceptable.
- B. If the product fails to perform as warranted when properly installed and maintained, the affected area will be repaired or replaced at the discretion of the Manufacturer.
- C. Chair Pads are not required for carpet warranty coverage.
- D. Warranty shall not exclude carpet product installed on stairs provided it is properly installed and maintained.
- E. Warranty shall be for a minimum non-prorated period of twenty-five years and shall cover against
 - 1. Excessive Surface Wear: More than 15% loss of pile fiber weight
 - 2. Excessive Static Electricity: More than 3.0 kV per AATCC 134

3. Resiliency Loss of the Backing: More than 10% loss of backing resiliency
 4. Delamination
 5. Edge Ravel
 6. Zippering
- F. Tuft Bind warranty in lieu of edge ravel and zippering is not acceptable.
- G. Provide certification and warranty that product is fully or partially recyclable through manufacturer's or aligned partner's recycling program. Include information regarding what portions of the product will be recycled into other recyclable/non-recyclable products, down-cycled, landfilled, and/or incinerated.

PART 2 - PRODUCTS

2.1 FIBER

- A. Nylon Fiber: Bulked Continuous Filament Nylon.
- B. Blends of Solutia fibers are not allowed. Solutia LXI fibers alone are not allowed.
- C. Durable stain inhibitor should be applied to the fiber during product manufacturing to resist fiber staining and soiling. Minimum average of three fluorine analyses of a single composite sample per CRI TM-102: 500 ppm.
- D. Fiber to contain carbon-core filament for permanent static control. Topical treatments not allowed.

2.2 BACKING CHARACTERISTICS

- A. Thermoplastic vinyl composite.
- B. Primary Backing: Synthetic Non-Woven.
- C. Pre-Coat (Fusion Coat): Sealant Vinyl
- D. Secondary Backing: Closed-Cell, Vinyl Cushion backing system.
 1. Density (ASTM D-1667): 18.5 lbs/cu ft +/- 5%
 2. Compression Set (ASTM D-1667): Max 10%
 3. Compression Deflection (ASTM D-1667): Min. 7 psi @ 25%; Max. 25 psi @ 25%
 4. Impermeable to moisture and airflow
 5. Provide for a chemically welded seam that is also impermeable to moisture and airflow

6. 6 Feet Width Roll Goods

- E. Product to be installed with a mill-applied releasable “dry” adhesive system to securely attach product to sub-floor in compliance with ADA guidelines (Section 4.5.3) if available from Manufacturer. Free-lay, grid system, and stretch-in installations not allowed.

2.3 RECYCLING PROGRAM

- A. Manufacturer must have a collection and recovery system for product and a fully established, currently operational recycling program at time of bid per FTC guides Section 260.7 (d).
- B. Manufacturer must be able to reclaim and recycle 100% of existing carpet of similar composition back into carpet at time of bid.
- C. Manufacturer must have product a take back program and be able to reclaim and recycle 100% of installed product back into carpet at the end of its service life at time of bid. Claiming a product is recyclable based on future expectation of technology, equipment, process or availability of that product as feed stock is not acceptable. Recycling process must be available for viewing.
- D. Collection and recycling program must be verified by an independent, neutral third-party organization, such as Scientific Certification Systems.
- E. Manufacturer must have written guarantee that 100% of the recovered product will be recycled and that no portion of the product will be landfilled or incinerated (including waste-to-energy).

2.4 ENVIRONMENTALLY PREFERABLE PRODUCT

- A. Carpet must be certified as an Environmentally Preferable Product (EPP) by a neutral, independent, third party organization such as Scientific Certification Systems. Carpets must carry an EPP carpet label certifying its Environmental Preferability. Products carrying EPP carpet labels will be given higher preference than those carrying only an EPP fiber label.

2.5 INDOOR AIR QUALITY

- A. Product must have low VOC, factory applied, “dry” adhesive.
- B. Product, inclusive of floor covering adhesive, must meet CRI’s IAQ requirements for carpet only. Environmental chamber testing per ASTM D-5116. Emission Rates determined at 24 hours.
 - 1. Product, inclusive of pre-applied adhesive must off gas less than:
 - a. 0.5 mg/sq. meter per hour of Total Volatile Organic Compound (TVOC);
 - b. 0.05 mg/sq. meter per hour of formaldehyde;
 - c. 0.4 mg/sq. meter per hour of styrene; and

- d. 0.05 mg/sq. meter per hour of 4-Phenyl Cyclohexene (4-PC)
2. Submit Indoor Air Quality report showing CRI Green label Certification Number for carpet (inclusive of adhesive). If results for carpet testing are not inclusive of adhesive, submit separate IAQ test reports for carpet and adhesive.
3. Indoor air quality results of the product installed must be same as those specified by the Project requirements.
4. Additionally, product, inclusive of adhesive, must meet the requirements of the State of Washington Indoor Air Quality Specifications for Carpet at 24 hours. Environmental chamber testing per ASTM D-5116. Product must not require the 30-day air out period that the State of Washington protocol allows.

2.6 PERFORMANCE CHARACTERISTICS

- A. Test reports for the following performance assurance testing to be submitted upon request. Submitted results shall represent average results for production goods of the referenced style.
- B. Requirements listed below must be met by all products.
 1. Flooring Radiant Panel: ASTM E-648 / NFPA 253: Class 1 (CRF: 0.45 watts/sq cm or greater)
 2. Federal Flammability: CPSC FF 1-70: Passes
 3. Smoke Density: ASTM E-662 / NFPA 258: ≤ 450 Flaming Mode
 4. Electrostatic Propensity: AATCC 134 (Step & Scuff): 3.0 kV or less
 5. Static Coefficient of Friction: ASTM C-1028: Passes ADA Guidelines for Accessible Routes (Minimum 0.60)
 6. Delamination of Secondary Backing of Pile Floor Coverings: ASTM D-3936: No Delamination
 7. Lightfastness: AATCC 16E: $\geq 4 @ 100$ hours
 8. Vetterman Drum: ASTM D-5417: Minimum 3 @ 22,000 cycles
 9. Moisture Barrier: Moisture Penetration by Impact @ 10 psi: No Penetration of backing and seam after 10,000 impacts
 10. Air Flow Barrier: Air Permeability of Textile Fabrics: No Air Flow (0.0 ft³/min) through backing and seam
 11. Seam Integrity: Seam to remain intact after 50,000 cycles per Phillips Chair Test

12. VOC Chamber Testing: ASTM D-5116: Product inclusive of “dry” adhesive system meets criteria established by the State of Washington Indoor Air Quality Specification for Carpet and/or Carpet & Rug Institute’s (CRI) Indoor Air Quality Carpet Testing Program. If “dry” adhesive (2.02E) not available from manufacturer and “wet”

2.7 MANUFACTURING SPECIFICATIONS

A. Style **Applause III** Powerbond Cushion RS

- | | | |
|-----|-----------------------------|---|
| 1. | Construction | Loop |
| 2. | Gauge | 5/64" |
| 3. | Pile Units per Inch | 8.2 |
| 4. | Pile Height Average | .187" |
| 5. | Tuft Density | 105 |
| 6. | Fiber System:

Ensure | 50% Dynex SDN 50% Dynex
Nylon with StaticControl and |
| 7. | Powerbond Backing System | 6 ft |
| 8. | Fusion Coat | Sealant Vinyl |
| 9. | Backing | Closed cell vinyl cushion |
| 10. | Weight | 35.5 oz/sq yd |
| 11. | Density | 18.5 lbs/cu ft |
| 12. | Thickness | .156" |
| 13. | Total Weight | 81.0 oz/sq yd +/- 5% |
| 14. | Compression Set | Max 10% |
| 15. | Compression Deflection | 7 min. 25 max. lbs/sq inch @ 25% |
| 16. | Electrostatic Propensity | 1.4 K.V. or lower |
| 17. | Flooring Radiant Panel Test | Mean average critical radiant flux:
0.45 w/sq cm or higher |
| 18. | Smoke Density | Flaming: Mean average: 450 or
lower |
| 19. | Flammability | Passes |

- 20. NSF 140 Gold
- 21. CRI Green Label Plus Certification GLP9744
- 22. Warranties Lifetime wear, delamination, edge ravel, static, zippering, loss of resiliency

B. Manufactured by Tandus Flooring

- 1. Style: **Abrasive Action** Powerbond Cushion.
- 2. Color: Tapestry 28505.

C. Construction Accuweave Patterned Loop

- 1. Gauge 1/12"
- 2. Pile Units per Inch 8.0
- 3. Pile Height Average .187"
- 4. Density Factor 7,513
- 5. Fiber System 100% TDX SDN Nylon
- 6. Powerbond Backing System 6 ft
- 7. Fusion Coat Sealant Vinyl
- 8. Backing Closed cell vinyl cushion
- 9. Weight 35.5 oz/sq yd
- 10. Density 18.5 lbs/cu ft
- 11. Thickness 0.156"
- 12. Total Weight 87.0 oz/sq yd +/- 5%
- 13. Compression Set Max 10%
- 14. Compression Deflection 7 min. 25 max. lbs/sq inch @ 25%
- 15. Flooring Radiant Panel Test Mean average critical radiant flux: 0.45 w/sq cm or higher
- 16. Smoke Density or Flaming: Mean average: 450 lower
- 17. Flammability Passes

2.8 SUBSTITUTIONS

- A. Substitutions: See Section 01-6100 - Product Substitutions.
- B. Product specifications, test reports, and other documents referenced in this section.
- C. Two (2) 18 inch x 18 inch samples of proposed carpet.
- D. Three (3) twelve inch long pieces of proposed moldings and any and all special treatment materials.
- E. Names of (5) five installations that have been in use for ten (10) years using backing technology as specified, including contact names and phone numbers.

2.9 ACCESSORIES

- A. Materials recommended by Manufacturer for patching, priming, chemically welding the seams, etc.
- B. Adhesives: Products to be supplied with a pre-cured, mill-applied or other “dry” adhesive system (2.02E) when available. Otherwise, adhesive should be full spread, extremely low VOC in compliance with CRI Indoor Air Quality Adhesive Testing Program requirements, compatible with materials being adhered, as recommended by the Manufacturer.
- C. Base, Carpet Edge, and Transition Strips: As specified in applicable sections.

PART 3 - EXECUTION

3.1 EXAMINATION / PREPARATION

- A. Prepare sub-floor to comply with criteria established in Manufacturer’s installation instructions. Use only preparation materials that are acceptable to the Manufacturer.
- B. Remove all deleterious substances from substrate(s) that would interfere with or be harmful to the installation.
 - 1. Remove sub-floor ridges and bumps. Fill cracks, joints, holes, and other defects.
- C. Verify that sub-floor is smooth and flat within specified tolerances and ready to receive carpet.
- D. Verify that substrate surface is dust-free and free of substances that would impair bonding of product to the floor.
- E. Verify that concrete surfaces are ready for installation and are within the limits recommended by Manufacturer.
- F. There will be no exceptions to the provisions stated in the Manufacturer’s installation instructions.

3.2 INSTALLATION - GENERAL

- A. Install product in accordance with Manufacturer’s installation instructions.

- B. Verify carpet match before cutting to ensure minimal variation between dye lots.
- C. Layout carpet and locate seams in accordance with shop drawings.
 - 1. Locate seams in area of least traffic, out of areas of pivoting traffic.
 - 2. Do not locate seams perpendicular through door openings.
 - 3. Align run of pile in same direction on adjacent pieces.
 - 4. Locate change of color or pattern between rooms under door centerline.
 - 5. Provide monolithic color, pattern, and texture match within any one area.
 - 6. Check pattern repeat, if any, for matching during installation and possible waste factors in ordering required amounts.
- D. Install carpet tight and flat on sub-floor, well-fastened at edges, with a uniform appearance.
- E. Double-cut carpet seams with accurate pattern match. Make cuts straight, true, and unfrayed.
- F. Chemically weld all seams with manufacturer's recommended seam sealer as stated in installation instructions. Make sure the seam is fully sealed.
- G. Roll with appropriate roller for complete contact of carpet with mill-applied adhesive to sub-floor.
- H. Trim carpet neatly at walls and around interruptions.
- I. Completed carpet is to be smooth and free of bubbles, puckers, and other defects.

3.3 PROTECTION & CLEANING

- A. Remove excess adhesive and/or seam sealer from floor and wall surfaces without damage.
- B. All rubbish, wrappings, debris, trimmings, etc. to be removed from site and disposed of properly.
- C. Clean and vacuum carpet surfaces using a beater brush/bar commercial vacuum.
- D. After each area of carpet is installed, protect from soiling and damage by other trades.

END OF SECTION

SECTION 09-7713 WALL COVERING - TACKWALL

PART 1 - PART1-GENERAL

1.1 DESCRIPTION

- A. Work included: Provide vinyl-coated fabric wall covering where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.

1.2 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen thoroughly trained and experienced in the necessary crafts and completely familiar with the specified requirements and methods needed for proper performance of the work of this Section.

1.3 SUBMITTALS

- A. Comply with pertinent provisions of Section 01-3300.
- B. Product data: Within 75 calendar days after the Contractor has received the , Owner's Notice to Proceed, submit:
 - 1. Materials list of items proposed to be provided under this Section;
 - 2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
 - 3. Samples of the full range of colors and patterns available from the proposed manufacturer in the specified range.
- C. Mock-ups:
 - 1. At the site provide a mock-up panel of the work of this Section.
 - a. Make the mock up panel approximately 4' -0" high by three full fabric widths wide.
 - b. Provide one mock-up panel for each color and pattern of vinyl-coated fabric wall covering used on the Work.
 - c. The mock-ups may not be part of the Work.
 - d. Revise as necessary to secure the Architect's approval.
 - 2. The mock-up panels will be used as the standard for comparison with the remainder of the work of this Section for the purpose of acceptance or rejection.

3. If the mock-up panels are not permitted to be part of the finished Work, completely demolish and remove them from the job site upon completion and, acceptance of the work of this Section.

1.4 PRODUCT HANDLING

- A. Comply with pertinent provisions of Section 01-6000.

1.5 EXTRA STOCK

- A. Deliver to the Owner for his use in future modifications, an extra stock of approximately 10% of each color and pattern of material, and proper adhesive, used in the work of this Section, packaging each type of material separately, distinctly marked, and adequately protected against deterioration.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Manufacturer: Basis of Design: Koroseal Wallcoverings
- B. Other Acceptable Manufacturere
 1. Carnegie Wallcoverings
 2. or approved Equal.

2.2 VINYL WALL COVERING

1. Fabric, color and patterns as selected by the Architect from the manufacturer's full range of selections meeting the following minimum criteria:
2. Total Weight 20 oz. PLY
3. Fabric Weight 13.3 oz. PSY
4. Roll Width 54"
5. Vinyl gauge: 0.024 in.
6. UL Ratings: Flame Spread: 10; Smoke Development: 5
7. Tensile (Minimum) 50 x 55 lbf
8. Tear (Minimum) 25 x 25 lbf
9. Federal Spec. CCC-W-408D, Type II WA Spec
10. WA-101, Type II
11. ASTM F-793 Category V

12. Type II Fire Testing
 - a. NFPA 101® Life Safety Code®
 - b. NFPA 255 (UL723, CAN S102M) Tunnel Test1 Class A Rating
 - c. NFPA 286 Corner Burn Test2 Meets requirements for Flame Spread, Smoke Developed and Flashover EU classification in accordance with EN 13501-1:2007 and EN-15102-2008
 13. Indoor Air Quality California 01350- Meets emission requirements for schools and offices.
 14. Repeat
 - a. Vertical N/A Horizontal N/A
 - b. Nominal Pattern Width 51 in. 132 cm
 - c. Match Information Random Match, Reverse Hang 1
- B. Tack board base shall be as specified in Section 09-2900, where tackwalls are called for on the plans or scheduled. Vinyl wall covering for tackwalls to be provided and installed under this Section.

2.3 ADHESIVE

- A. Adhesive shall be strippable and in accordance with the manufacturer's recommendations.

2.4 WALL SIZE

- A. Wall size shall be as recommended by the wall covering manufacturer and shall be compatible with the adhesive used.

2.5 MISCELLANEOUS

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the review of the Architect.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.
- B. Make moisture content tests of substrate by use of an electronic moisture meter and verify that substrate moisture content does not exceed:
 1. For plaster and gypsum wallboard: 5%;

2. For masonry and concrete: 12%;
3. For wood products: Maximum moisture content 7% average, with a range permitted in individual pieces from 5% to 15%.

3.2 PREPARATION

A. Metal:

1. Clean the surface free from rust, scale, grease, oil, and other contaminants.
2. Prime bare metal with a metal primer recommended for the purpose by the manufacturer of the approved fabric.

B. Wood:

1. Make the surface completely smooth; set nail heads and fill with waterproof filler, sanding smooth with the adjacent surfaces; and verify proper moisture content.
2. Seal knots, pitch, and sap streaks with one coat of 2 lb cut white shellac and one coat of the adhesive used for applying the fabric, covering the entire surface.

C. Gypsum wallboard and plaster:

1. Over gypsum wallboard, apply a uniform release coat of material recommended by the manufacturer of the approved adhesive.
2. Dust the surface thoroughly and remove all loose material.
3. Verify proper moisture content.

3.3 INSTALLATION OF METAL MOLDING

- A. Where wood trim other material is not indicated install the manufacturer's standard metal molding at external corners and at exposed edges of fabric, using adhesive recommended for the purpose by the manufacturer of the molding, installing true to line, using full-length stock to the maximum practicable, butting horizontal joints to form a tight hairline crack, and mitering corners.

3.4 INSTALLATION OF FABRIC

A. Sequence:

1. Use fabric in consecutive numerical sequence of their manufacture.
2. Place fabric panels sequentially in the exact order they are cut from the roll, including for filling all spaces above doors and above or below windows and similar locations.

- B. Handle the fabric in strict accordance with the manufacturer's recommendations.

1. Trim additional selvage where required to achieve a color and pattern match at seams.
2. Follow the manufacturer's printed instructions for mixing adhesive
3. When overlapping the edges and double-cutting through both thicknesses, exercise care to prevent cutting the substrate.
4. Wrap fabric 6" beyond inside and outside corners; not cutting at corners except when color of fabric selected is different on adjacent walls.
5. Do not permit horizontal seams.
6. Install the fabric prior to installation of plumbing fixtures, casing, bases, and cabinets.
7. Use stiff bristled brush or flexible broad knife to eliminate air pockets and to secure fabric to substrate surfaces.
8. Using a damp sponge, remove excess adhesive from each seam as it is made, wiping clean and dry with a cloth towel.

3.5 ADJUSTMENT AND CLEANING

- A. As the work progresses, clean the surplus adhesive from fabric surfaces and adjacent surfaces.
- B. Visually inspect to verify that installed fabric is secure, smooth, clean" without wrinkles, and with no gaps or overlaps.
- C. Inspect all seams, verifying that precise match has been achieved, and correcting mismatch of color and/ or pattern.
- D. Verify that installed fabric meets or exceeds the quality of installation achieved in the approved mock-up panels.

END OF SECTION

SECTION 09-9000 - 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.
- B. See Section 09-9600 Speacial Coatings for exterior ferrous metal

1.2 SUMMARY

- A. This Section includes surface preparation, painting, and finishing of exposed interior and exterior items and surfaces.
 - 1. Surface preparation, priming, and finish coats specified in this Section are in addition to shop-priming and surface treatment specified under other Sections.
- B. Paint exposed surfaces whether or not colors are designated in schedules, except where a surface or material is specifically indicated not to be painted or is to remain natural. Where an item or surface is not specifically mentioned, paint the same as similar adjacent materials or surfaces. If color or finish is not designated, the Architect will select from standard colors or finishes available.
 - 1. Painting includes field-painting exposed bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron work, and primed metal surfaces of mechanical and electrical equipment.
- C. Painting is not required on prefinished items, finished metal surfaces, concealed surfaces, operating parts, and labels.
 - 1. Prefinished items not to be painted include the following factory-finished components:
 - a. Metal toilet enclosures.
 - b. Acoustic materials, (except ceiling or wall tiles specified to be refinished)
 - c. Architectural woodwork and casework.
 - d. Light fixtures.
 - e. Switchgear.
 - f. Distribution cabinets.
 - 2. Concealed surfaces not to be painted include wall or ceiling surfaces in the following generally inaccessible areas:

- a. Foundation spaces.
 - b. Furred areas.
 - c. Pipe spaces.
 - d. Duct shafts.
3. Finished metal surfaces not to be painted include:
- a. Anodized aluminum.
 - b. Stainless steel.
 - c. Chromium plate.
 - d. Copper.
 - e. Bronze.
 - f. Brass.
4. Operating parts not to be painted include moving parts of operating equipment, such as the following:
- a. Valve and damper operators.
 - b. Linkages.
 - c. Sensing devices.
 - d. Motor and fan shafts.
5. Labels: Do not paint over Underwriters Laboratories, Factory Mutual or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.
- D. Related Sections: The following Sections contain requirements that relate to this Section:
1. Division 5 Section "Structural Steel" for shop-priming structural steel.
 2. Division 5 Section "Metal Fabrications" for shop-priming ferrous metal.
 3. Division 6 Section "Interior Architectural Woodwork" for shop-priming interior architectural woodwork.
 4. Division 9 Section "Special Coatings" for special coatings to be applied to all Exterior Ferrous Metal.
 5. Division 9 Section "Exterior Wood Stains" for exterior wood stains.

6. Division 9 Section "Wall Coverings" for substrate sealer under wall coverings.

1.3 SUBMITTALS

- A. General: Submit the following according to Conditions of the Contract and Division 1 Specification Sections.
- B. Product data for each paint system specified, including block fillers and primers.
 1. Provide the manufacturer's technical information including label analysis and instructions for handling, storage, and application of each material proposed for use.
 2. List each material and cross-reference the specific coating, finish system, and application. Identify each material by the manufacturer's catalog number and general classification.
 3. Certification by the manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).
- C. Samples for initial color selection in the form of manufacturer's color charts.
 1. After color selection, the Architect will furnish color chips for surfaces to be coated.
- D. Samples for Verification Purposes: Provide samples of each color and material to be applied, with texture to simulate actual conditions, on representative samples of the actual substrate.
 1. Provide stepped samples, defining each separate coat, including block fillers and primers. Use representative colors when preparing samples for review. Resubmit until required sheen, color, and texture are achieved.
 2. Provide a list of material and application for each coat of each sample. Label each sample as to location and application.
 3. Submit samples on the following substrates for the Architect's review of color and texture only:
 - a. Concrete: Provide two 4-inch-square samples for each color and finish.
 - b. Painted Wood: Provide two 12-inch-square samples of each color and material on hardboard.
 - c. Stained or Natural Wood: Provide two 4-by-8-inch samples of natural and stained wood finish on actual wood surfaces.
 - d. Ferrous Metal: Provide two 4-inch-square samples of flat metal and two 8-inch-long samples of solid metal for each color and finish.

1.4 QUALITY ASSURANCE

- A. Applicator Qualifications: Engage an experienced applicator who has completed painting system applications similar in material and extent to those indicated for the Project that have resulted in a construction record of successful in-service performance.
- B. Single-Source Responsibility: Provide primers and undercoat paint produced by the same manufacturer as the finish coats.
- C. Field Samples: On wall surfaces and other exterior and interior components, duplicate finishes of prepared samples. Provide full-coat finish samples on at least 100 sq. ft. of surface until required sheen, color, and texture are obtained; simulate finished lighting conditions for review of in-place work.
 - 1. Final acceptance of colors will be from job-applied samples.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to the job site in the manufacturer's original, unopened packages and containers bearing manufacturer's name and label, and the following information:
 - 1. Product name or title of material.
 - 2. Product description (generic classification or binder type).
 - 3. Manufacturer's stock number and date of manufacture.
 - 4. Contents by volume, for pigment and vehicle constituents.
 - 5. Thinning instructions.
 - 6. Application instructions.
 - 7. Color name and number.
- B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F (7 deg C). Maintain containers used in storage in a clean condition, free of foreign materials and residue.
 - 1. Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily. Take necessary measures to ensure that workers and work areas are protected from fire and health hazards resulting from handling, mixing, and application.

1.6 JOB CONDITIONS

- A. Apply water-based paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 50 deg F (10 deg C) and 90 deg F (32 deg C).
- B. Apply solvent-thinned paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 45 deg F (7 deg C) and 95 deg F (35 deg C).

- C. Do not apply paint in snow, rain, fog, or mist; or when the relative humidity exceeds 85 percent; or at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.
 - 1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by the manufacturer during application and drying periods.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
- B. INTERIOR AND EXTERIOR PAINT AND STAINS:
 - 1. Benjamin Moore and Co. (Moore).
 - 2. Sansin Enviro Stain.
 - 3. or approved equal.

2.2 PAINT MATERIALS, GENERAL

- A. Material Compatibility: Provide block fillers, primers, finish coat materials, and related materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by the manufacturer based on testing and field experience.
- B. Material Quality: Provide the manufacturer's best-quality trade sale paint material of the various coating types specified. Paint material containers not displaying manufacturer's product identification will not be acceptable.
 - 1. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish the manufacturer's material data and certificates of performance for proposed substitutions.
- C. Colors: Provide color selections made by the Architect from the manufacturer's full range of standard colors.

2.3 PRIMERS

- A. Primers: Provide the manufacturer's recommended factory-formulated primers that are compatible with the substrate and finish coats indicated.
- B. Available Products: Subject to compliance with requirements, prime coat materials that may be incorporated in the Work include, but are not limited to, the following:
- C. Products: Subject to compliance with requirements, provide one of the following:

1. Concrete and Masonry Primers: Interior, flat, latex-based paint.
 - a. Moore: Moore's Latex Quick-Dry Prime Seal #201.
 - b. P & L: Vapex Latex Flat Wall Finish.
2. Gypsum Drywall Primer: White, interior, latex-based primer.
 - a. Moore: Moore's Latex Quick-Dry Prime Seal #201.
 - b. P & L: Latex Wall Primer Z30001.
3. Ferrous Metal Primers: Synthetic, quick-drying, rust-inhibiting primers.
 - a. Moore: IronClad Retardo Rust-Inhibitive Paint #163.
 - b. P & L: Effecto Rust-Inhibiting Primer.

2.4 UNDERCOAT MATERIALS

- A. Undercoat Materials: Provide the manufacturer's recommended factory-formulated undercoat materials that are compatible with the substrate and finish coats indicated.
- B. Available Products: Subject to compliance with requirements, undercoat materials that may be incorporated in the Work include, but are not limited to, the following:
- C. Products: Subject to compliance with requirements, provide one of the following:
 1. Interior Enamel Undercoat: Ready-mixed enamel.
 - a. Moore: Moore's Alkyd Enamel Underbody #217.
 - b. P & L: Interior Trim Primer.
 - c. Or approved equal

2.5 EXTERIOR FINISH PAINT MATERIAL

- A. Available Products: Subject to compliance with requirements, finish coat materials that may be incorporated in the Work include, but are not limited to, the following:
- B. Products: Subject to compliance with requirements, provide one of the following:
 1. Exterior, Polyvinyl Acetate Emulsion: Quick-drying, flat, polyvinyl acetate (PVA) paint.
 - a. Moore: Moore's Flat Exterior Latex Masonry & House Paint #105.
 - b. P & L: Pro-Hide Plus Interior/Exterior Vinyl-Acrylic Flat Paint Z3400 Series.
 - c. Or approved Equal

2. Deep-Color, Exterior Alkyd Resin Trim Paint: Deep-color, ready-mixed alkyd paint.
 - a. Moore: Moore's House Paint #110.
 - b. P & L: Effecto Enamel.
 - c. Or approved equal.

2.6 EXTERIOR FINISH STAIN MATERIAL

- A. Available Products: Subject to compliance with requirements, finish coat materials that may be incorporated in the Work include, but are not limited to, the following:
- B. Products: Subject to compliance with requirements, provide one of the following:
 1. Exterior, Saturated Stain.
 - a. Sansin Enviro Stain.
 - b. Or approved Equal

2.7 INTERIOR FINISH PAINT MATERIAL

- A. Finish Paint: Provide the manufacturer's recommended factory-formulated finish-coat materials that are compatible with the substrate and undercoats indicated.
- B. Available Products: Subject to compliance with requirements, finish coat materials that may be incorporated in the Work include, but are not limited to, the following:
 1. Interior, Flat, Odorless, Alkyd Paint: Ready-mixed, interior, flat, low-odor, alkyd enamel.
 - a. Moore: Moore's Alkyd Sani-Flat #204.
 - b. P & L: Lyt-All Flowing Flat.

2.8 INTERIOR FINISH STAIN MATERIAL

- A. Finish Stain: Provide the manufacturer's recommended factory-formulated finish-coat materials that are compatible with the substrate and undercoats indicated.
- B. Available Products: Subject to compliance with requirements, finish coat materials that may be incorporated in the Work include, but are not limited to, the following:
 1. Interior Wood Stain.
 - a. Sansin Enviro Stain Purity Interior Stain

- b. or approved equal

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions under which painting will be performed for compliance with paint application requirements. Surfaces receiving paint must be thoroughly dry before paint is applied.
 - 1. Do not begin to apply paint until unsatisfactory conditions have been corrected.
 - 2. Start of painting will be construed as the Applicator's acceptance of surfaces and conditions within a particular area.
- B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.
 - 1. Notify the Architect about anticipated problems using the materials specified over substrates primed by others.

3.2 PREPARATION

- A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted, or provide surface-applied protection prior to surface preparation and painting. Remove these items, if necessary, to completely paint the items and adjacent surfaces. Following completion of painting operations in each space or area, have items reinstalled by workers skilled in the trades involved.
- B. Cleaning: Before applying paint or other surface treatments, clean the substrates of substances that could impair the bond of the various coatings. Remove oil and grease prior to cleaning. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.
- C. Surface Preparation: Clean and prepare surfaces to be painted according to the manufacturer's instructions for each particular substrate condition and as specified.
 - 1. Provide barrier coats over incompatible primers or remove and reprime. Notify Architect in writing about anticipated problems using the specified finish-coat material with substrates primed by others.
 - 2. Cementitious Materials: Prepare concrete, concrete masonry block, cement plaster, and mineral-fiber-reinforced cement panel surfaces 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. Use abrasive blast-cleaning methods if recommended by the paint manufacturer.

- b. 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 printed directions.
 3. Wood: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces exposed to view smooth and dust off.
 - a. Scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or other recommended knot sealer before applying primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand smooth when dried.
 - b. Prime, stain, or seal wood to be painted immediately upon delivery. Prime edges, ends, faces, undersides, and backsides of wood, including cabinets, counters, cases, and paneling.
 - c. When transparent finish is required, backprime with spar varnish.
 - d. Backprime paneling on interior partitions where masonry, plaster, or other wet wall construction occurs on backside.
 - e. Seal tops, bottoms, and cutouts of unprimed wood doors with a heavy coat of varnish or sealer immediately upon delivery.
 4. Ferrous Metals: Clean ungalvanized ferrous metal surfaces that have not been shop-coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with recommendations of the Steel Structures Painting Council (SSPC).
 - a. Blast steel surfaces clean as recommended by the paint system manufacturer and according to requirements of SSPC specification SSPC-SP 10.
 - b. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by the paint manufacturer, and touch up with the same primer as the shop coat.
 5. Galvanized Surfaces: Clean galvanized surfaces with nonpetroleum-based solvents so that the surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.
- D. Materials Preparation: Carefully mix and prepare paint materials according to manufacturer's directions.
1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.

2. Stir material before application to produce a mixture of uniform density; stir as required during application. Do not stir surface film into material. Remove film and, if necessary, strain material before using.
3. Use only thinners approved by the paint manufacturer and only within recommended limits.

3.3 APPLICATION

- A. General: Apply paint according to manufacturer's directions. Use applicators and techniques best suited for substrate and type of material being applied.
- B. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
 1. Paint colors, surface treatments, and finishes are indicated in the schedules.
 2. Provide finish coats that are compatible with primers used.
 3. The number of coats and the film thickness required are the same regardless of the application method. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer. Sand between applications where sanding is required to produce a smooth even surface according to the manufacturer's directions.
 4. Apply additional coats if undercoats, stains, or other conditions show through final coat of paint until paint film is of uniform finish, color, and appearance. Give special attention to ensure that surfaces, including edges, corners, crevices, welds, and exposed fasteners, receive a dry film thickness equivalent to that of flat surfaces.
 5. The term exposed surfaces includes areas visible when permanent or built-in fixtures, convactor covers, covers for finned tube radiation, grilles, and similar components are in place. Extend coatings in these areas, as required, to maintain the system integrity and provide desired protection.
 6. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before the final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 7. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, nonspecular black paint.
 8. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
 9. Finish exterior doors on tops, bottoms, and side edges same as exterior faces.
 10. Sand lightly between each succeeding enamel or varnish coat.
 11. Omit primer on metal surfaces that have been shop-primed and touch-up painted.

- C. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
 - 1. Allow sufficient time between successive coats to permit proper drying. Do not recoat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and where application of another coat of paint does not cause the undercoat to lift or lose adhesion.
- D. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to the manufacturer's directions.
 - 1. Brushes: Use brushes best suited for the material applied.
 - 2. Rollers: Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by the manufacturer for the material and texture required.
 - 3. Spray Equipment: Use airless spray equipment with orifice size as recommended by the manufacturer for the material and texture required.
- E. Minimum Coating Thickness: Apply materials no thinner than the manufacturer's recommended spreading rate. Provide the total dry film thickness of the entire system as recommended by the manufacturer.
- F. Mechanical and Electrical Work: Painting mechanical and electrical work is limited to items exposed in mechanical equipment rooms and in occupied spaces.
- G. Mechanical items to be painted include, but are not limited to, the following:
 - 1. Piping, pipe hangers, and supports.
 - 2. Heat exchangers.
 - 3. Tanks.
 - 4. Ductwork.
 - 5. Insulation.
 - 6. Supports.
 - 7. Motors and mechanical equipment.
 - 8. Accessory items.
- H. Electrical items to be painted include, but are not limited to, the following:
 - 1. Conduit and fittings.
- I. Block Fillers: Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.

- J. Prime Coats: Before applying finish coats, apply a prime coat of material, as recommended by the manufacturer, to material that is required to be painted or finished and that has not been prime-coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.
- K. Stipple Enamel Finish: Roll and redistribute paint to an even and fine texture. Leave no evidence of rolling such as laps, irregularity in texture, skid marks, or other surface imperfections.
- L. Pigmented (Opaque) Finishes: Completely cover to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.
- M. Transparent (Clear) Finishes: Use multiple coats to produce a glass-smooth surface film of even luster. Provide a finish free of laps, cloudiness, color irregularity, runs, brush marks, orange peel, nail holes, or other surface imperfections.
 - 1. Provide satin finish for final coats.
- N. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with specified requirements.

3.4 FIELD QUALITY CONTROL

- A. The Owner reserves the right to invoke the following test procedure at any time and as often as the Owner deems necessary during the period when paint is being applied:
 - 1. The Owner will engage the services of an independent testing agency to sample the paint material being used. Samples of material delivered to the Project will be taken, identified, sealed, and certified in the presence of the Contractor.
 - 2. The testing agency will perform appropriate tests for the following characteristics as required by the Owner:
 - a. Quantitative materials analysis.
 - b. Abrasion resistance.
 - c. Dry opacity.
 - d. Color retention.
 - e. Alkali and mildew resistance.
 - 3. If test results show material being used does not comply with specified requirements, the Contractor may be directed to stop painting, remove noncomplying paint, pay for testing, repaint surfaces coated with rejected paint, and remove rejected paint from previously painted surfaces if, upon repainting with specified paint, the two coatings are incompatible.

3.5 CLEANING

- A. Cleanup: At the end of each work day, remove empty cans, rags, rubbish, and other discarded paint materials from the site.
 - 1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping. Be careful not to scratch or damage adjacent finished surfaces.

3.6 PROTECTION

- A. Protect work of other trades, whether being painted or not, against damage by painting. Correct damage by cleaning, repairing or replacing, and repainting, as acceptable to Architect.
- B. Provide "Wet Paint" signs to protect newly painted finishes. Remove temporary protective wrappings provided by others to protect their work after completing painting operations.
 - 1. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.7 EXTERIOR PAINT SCHEDULE

- A. General: Provide the following paint systems for the various substrates indicated.
- B. Wood siding, Wood Trellis , Rafter Tails, Soffits, Fascia, Trim and Exterior Wood Doors:
 - 1. Saturated Stain:
 - a. Prime (foundation) Coat
 - 1) SDF Sansin Foundation
 - b. First Coat: Deep-color saturated stain.
 - 1) Sansin SDF Enviro Stain .
 - 2) Or approved equal
 - c. Second Coat: Deep-color saturated stain.
 - 1) Sansin SDF Enviro Stain
 - d. Color: Sansin Saturated "Red Oak 73"
- C. Ferrous Metal: **(See section 09960 for exterior ferrous metal).**
- D. Bid Alternate - Cementitious Siding:

1. Lusterless (Flat) Acrylic Finish: Two coats with total dry film thickness not less than 2.5 mils.
 - a. First and Second Coats: Exterior acrylic emulsion.
 - 1) Moore: Moore's Flat Exterior Latex Masonry & House Paint #105.
 - 2) P & L: Vapex Latex Flat House Paint.
 - 3) Or approved equal

3.8 INTERIOR PAINT SCHEDULE

A. General: Provide the following paint systems for the various substrates, as indicated.

B. Gypsum Drywall Systems:

1. Lusterless (Flat) Emulsion Finish: Two coats.
 - a. Primer: White, interior, latex-based primer.
 - 1) Moore: Moore's Latex Quick-Dry Prime Seal #201.
 - 2) P & L: Latex Wall Primer Z30001.
 - 3) Or approved equal
 - b. Finish Coat: Interior, flat, latex-based paint.
 - 1) Moore: Regal Wall Satin #215.
 - 2) P & L: Vapex Latex Flat Wall Finish.
 - 3) Or approved equal
2. Odorless Semigloss Alkyd Enamel Finish: Three coats with total dry film thickness not less than 2.5 mils.
 - a. Primer: White, interior, latex-based primer.
 - 1) Moore: Moore's Latex Quick-Dry Prime Seal #201.
 - 2) P & L: Latex Wall Primer Z30001.
 - 3) Or approved equal
 - b. First and Second Coats: Interior, semigloss, odorless, alkyd enamel.
 - 1) Moore: Moore's Satin Impervo Enamel #235.
 - 2) P & L: Cellu-Tone Alkyd Satin Enamel.

- 3) Or approved equal
- C. Woodwork (Stain unless otherwise noted)
 1. Interior wood stain
 - a. First and Coat: (3-4 mil)
 - 1) Sansin Enviro Stain Purity Interior stain
 - 2) Or approved equal
 - b. Second Coat
 - 1) Sansin Enviro Stain Purity Clear
 - 2) or approved equal
 - c. Color: To be Selected by Architect and coordinated with Factory Finished Casework under Section 06-4100.
- D. Woodwork (where specified as paint grade) :
 1. Semigloss Enamel Finish: Three coats.
 - a. Undercoat: Interior enamel undercoat.
 - 1) Moore: Moore's Alkyd Enamel Underbody #217.
 - 2) P & L: Interior Trim Primer.
 - 3) Or approved equal
 - b. First and Second Coats: Interior, semigloss, odorless, alkyd enamel.
 - 1) Moore: Moore's Satin Impervo Enamel #235.
 - 2) P & L: Cellu-Tone Alkyd Satin Enamel.
 - 3) Or approved equal.
- E. Ferrous Metal:
 1. Semigloss Enamel Finish: Two coats over primer with total dry film thickness not less than 2.5 mils.
 - a. Primer: Synthetic, quick-drying, rust-inhibiting primer.
 - 1) Moore: Ironclad Retardo Rust-Inhibitive Paint #163.
 - 2) P & L: Effecto Rust-Inhibiting Primer.
 - 3) Or approved equal.

- b. Undercoat: Interior enamel undercoat.
 - 1) Moore: Moore's Alkyd Enamel Underbody #217.
 - 2) P & L: Interior Trim Primer.
 - 3) Or approved equal

- c. Finish Coat: Interior, semigloss, odorless, alkyd enamel.
 - 1) Moore: Moore's Satin Impervo Enamel #235.
 - 2) P & L: Cellu-Tone Alkyd Satin Enamel.
 - 3) Or approved Equal

END OF SECTION

SECTION 09-9600-COATING SYSTEMS FOR STEEL

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.
- B. See Section 09 9000 Painting for interior non-ferrous metal

1.2 SUMMARY

- A. This Section includes surface preparation, painting, and finishing of exposed exterior ferrous metal items and surfaces .
 - 1. Surface preparation, priming, and finish coats specified in this Section are in addition to shop-priming and surface treatment specified under other Sections.

1.3 REFERENCES

- A. ASTM D 16 - Terminology Relating to Paint, Varnish, Lacquer, and Related Products.
- B. SSPC-SP 1 - Solvent Cleaning.
- C. SSPC-SP 2 - Hand Tool Cleaning.
- D. SSPC-SP 3 - Power Tool Cleaning.
- E. SSPC-SP 6/NACE 3 - Commercial Blast Cleaning.

1.4 DEFINITIONS

- A. Definitions of Painting Terms: ASTM D 16, unless otherwise specified.
- B. Dry Film Thickness (DFT): Thickness of a coat of paint in fully cured state measured in mils (1/1000 inch).

1.5 SUBMITTALS

- A. Comply with Section 01330 - Submittal Procedures.
- B. Product Data: Submit manufacturer's product data for each coating, including generic description, complete technical data, surface preparation, and application instructions.
- C. Color Samples: Submit manufacturer's color samples showing full range of standard colors.
- D. Manufacturer's Quality Assurance: Submit manufacturer's certification that coatings comply with specified requirements and are suitable for intended application.

E. Warranty: Submit manufacturer's standard warranty.

1.6 QUALITY ASSURANCE

A. Manufacturer's Qualifications:

1. Specialize in manufacture of coatings with a minimum of 10 years successful experience.
2. Able to demonstrate successful performance on comparable projects.
3. Single Source Responsibility: Coatings and coating application accessories shall be products of a single manufacturer.

B. Applicator's Qualifications:

1. Experienced in application of specified coatings for a minimum of 5 years on projects of similar size and complexity to this Work.
2. Applicator's Personnel: Employ persons trained for application of specified coatings.

C. Preapplication Meeting: Convene a preapplication meeting 3 weeks before start of application of coating systems. Require attendance of parties directly affecting work of this section, including Contractor, Architect, applicator, and manufacturer's representative. Review the following:

1. Environmental requirements.
2. Protection of surfaces not scheduled to be coated.
3. Surface preparation.
4. Application.
5. Repair.
6. Field quality control.
7. Cleaning.
8. Protection of coating systems.
9. One-year inspection.
10. Coordination with other work.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying:

1. Coating or material name.

2. Manufacturer.
 3. Color name and number.
 4. Batch or lot number.
 5. Date of manufacture.
 6. Mixing and thinning instructions.
- B. Storage:
1. Store materials in a clean dry area and within temperature range in accordance with manufacturer's instructions.
 2. Keep containers sealed until ready for use.
 3. Do not use materials beyond manufacturer's shelf life limits.
- C. Handling: Protect materials during handling and application to prevent damage or contamination.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Weather:
1. Air and Surface Temperatures: Prepare surfaces and apply and cure coatings within air and surface temperature range in accordance with manufacturer's instructions.
 2. Surface Temperature: Minimum of 5 degrees F (3 degrees C) above dew point.
 3. Relative Humidity: Prepare surfaces and apply and cure coatings within relative humidity range in accordance with manufacturer's instructions.
 4. Precipitation: Do not prepare surfaces or apply coatings in rain, snow, fog, or mist.
 5. Wind: Do not spray coatings if wind velocity is above manufacturer's limit.
- B. Ventilation: Provide ventilation during coating evaporation stage in confined or enclosed areas in accordance with manufacturer's instructions.
- C. Dust and Contaminants:
1. Schedule coating work to avoid excessive dust and airborne contaminants.
 2. Protect work areas from excessive dust and airborne contaminants during coating application and curing.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
1. Tnemec Company Incorporated, (800) 863-6321 (Design Standard)
 2. or approved Equal
- B. Product described are for Tnemec Company Incorporated product is to establish product requirements and standards to meet if submitting product substitutions.

2.2 COATING SYSTEMS FOR EXTERIOR STEEL

- A. Grilles, louvers and miscellaneous exposed steel when not factory finished:
1. System Type: Acrylic Coating System.
 2. Surface Preparation: SSPC-SP1 Solvent Clean both before and after mechanically cleaning all surfaces by whatever means practical to roughen the surfaces. All surfaces shall be clean, dry and uniformly roughened to exhibit an anchor profile..
 3. Primer / Tie Coat: Series 115 | Uni-Bond DF-Color; 2.0 to 4.0 mils DFT.
 4. Field Finish Coat: Series 1029 | Enduratone-Color; 2.0 to 3.0 mils DF
 5. Total DFT: 4.0 to 7.0 mils.
 6. Finish Color: As selected by Architect from manufacturer's standard colors.
- B. Steel Columns, Exterior Beams, Outriggers and Rain Water Leaders.
1. Shop :Surface Preparation: SSPC-SP1 Solvent Clean both before and after mechanically cleaning all surfaces per SSPC-SP6 / NACE No. 3 Commercial Blast Clean to create a dense, uniform and angular surface profile of 2.0 mils minimum.
 2. Shop Prime: Series 90-97 | Tneme-Zinc; 2.5 to 3.5 mils DFT
 3. Field: Intermediate: Series 27WB | Typoxy-Color; 4.0 to 6.0 mils DFT
 4. Field: Final Finish: Series 1095 | Endura-Shield-Color; 3.0 to 5.0 mils DFT
 5. Total DFT: 9.5 to 14.5
 6. Finish Color: As selected by Architect from manufacturer's standard colors.

2.3 ACCESSORIES

- A. Coating Application Accessories:

- B. Accessories required for application of specified coatings in accordance with manufacturer's instructions, including thinners.
- C. Products of coating manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions under which coating systems are to be applied. Notify Architect of areas or conditions not acceptable. Do not begin surface preparation or application until unacceptable areas or conditions have been corrected.

3.2 PROTECTION OF SURFACES NOT SCHEDULED TO BE COATED

- A. A. Protect surrounding areas and surfaces not scheduled to be coated from damage during surface preparation and application of coatings.
- B. B. Immediately remove coatings that fall on surrounding areas and surfaces not scheduled to be coated.

3.3 SURFACE PREPARATION OF STEEL

- A. Prepare steel surfaces in accordance with manufacturer's instructions.
- B. Fabrication Defects:
 - 1. Correct steel and fabrication defects revealed by surface preparation.
 - 2. Remove weld spatter and slag.
 - 3. Round sharp edges and corners of welds to a smooth contour.
 - 4. Smooth weld undercuts and recesses.
 - 5. Grind down porous welds to pinhole-free metal.
 - 6. Remove weld flux from surface.
- C. Ensure surfaces are dry.
- D. Interior Steel Surfaces, Mild Exposure: Remove visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter in accordance with SSPC-SP 2 or SP 3.
- E. Interior Steel Surfaces, Moderate to Severe Exposure: Remove visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter in accordance with SSPC-SP 6/NACE 3.
- F. Exterior Steel Surfaces: Remove visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter in accordance with SSPC-SP 6/NACE 3.

- G. Totally Spray-Applied Shop Coating Systems for Steel: Remove visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter in accordance with SSPC-SP 6/NACE 3.
- H. Abrasive Blast-Cleaned Surfaces: Coat abrasive blast-cleaned surfaces with primer before visible rust forms on surface. Do not leave blast-cleaned surfaces uncoated for more than 8 hours.
- I. Shop Primer: Prepare shop or field primer to receive field coat in accordance with manufacturer's instructions.

3.4 SURFACE PREPARATION OF GALVANIZED STEEL AND NONFERROUS METAL

- A. Prepare galvanized steel and nonferrous metal surfaces in accordance with manufacturer's instructions. Surface preparation recommendations will vary depending on substrate and exposure conditions.

3.5 APPLICATION

- A. Apply coatings in accordance with manufacturer's instructions.
- B. Mix and thin coatings, including multi-component materials, in accordance with manufacturer's instructions.
- C. Keep containers closed when not in use to avoid contamination.
- D. Do not use mixed coatings beyond pot life limits.
- E. Use application equipment, tools, pressure settings, and techniques in accordance with manufacturer's instructions.
- F. Uniformly apply coatings at spreading rate required to achieve specified DFT.
- G. Apply coatings to be free of film characteristics or defects that would adversely affect performance or appearance of coating systems.
- H. Stripe paint with brush critical locations on steel such as welds, corners, and edges using specified primer.

3.6 REPAIR

- A. Materials and Surfaces Not Scheduled To Be Coated: Repair or replace damaged materials and surfaces not scheduled to be coated.
- B. Damaged Coatings: Touch-up or repair damaged coatings. Touch-up of minor damage shall be acceptable where result is not visibly different from adjacent surfaces. Recoat entire surface where touch-up result is visibly different, either in sheen, texture, or color.
- C. Coating Defects: Repair in accordance with manufacturer's instructions coatings that exhibit film characteristics or defects that would adversely affect performance or appearance of coating systems.

3.7 FIELD QUALITY CONTROL

A. Inspector's Services:

1. Verify coatings and other materials are as specified.
2. Verify surface preparation and application are as specified.
3. Verify DFT of each coat and total DFT of each coating system are as specified using wet film and dry film gauges.
4. Coating Defects: Check coatings for film characteristics or defects that would adversely affect performance or appearance of coating systems.
 - a. Check for holidays on interior steel immersion surfaces using holiday detector.
5. Report:
 - a. Submit written reports describing inspections made and actions taken to correct nonconforming work.
 - b. Report nonconforming work not corrected.
 - c. Submit copies of report to Architect and Contractor.

B. Manufacturer's Field Services: Manufacturer's representative shall provide technical assistance and guidance for surface preparation and application of coating systems.

3.8 CLEANING

- A. Remove temporary coverings and protection of surrounding areas and surfaces.

3.9 PROTECTION OF COATING SYSTEMS

- A. Protect surfaces of coating systems from damage during construction.

END OF SECTION

SECTION 10-1400 - SIGNS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work included: Provide identifying devices where shown on the Drawings, as specified herein, and as needed for a complete and proper installation including, but not necessarily limited to:
 - 1. Building identification
 - 2. Room identification
 - 3. Door signs.
 - 4. Accessible directional
 - 5. Accessible restroom
 - 6. Accessible parking stall signs
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.

1.2 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen thoroughly trained and experienced in the necessary crafts and completely familiar with the specified requirements and methods needed for proper performance of the work of this Section.

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product data: Within 75 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:
 - 1. Materials list of items proposed to be provided under this Section;
 - 2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements;
 - 3. Details of installation and anchorage sufficient to enable proper interface of the work of this Section with the work of other trades.
 - 4. Samples of manufacturer's full range of standard color options.

1.4 PRODUCT HANDLING

- A. Comply with pertinent provisions of Section 01640.

PART 2 - PRODUCTS

2.1 MANUFACTUER

- A. Owner to provide door and strikeside signs Contractor to install.**
- B. Contractor to provide and install exterior site and parking signs and breakaway poles.**

2.2 MATERIALS

- A. Plaque Signs: Provided by owner.
- B. All signage shall comply with all current local, state, and federal codes and ordinances, including but not limited to: California Title-24 and the Federal Americans with Disabilities Act.
- C. All permanent signs shall have contracted both California Grade 2 Braille messages and raised letters. Dots shall be 1/10 inch (2.25 mm) on centers in each cell with 2/10 inch (5.08mm) space between cells. Dots shall be raised a minimum of 1/40 (.025) inch (0.635 mm) above background. Letters shall be raised 1/32 inch (0.794 mm). Engraved letters will not be acceptable. Letters shall have sans-serif uppercase characters.
- D. Visual characters can be serif or sans serif and upper and lower case characters may be used for visual characters. Letter style shall be Helvetica medium unless otherwise noted on drawings or schedule. Minimum size shall be 5/8" (15.9 mm) and maximum size shall be 2" (51 mm). Characters on signs shall have a width to height ratio between 3:5 and 1:1 and a stroke width to height ratio of 1:5 to 1:10.
- E. All signs shall have raised letters and Braille, as mentioned in Paragraph B above, in contrasting colors and a solid background. Sizes and form shall be as indicated on the Drawmgs.
 - 1. Background matenal: Sshall be one piece magnesium permanent color.
 - 2. Color as selected by the Architect.
 - 3. Signs shall be installed on the wall adjacent to the latch outside of the door. Where there is no wall space on the latch side, including at double leaf doors, signs shall be placed on the nearest adjacent wall.
 - 4. Mounting height shall be 60 inches above the finished floor to the centerline of the sign. Mounting locations shall be determined so that a person may approach within 3 inches of the sign without encountering protruding objects or standing within the swing of the door.
- F. Signs shall be secured in place with pressure sensitive adhesive and vandal proof screws, one at each corner of the sign, minimum of 4 screws per sign.

- G. Signs adhered to glass are to have a corresponding opaque vinyl decal that matches the sign in shape and field color to be applied to opposite side of glass then the sign. Adhesive method shall bond sign to glass to prevent removal.
- H. In addition to the permanent signage required above, provide signs at restroom doors accessible to the physically disabled in the shape and size required by California Title 24 of CCR and as follows.
 - 1. Doorways leading to men's sanitary facilities, shall be identified by an equilateral triangle 1/4 inch thick with edges 12 inches long and a vertex pointing upward. Women ' s sanitary facilities shall be identified by a circle, 1/4 inch thick and 12 inches in diameter. Unisex sanitary facilities shall be identified by a circle, 1/4 inch thick, 12 inches in diameter with a 1/4 inch thick triangle superimposed on the circle and within the 12 inch diameter. These geometric symbols shall be centered on the door at a height of 60 inches and their color and contrast shall be distinctly different from the color and contrast of the door.

2.3 ACCESSIBILITY SYMBOLS

- A. Where called for accessibility symbol shall be the International Symbol of Accessibility The symbol shall be a white figure on a blue background.
- B. Install International Symbol of Accessibility at building entrances and additional directional signs as indicated.
- C. Occupancy signs posting maximum occupancy , if required, shall be in compliance with the State Fire Marshal and the local fire authority and shall be located in a conspicuous location near entry and exit locations.

2.4 SIGN SCHEDULE

- A. Refer to the schedule on drawings for location type and text.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be - performed. Correct conditions detrimental to timely and proper completion of the
- B. Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 INSTALLATION

- A. Install the work of this Section in strict accordance with the manufacturers' recommendations, using only the approved mounting materials, and locating all components firmly into position, level and plumb.

END OF SECTION

SECTION 10-2800 - TOILET ROOM ACCESSORIES:

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work included: Provide toilet room accessories where indicated on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.

1.2 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen thoroughly trained and experienced in the necessary crafts and completely familiar with the specified requirements and methods needed for proper performance of the work of this Section.
- B. Mounting heights and locations of toilet accessories shall meet accessibility requirements of California Title 24, and American with Disabilities Act, (A.D.A.) Public Law 101-336.

1.3 SUBMITTALS

- A. Comply with pertinent provisions of Section 01340.
- B. Product data: Within 75 calendar days after the contractor has received the Owner's Notice to Proceed, submit:
 - 1. Materials list of items proposed to be provided under this Section;
 - 2. Manufacturer's specifications, catalog cuts, and other data needed to demonstrate compliance with the specified requirements.

1.4 PRODUCT HANDLING

- A. Comply with pertinent provisions of Section 01640.

PART 2 - PRODUCTS

2.1 TOILET ROOM ACCESSORIES

- A. Provide the following products of Bobrick Washroom Equipment Company, or equal approved by the Architect.
 - 1. Feminine Napkin Disposal and Toilet Tissue Dispenser (women's accessible stalls)
 - a. B-3094 Classic Series Recessed Sanitary Napkin / Toilet Tissue Dispenser Combo .

- b. In accessible Restroom dispenser shall not project more than 3 inches from the wall of partition and shall be no closer than 1.5 inches to the tangent point of the grab bar.
- 2. Toilet Seat Cover Dispenser
 - a. B-4221 Contura series surface mounted unit of Type 304 stainless steel , satin finish.
- 3. Soap Dispenser
 - a. Bobrick B-822 lavatory.
- 4. Paper Towel Dispenser
 - a. Owner provided contractor install.
- 5. Waste Receptacle
- 6. Owner provided contractor install - Staff restroom
- 7. Grab Bars
 - a. Bobrick series B-6806, 1-1/2" diameter, 18 gauge, Type 304 stainless steel satin finish tubing with anchors and fasteners for concealed mounting.

2.2 OTHER MATERIALS

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the review of the Architect.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 INSTALLATION

- A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.
- B. Install each item in its proper location, firmly anchored into position, level and plumb, and in accordance with the manufacturer's recommendations.

END OF SECTION

SECTION 10-4116 - FIRE EXTINGUISHERS, CABINETS, AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:

- 1. Fire extinguishers.
- 2. Fire extinguisher cabinets.

1.3 SUBMITTALS

- A. General: Submit the following according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Manufactures product data of proposed items to be provided with the following information:
 - 1. Material specifications demonstrating the items meet the requirements of this section.
 - 2. Size, weight, mounting detail and required clearance necessary for each product proposed.

1.4 QUALITY ASSURANCE

- A. Single-Source Responsibility: Obtain extinguishers and cabinets from one source from a single manufacturer.
- B. UL-Listed Products: Fire extinguishers shall be UL listed with UL listing mark for type, rating, and classification of extinguisher.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
 - 1. Larsen's Manufacturing Co.
 - 2. Modern Metal Products by Muckle.
 - 3. Potter-Roemer, Inc.

4. or approved equal

2.2 FIRE EXTINGUISHERS

- A. General: Provide fire extinguishers for each cabinet and other locations indicated, in colors and finishes selected by Architect from manufacturer's standard, that comply with authorities having jurisdiction.
- B. Multipurpose Dry Chemical Type: UL-rated 2-A:10:B:C, 5-lb nominal capacity, in enameled steel container.

2.3 CABINETS

- A. Construction: Manufacturer's standard box, with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated. Weld joints and grind smooth. Miter and weld perimeter door frames.
- B. Fire-Rated Cabinets: UL listed with UL listing mark with fire-resistance rating of wall where it is installed.
- C. Cabinet Type: Suitable for containing the following:
 1. Fire extinguisher.
- D. Cabinet Mounting: Suitable for the following mounting conditions:
 1. Fully recessed: ADA compliant cabinet box (tub) fully recessed in walls.
- E. Trim Style: Fabricate trim in one piece with corners mitered, welded, and ground smooth.
 1. Exposed Trim: One-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend).
 - a. Square-edge trim with 1/4- to 5/16-inch backbend depth.
 - b. Trim Metal: Of same metal and finish as door.
- F. Door Material and Construction: Manufacturer's standard door construction, of material indicated, coordinated with cabinet types and trim styles selected.
 1. Enameled Steel: Manufacturer's standard finish, hollow steel door construction with tubular stiles and rails.
 2. Door Glazing: Fully tempered float glass complying with ASTM C 1048, Condition A, Type I, Quality q3, Kind FT, Class as follows:
 - a. Class 1 (clear).
- G. Identify fire extinguisher in cabinet with FIRE EXTINGUISHER lettering applied to door. Provide lettering to comply with authorities having jurisdiction for letter style, color, size, spacing, and location.

1. Application Process: Etched.

H. Door Style: Manufacturer's standard design.

1. Frameless Tempered Full-Glass Panel: Frosted, tempered float glass with polished edges and inside surface etched with lettering or design indicated.

2. Door Hardware: Provide manufacturer's ADA compliant door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated. Provide either lever handle with cam-action latch, or exposed or concealed door pull and friction latch. Provide concealed or continuous-type hinge permitting door to open 180 deg.

2.4 FINISHES FOR CABINETS, GENERAL

A. Comply with NAAMM "Metal Finishes Manual" for recommendations relative to applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying temporary strippable protective covering prior to shipping.

2.5 STEEL CABINET FINISHES

A. Surface Preparation: Solvent-clean surfaces complying with SSPS-SP 1 to remove dirt, oil, grease, and other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5 (white metal blast cleaning) or SSPC-SP 8 (pickling).

B. Factory-Priming for Field-Painted Finish: Apply shop primer specified below immediately following surface preparation and pretreatment.

1. Shop Primer: Manufacturer's or fabricator's standard fast-curing, lead-free, universal primer, selected for resistance to normal atmospheric corrosion, for compatibility with substrate and field-applied finish paint system indicated, and for capability to provide a sound foundation for field-applied topcoats despite prolonged exposure.

C. Baked-Enamel Finish: Immediately after cleaning and pretreatment, apply manufacturer's standard two-coat baked-enamel finish consisting of prime coat and thermosetting topcoat. Comply with paint manufacturer's instructions for applying and baking to achieve a minimum dry film thickness of 2.0 mils.

1. Color and Gloss: As selected by Architect from manufacturer's standard choices for color and gloss. Paint the following:

a. Exterior of cabinet, except for those surfaces indicated to receive another finish.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions under which work will be performed under this Section. Do not proceed until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Follow manufacturer's printed instructions for installation.
- B. Install in locations and at mounting heights indicated or, if not indicated, at heights to comply with applicable regulations of governing authorities.

END OF SECTION

SECTION 22-0000 - GENERAL PLUMBING REQUIREMENTS

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.
- B. Consult all other Sections, determine the extent and character of related work and properly coordinate work specified herein with that specified elsewhere to produce a complete and operable installation. This Section is provided to assist Contractor in coordination of work scope but shall not be construed to limit Contractor's scope of work encompassed by the contract documents.
- C. Related work specified elsewhere:
 - 1. Utilities five feet beyond building line unless noted otherwise.
 - 2. Structural steel (except as specified herein). Support of plumbing materials and equipment.
 - 3. Painting (except as specifically indicated).
 - 4. Sleeves, inserts and plumbing equipment installed under other Sections.

1.2 SUMMARY

- A. Work included: Materials, equipment, fabrication, installation, starting, testing and commissioning in conformance with applicable codes and authorities having jurisdiction for Plumbing Work covered by all sections within this Division including, but not limited to:
 - 1. Plumbing.
 - 2. Sealants and firestopping.

1.3 REFERENCE STANDARDS

- A. Reference to codes, standards, specifications and recommendations of technical societies, trade organizations and governmental agencies shall mean that latest edition of such publications adopted and published prior to submittal of the bid. Such codes or standards shall be considered a part of this Specification as though fully repeated herein.
- B. Work shall be performed in accordance with all applicable requirements of the latest edition of all governing codes, rules and regulations including but not limited to the following minimum standards, whether statutory or not
- C. Requirements of Regulatory Agencies:
 - 1. In accordance with the requirement of Division 1 - General Requirements.

2. Nothing in contract documents shall be construed to permit work not conforming to current and applicable laws, ordinances, rules and regulations.
 3. When contract documents exceed requirements of applicable laws, ordinances, rules and regulations, comply with documents establishing the more stringent requirement.
 4. It is not the intent of contract documents to repeat requirements of codes except where necessary for completeness or clarity.
 5. Seismic construction and restraints: In accordance with requirements of CBC 2013 and ASCE 7-10.
 6. Comply with the Safety Orders issued by California Occupational Safety and Health Act, COSHA and any other safety, health or environmental regulations of the State of California and any districts having jurisdictional authority. Where an omission or conflict appears between COSHA requirements and the Drawings and Specifications, COSHA requirements shall take precedence.
 7. Applicable codes and standards as listed below, in addition to others specified in individual sections:
 - a. See Specification Section 01-4000 - REGULATORY REQUIREMENTS & REFERENCE STANDARDS
- D. Published specifications, standards, tests or recommended method of trade, industry or governmental organizations as listed below apply to all work in Divisions 22, in addition to other standards which may be specified in individual sections.
- E. All base material shall meet ASTM and ANSI standards.
- F. All Gas Fired Devices: Comply with standards and bear label of AGA.
- G. All Pressure Vessels, Relief Valves, Safety Relief Valves and Safety Valves: Comply with standards, ASME stamped.
- H. All Electrical Devices and Wiring.
 1. Conform to standards of CEC/NEC.
 2. All devices UL or EU listed and identified.
- I. Guidelines and Standards: The latest edition of guidelines and standards published by the following groups will govern the Plumbing Systems and associated support system design. The systems shall be designed to meet or exceed these guidelines and standards.
 1. AABC - Associated Air Balance Council
 2. ADC - Air Diffuser Balance Council
 3. AGA - American Gas Association

4. AMCA - Air Movement and Control Association, Inc.
 5. ANSI - American National Standards Institute
 6. ARI - Air Conditioning and Refrigeration Institute
 7. ASC - Adhesive and Sealant Council
 8. ASHRAE - American Society of Heating, Refrigeration and Air Conditioning Engineers
 9. ASME - American Society of Mechanical Engineers
 10. ASTM - American Society for Testing and Materials
 11. AWWA - American Water Works Association
 12. AWS - American Welding Society
 13. COSHA - California Occupational Safety and Health Act
 14. ETL - Intertek Semko (Formerly Electrical Testing Laboratories)
 15. GISO - General Industry Safety Orders
 16. HI - Hydraulic Institute
 17. IEEE - Institute of Electrical and Electronic Engineers
 18. NBS - National Bureau of Standards
 19. NEBB - National Environmental Balancing Bureau
 20. NEMA - National Electrical Manufacturer's Association
 21. NFPA - National Fire Protection Association
 22. OSHPD - Office of Statewide Health Planning and Development
 23. SFA - California State and Local Fire Marshall
 24. SMACNA - Sheet Metal and Air Conditioning Contractors National Association, Inc.
 25. UL - Underwriters' Laboratories, Inc.
- 1.4 QUALITY ASSURANCE
- A. Supply all equipment and accessories in compliance with the applicable standards listed and with all applicable national, state and local codes.
 - B. All equipment and accessories shall be new and the product of a manufacturer regularly engaged in its manufacture.

- C. All items of a given type shall be the products of same manufacturer.
 - D. Conform to DSA Bulletin BU-09-10 regarding installation of "LEAD FREE" plumbing fixtures, fittings and piping.
- 1.5 PRODUCT SUBMITTALS
- A. Comply with pertinent provisions of Section 01340.
 - 1. Product data: Within 75 calendar days after the Contractor has received the Owner's Notice to Proceed, submit: Materials list of items proposed to be provided under this Section;
 - 2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
 - B. No work may begin on any part of this Project until the related submittals have been reviewed for conformity with the design intent and the Contractor has responded to all comments to the satisfaction of the Owner's Representative.
 - C. Submit drawings, product data, samples and certificates of compliance required as hereinafter specified. See also Division I for additional requirements.
 - D. Submit Product Data and material safety data sheets (MSDSs) for adhesives and sealants used on the interior of the building indicating VOC content of each product used. Indicate VOC content in g/L calculated according to 40 CFR 59, Subpart D (EPA method 24).
- 1.6 SHOP DRAWINGS
- A. Prepare and submit Shop Drawings for all Work, Minimum 1/4" per foot scale. Clearly indicate any proposed deviations from contract documents.
 - 1. Shop fabrication, coordination and installation drawings by the Contractor, are for the Contractor's use and shall be the Contractor's responsibility. These Drawings indicate where the Contractor intends to install the material and equipment as required by the Contract Documents.
 - a. Contractor's reliance of contract documents or electronic files of contract documents for shop drawings is not acceptable.
 - B. Layout drawings, as a requirement of Division 22, shall indicate superimposed Work of all Sections involved including ductwork, piping, electrical work, ceiling work, etc. Include all mechanical rooms.
 - 1. Individual coordinated trade layout drawings are to be prepared for all deviations from design documents.
 - C. Contractor is to assure that each trade has coordinated work with other trades, prior to submittal.
 - 1. Identify any coordination or trade conflicts with proposed resolution.

- a. Include stamp on each submittal indicating that layout shop drawing has been coordinated.
 - b. No layout shop drawing will be reviewed without stamped and signed coordinated assurance by Contractor.
2. All changes shall be clearly marked on each submitted layout drawing.
- D. Review is not intended to verify dimensions or quantities, or to coordinate items shown on these Drawings, Review is for general conformance with design concept of the Project and general compliance with the information given in the Contract Documents. Contractor is responsible for dimensions, which shall be confirmed and correlated at the Jobsite, for fabrication processes and techniques or construction, for coordination of Work with that of all other trades and the satisfactory performance of Work.
- E. Shop drawings shall show work of all trades including but not limited to:
 1. Ductwork.
 2. Piping: All trades.
 3. Fire and smoke dampers, tag each damper with a unique tag number.
 4. Electrical equipment.
 5. Main electrical conduits and bus ducts.
 6. Equipment supports and suspension devices.
 7. Structural and architectural constraints.
 8. Show location of:
 - a. Valves: Manual and automatic.
 - b. Piping specialties.
 - c. Dampers: Fire/ smoke, automatic and manual volume, etc.
 - d. Access doors.
 - e. Control and electrical panels.
 - f. Others as required for clear coordination.
- F. Drawings shall indicate coordination with work specified in other Divisions which must be coordinated with work specified under Division 22, including (where applicable), but not limited to:
 1. Site utilities and irrigation equipment and piping.
 2. Cable trays.

3. Computer equipment.
4. Others as required.

1.7 CLOSE-OUT REQUIREMENTS

A. Procedure:

1. Until the documents required in this Section are submitted and approved, the system will not be considered "accepted".
2. Before requesting acceptance of work, submit one set of Completion Documents for review and approval of Owner's Representative.
3. After review, furnish quantity of sets indicated below to Owner.
4. Format
 - a. Paper copies; assemble in chronological order following alpha-numeric system used in specification, in heavy three-ring binder.

B. Operating and Maintenance (O&M) Manual:

1. In accordance with requirements of Division 1 - General Requirements.
2. O&M Manual shall include but is not limited to the following:
 - a. Complete Product Data Submittals so that the details of the device are known.
 - b. Manufacturer's name, model number, service manual, spare-parts list and descriptive literature for all components.
 - c. Operating instructions.
 - d. Maintenance and repair requirements.
 - e. Wiring diagrams.
 - f. Requirements for special tools, test kits and calibration instructions.
 - g. Replacement parts list.
 - h. Valve tag directory.
 - i. Name, address and phone number of contractor's equipment suppliers and service agencies.

C. Record Drawings:

1. Keep up-to-date during progress of job, one set of reproducible of Plumbing Drawings indicating the Record installation. In addition to changes made during course of Work, show following by dimension from readily obtained base lines:
 - a. Fully illustrate all revisions made by all trades in the course of work.
 - b. Include all field changes, adjustments, variances, substitutions and deletions, including all Change Orders.
 - c. Exact location, type and function of concealed valves, controllers, piping, air vents and piping drains.
 - d. Exact size, invert elevations and location of underground and under floor piping.
2. Progress drawing set shall be available for inspection by Owner's Representative weekly.
3. Update shop drawings and record drawings to reflect revisions and additional data listed above at completion of Project:
 - a. Original engineering design drawings will be provided to Contractor in electronic format compatible with AutoCAD version 2011 or later.
 - b. Both shop and engineering design drawings shall be in format compatible with AutoCAD version 2011 or later.
 - c. Drawings required to be updated if revisions were made:
 - 1) Floor plans.
 - 2) Shop drawings.
 - 3) Sections.
 - 4) Riser diagrams.
- D. Commissioning Reports:
 1. Coordinate with Owner's Representative.
- E. Miscellaneous Certificates:
 1. Pressure and Leakage Test documentation/ certificates.
 2. Training/Instruction completion certificates.
 3. Fire Marshal and Fire Department approvals of system, as required.
 4. Final inspection certificate signed by governing authorities.
 5. Warranty period, including start and end period.

6. Field test report, including as applicable:
 - a. Startup documents with date and name of technician.
 - b. Piping pressure tests.
 - c. Drain pan drainage tests.
 - d. Letters from manufacturers certifying their supervision of equipment installation and start-up procedures.
 - e. Machinery vibration test reports.

1.8 SUBSTITUTIONS AND PRODUCT OPTIONS

A. Contractor's Options:

1. For products specified only by reference standard, select product meeting that standard, by any manufacturer.
2. For products specified by naming one product or manufacturer, submit request for substitutions for any product or manufacturer which is not specifically named in accordance with substitutions clause. Refer to Division I Specification for substitution procedures.
3. Wherever catalog numbers and specific brands or trade names are used, they are used to establish standards of quality, utility and appearance required.

1.9 DESCRIPTION OF BID DOCUMENTS

A. Drawings:

1. Drawings in general are diagrammatic. Intention is to show size, capacity, approximate location, direction and general relationship of one work phase to another, but not exact detail or arrangement
2. Scaled and figured dimensions are approximate and are for estimating purposes only. Indicated dimensions are limiting dimensions where noted. Piping elevation requirements shall be determined by the Contractor after final coordination with other trades.
3. Before proceeding with work check and verify all dimensions in field.
4. Assume all responsibility for fitting of materials and equipment to other parts of equipment and structure.
5. Make adjustments that may be necessary or requested in order to resolve space problems, preserve headroom and avoid architectural openings, structural members and work of other trades.
6. For exact locations of building elements, refer to dimensional Architectural and Structural drawings.

- B. Do not use equipment exceeding dimensions indicated on drawings or equipment or arrangements that reduce required clearances or exceed specified maximum dimensions.
- C. If any part of Specifications or Drawings appears unclear or contradictory, apply to Owner's Representative for an interpretation and decision as early as possible.
 - 1. Do not proceed with work without the decision of the Owner's Representative.

1.10 PROJECT CONDITIONS

- A. Examine site related work and surfaces before starting work of any Section:
 - 1. In case of conflict, the most stringent takes precedence.
 - 2. For purposes of clarity and legibility, Drawings are essentially diagrammatic to extent that many piping offsets, bends, unions, special fittings, exact locations of items are not indicated, unless specifically dimensioned. Especially note a number of required pipe offsets to coordinate with structure are not shown. Coordinate dimensioned conditions, including invert elevations, with other trades prior to installation by any trade.
 - 3. Exact routing of piping, etc. shall be governed by structural conditions, obstructions. Not all offsets in piping are shown on the plumbing drawings. Determine which item to offset or relocate. Maintain required slope in piping. Make use of data in Contract Documents. In addition, Owner's Representative reserves right, at no additional cost to the Owner, to make any reasonable change in location of mechanical items, exposed at ceiling or on walls, to group them into orderly relationships or increase their utility. Verify Owner's Representative's requirements in this regard prior to rough-in.
 - 4. Take dimensions, location of doors, partitions, similar physical features from Architectural Drawings. Verify at Site under this Division. Consult Architectural Drawings for exact location of outlets to center with Architectural features, panels, etc., at the approximate location shown on plumbing drawings.
 - 5. Mounting heights of brackets, outlets, etc., as required.
 - 6. Report to Owner's Representative, in writing, conditions which will prevent proper provision of this work.
 - 7. Beginning work of any Section without reporting unsuitable conditions to Owner's Representative constitutes acceptance of conditions by Contractor and any adjustments after the beginning of work shall be performed at no cost to the Owner.
 - 8. Perform any required removal, repair or replacement of this work caused by unsuitable conditions at no additional cost to the Owner.
- B. Coordination:

1. Work out all congested conditions involving Work specified under this Division and Work in other Divisions in advance of installation. If necessary, and before Work proceeds in these areas, prepare supplementary Drawings under this Division for review showing all Work in congested area. Provide supplementary Drawings, additional Work necessary to overcome congested conditions, at no additional cost to the Owner.
 2. Conflicts: Difference or disputes concerning coordination, interference or extent of Work between sections shall be decided as follows:
 - a. Install plumbing and electrical systems in the following order of preference (those trades listed below another must reroute to resolve the conflict):
 - 1) Drain piping required by code to be sloped.
 - 2) Electrical conduit 4 inches and larger.
 - 3) Domestic water piping.
 - 4) Fire sprinkler piping.
 - 5) Electrical conduit smaller than 4 inches.
 - 6) Control system piping and wiring.
 - b. Continued disputes shall be decided by Contractor and Contractor's decision, if consistent with Contract Document requirements, shall be final.
 3. Supervision: An authorized and competent representative shall constantly supervise the work from beginning to completion.
 4. Provide templates, information and instructions to other Divisions to properly locate holes and openings to be cut or provided.
 5. The drawings govern in matters of quantity, and the specifications govern in matters of quality. In the event of conflict within the drawings involving quantities, or within the specifications involving quantities, or within the specifications involving quality, the greater quantity and higher quality shall apply. Such discrepancies shall be noted and clarified in the Bid. No additional allowances will be made because of errors, ambiguities, or omissions that reasonably should have been discovered during the preparation of the Bid.
- C. Equipment Rough-In:
1. Rough-in locations shown on plumbing drawings for equipment furnished by the Owner and for equipment furnished under other Divisions are approximate only. Obtain exact rough-in locations from following sources.
 - a. From Shop Drawings for equipment provided under this contract

- b. From Owner's Representative for Owner furnished-Contractor installed equipment
 - c. From existing equipment where such equipment is relocated under this Contract.
 - 2. Verify plumbing characteristics of equipment before starting rough-in. Where conflict exists between equipment and rough-in shown on Drawings obtain clarification from Owner's Representative and provide as directed by the Owner's Representative at no additional cost to the Owner.
 - 3. Make final connections.
- 1.11 CLEARANCE FROM ELECTRICAL EQUIPMENT
 - A. Piping:
 - a. Prohibited, except as noted, in Electric rooms and closets over equipment, as restricted by CEC.
 - b. Telephone rooms and closets.
 - c. Elevator machine rooms.
 - d. Electric switchboard room.
 - 2. Prohibited, except as noted, over or within 5 feet of:
 - a. Transformers.
 - b. Substations.
 - c. Switchboards.
 - d. Motor control centers.
 - e. Standby power plant
 - f. Bus ducts.
 - g. Electrical panels.
- B. Drip pans under piping:
 - 1. Where piping is located over any electrical equipment listed above, reroute piping if possible rather than use drip pan.
 - 2. 18 gage galvanized steel.
 - 3. 18 gage copper.
 - 4. Reinforced and supported.

5. Watertight
6. With 1-1/4 inch drain outlet piped to floor drain or service sink.

1.12 PRODUCT DELIVERY, HANDLING AND STORAGE

- A. See Division I - General Requirements.
- B. Deliver equipment in its original package to prevent damage or entrance of foreign matter. Provide materials on factory provided shipping skids and lifting lugs if required for handling, provide protective coverings during construction.
- C. Handle and ship in accordance with manufacturer's recommendations.
- D. Identify materials and equipment delivered to Site to permit check against approved materials list, reviewed with no exceptions taken Shop Drawings.
- E. Protect from loss or damage. Replace lost or damaged materials and equipment with new at no additional cost to the Owner.
- F. Where necessary, ship in crated sections of size to permit passing through available space.

1.13 PROJECT MANAGEMENT AND COORDINATION SERVICES

- A. See Division I - General Requirements.
- B. Overview: Provide a project manager/ engineer for the duration of the Project to coordinate the Division 22 work with all other trades. Coordination services, procedures and documentation responsibility shall include, but shall not be limited to the items listed in this Section.
- C. Review of submittals and shop drawings prepared by other subcontractors.
 1. Obtain copies of all submittals and shop drawings for equipment provided by others that require electrical service connections or interface with Division 22. Provide the electrical contractor a complete list of all required electrical connections.
 2. Perform a thorough review of the submittals and shop drawings to confirm compliance with the service requirements contained in the Division 22 contract documents. Document any discrepancy or deviation as follows:
 - a. Prepare report summarizing the discrepancy.
 - b. Provide a copy of the specific submittal or shop drawing, indicating via cloud, the discrepancy.
 3. Prepare and maintain a submittal and shop drawing review log indicating the following information:
 - a. Shop drawing or specification number and brief description of the system/ material.

- b. Date of your review.
 - c. Indication if follow-up coordination is required.
 - D. Request for information (RFI):
 - 1. See Division I - General Requirements.
- 1.14 REVIEW OF CONSTRUCTION
 - A. Work may be reviewed at any time by the Owner's Representative
 - B. Advise Owner's Representative that work is ready for review at following times:
 - 1. Prior to backfilling buried work.
 - 2. Prior to concealment of work in walls and above ceilings.
 - 3. When all requirements of Contract have been complete.
 - C. Neither backfill nor conceal work without Owner's Representative's consent
 - D. Maintain on job set of Specifications and Drawings for use by Owner's Representative's: 1. Include all change orders.
 - E. Contractor is responsible for construction methods, sequences and safety precautions.
- 1.15 SCHEDULE OF WORK
 - A. In accordance with Division 1:
 - 1. Arrange work to conform to schedule of construction established or required to comply with Contract Documents.
 - 2. In scheduling, anticipate means of installing equipment through available openings in structure.
- 1.16 CUTTING AND PATCHING
 - A. See Division I - General Requirements.
- 1.17 UTILITY CONNECTIONS
 - A. Connect to on-site piping mains.
- 1.18 WARRANTY
 - A. In accordance with Division 1.

- B. Warranty all materials, equipment, apparatus and workmanship to be free of defective materials and faulty workmanship for period of two year from date of filing of Notice of Completion or upon beneficial use, at the direction of the Owner's Representative.
- C. Provide new materials, equipment, apparatus and labor to replace that determined by Owner's Representative to be defective or faulty.
- D. This guarantee also applies to services including instructions, adjusting, testing, noise, balancing, etc.
- E. Furnish Manufacturers' standard Warranties in excess of one year.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Alternate manufacturers as identified in each section will be considered under conditions specified in Paragraph 1,9 of this Section.
- B. Identify materials, equipment by manufacturer's name, nameplate data. Remove unidentified materials, equipment from Site.
- C. Equipment specified by manufacturer's number shall include all accessories, controls, etc., listed in catalog as standard with equipment. Furnish optional or additional accessories as specified.
- D. Where no specific make of material or equipment is mentioned, any first class product of reputable manufacturer may be used, provided it conforms to requirements of system and meets with acceptance.
- E. Provide an authorized representative to constantly supervise work of this Division, check all materials prior to installation for conformance with Drawings, Specifications, reviewed Submittals and reviewed Shop Drawings.
- F. Conform to conditions shown and specified. Coordinate with other trades for best possible assembly of combined Work. Relocate equipment when necessitated by failures to coordinate Work or to advise Owner's Representative of conflicts in writing.
- G. Material and Equipment-General Requirements:
 - 1. New.
 - 2. Approved for use by State Fire Marshal.
 - 3. Testing agency labeled or with other identification wherever standards have been established.
 - 4. Owner's Representative reserves right to reject items not in accordance with Specification either before or after installation.

5. Comprised to render complete and operable systems; provide additional items needed to complete installation to conform with design intent.
 6. Compatible with space allocated; modifications necessary to adjust items to space limitations at Contractor's expense.
 7. Installed fully operating and without objectionable noise or vibration.
 8. Design of plumbing systems is generally based on product of the first named manufacturers cited. Where systems for product installed necessitate modification of systems shown on drawings, Contractor is responsible for installation of systems appropriate to product installed.
 9. For interior applications use paints and coatings that comply with requirements of Division 1, CalGreen Standards and VOC limitations.
- H. Electrical Requirements
1. Electrical Work performed under Divisions 22 shall conform to requirements of Division 26- Electrical.
 2. Provide weatherproof devices and installation for out-of-doors work.

PART 3 - PART 3 EXECUTION

3.1 INSPECTION

- A. Verify that conditions are satisfactory for the installation of materials and equipment. Make field measurements to ensure that items will fit in the space available. Verify that penetrations and blocking have been installed properly and located correctly. Notify Owner's Representative if conditions are not satisfactory and do not commence work until conditions have been corrected.

3.2 INSTALLATION

- A. Install materials and equipment in compliance with governing codes.
- B. Use printed descriptions, specifications and recommendations of manufacturers as a guide for installation of Work, Follow in all cases where manufacturers' of articles used furnish directions covering points not specified or shown.
- C. Equipment
 1. See Division I - General Requirements.
 2. Assemble equipment which is required to be field assembled under the direct supervision of the manufacturers' agent.

3. Prior to the final acceptance submit letters from the manufacturers that equipment has been assembled under the direct supervision of the manufacturers' agent
 4. Accurately set and level equipment with supports neatly placed and properly fastened.
 5. Properly fasten equipment in place with bolts to prevent movement during a seismic event
 6. Coordinate the installation of equipment with openings in structure.
 7. Arrange piping and equipment for ready access to valves, unions and adequate clearances for maintenance and service.
 8. Coordinate and fully dimension steel or wood supports for plumbing equipment where shown on drawings with installing contractor.
 9. Provide all roof and piping penetrations, etc.
 10. Concrete:
 - a. Concrete work, include forming, steel bar reinforcing, cast-in-place concrete, finishing and grouting is specified under Division 3-Concrete.
 - b. Coordinate and fully dimension concrete housekeeping pads and curbs with installing contractor; dimensions shall be as required for structural and seismic requirements.
- D. Electrical:
1. See Division 26 - Electrical.
 2. Install electrical devices with code required clearances and access.
 3. Assist the electrical contractor in the proper connecting of all electrical wiring and equipment required for plumbing equipment
- E. Sleeves, Chases and Concrete Inserts:
1. Provide all required sleeves, chases, concrete inserts, anchor bolts, etc.
 2. Sleeves, chases are prohibited in structural members, except where shown or as approved by SEOR or directed by Owner's Representative in writing.
 3. Do not embed piping in concrete.
- F. Escutheons: Provide spring clamp plates where pipes run through walls, floors or ceilings and are exposed in finish locations of the building. Plates shall be chrome plated heavy brass of plain pattern and shall be set tight to pipe and building surface.

G. Waterproof Construction:

4. Include membrane clamps, sheet metal flashing, counter flashing, caulking and sealant as required for waterproofing of piping penetrations and sealing penetrations in or through fire walls, floors, ceiling slabs and foundation walls.
5. All penetrations through vapor barriers at slabs on grade shall be taped and made vapor tight.

H. Restoration of Damage:

6. Repair or replace, as directed by Owners Representative, materials and parts of premises which become damaged.
7. Remove replaced parts from premises at no additional cost to the Owner.

I. Review architectural drawings and coordinate with Architect and other contractors to be sure that all architectural shafts, plenums, rated duct enclosures etc. required for plumbing systems are properly located and dimensioned.

3.3 PROTECTION OF MATERIALS

- A. See Division 1- General Requirements.
- B. Completely cover motors and other moving machinery to protect from dirt and water during construction.
- C. Cap all openings in pipe daily to protect against entry by foreign matter.
- D. Material, equipment or apparatus damaged because of improper storage or protection will be rejected.
 1. Remove from site and provide new, duplicate, material, equipment or apparatus in replacement of that rejected.
- E. Perform Work in manner precluding unnecessary fire hazard.

3.4 ADJUSTMENT

A. Preliminary Operation:

1. Operate any portion of installation for Owner's convenience if so requested by Owner's Representative. Such operation does not constitute acceptance of Work as complete but does constitute beneficial use. Cost of utilities, such as gas and electrical power, will be borne by the Owner if operation is requested by Owner's Representative.

B. Startup Service:

1. Prior to startup, ensure that systems are ready, including checking the following: proper equipment rotation, proper wiring, auxiliary connections, lubrications, controls and properly set relief and safety valves.

2. Start and operate all systems.
3. Provide services of factory trained technicians for startup of major equipment and systems including EMS, etc.
4. Life Safety Testing,
 - a. Correct any problems related to equipment supplied under Divisions 22.
 - b. Provide all tests required to start and commissioning the system and for assisting the design/ construct team in demonstrating system compliance to DSA inspector.

C. Noise:

1. Cooperate in reducing any objectionable noise or vibration caused by plumbing systems to the extent of adjustments to specified and installed equipment and appurtenances.
2. Completely correct noise problems caused by failure to make installation in accordance with Contract Documents, including labor and materials required as a result of such failure, at no additional cost to the Owner.

3.5 SPECIAL TOOLS

A. Furnish to Owner at completion of work:

1. One set of any special tools required to operate, adjust, dismantle or repair equipment furnished under any section of this Division.
2. Pressure gage and temperature sensor for piping test plug.

3.6 CLEANING

A. Cleaning 1, See Division 1.

B. Thoroughly clean equipment, fans, pumps, motors, piping and other materials under this Division free from all rust, scale and all other dirt before any covering or painting is done, or the systems put in operation; leave in condition satisfactory to Owners Representative.

C. At all times keep the premises free from accumulation of waste material and debris caused by his employees. At the completion of the Project, and at other times as Owners Representative may direct, remove refuse from within and around the building. All tools, scaffolding and surplus materials shall also be removed, leaving the Site of his Work clean.

D. Completely cover all motors and other moving machinery to prevent entry of dirt and water during construction.

3.7 PAINTING

- A. Cleaning 1, See Division 1.
- B. Painting:
 - 1. Piping exposed to outdoors:
 - a. One coat primer.
 - b. Two coat alkyd oil paint, UV resistant for PVC piping, color as indicated.
 - c. Not required for copper, galvanized steel, or insulated piping.
 - 2. Steel hangers and supports exposed to outdoors:
 - a. One coat primer.
 - b. Not required for galvanized steel.
 - 3. Marred surfaces of factory painted equipment
 - a. Spot coat to match adjacent coat.
 - 4. Insulation exposed to sunlight See Section 22 0529 - Hangers, Supports, Mechanical Vibration and Seismic Controls and Section 22 0700 - Piping and Equipment Insulation.
- C. Execution:
 - 1. Protect flooring and equipment with drip cloths.
 - 2. Paint and materials stored in location where directed.
 - 3. Oily rags and waste removed from building every night.
 - 4. Wire brush and clean off all oil, dirt and grease areas to be painted before paint if applied.
 - 5. Workmanship:
 - a. No painting or finishing shall be done with:
 - 1) Dust laden air.
 - 2) Unsuitable weather conditions.
 - 3) Space temperature below 60 degrees Fahrenheit
 - b. Pipes painted containing no heat and remain cold until paint is dried.
 - c. Paint spread with uniform and proper film thickness showing no runs, sags, crawls or other defects.

- d. Finished surfaces shall be uniform in sheen, color and texture.
 - e. e. All coats thoroughly dry before succeeding coats are applied, minimum 24 hours between coats.
 - f. f. Priming undercoat of slightly different color for inspection purposes. 6. Piping continuously painted in all exposed areas.
- D. Paint:
- 1. High gloss medium or long alkyd paint.
 - 2. Best grade for its purpose.
 - 3. Deliver in original sealed containers.
 - 4. Apply in accordance with manufacturer's instructions.
- E. Colors:
- 1. Colors as directed by Architect or Owner's Representative unless specified herein.
 - 2. Uncoated hangers, supports, rods and insets: dip in zinc chromate primer.
- F. Factory Finish:
- 1. Ceiling and wall mounted air outlets in acoustical tile ceilings: Baked white enamel.
 - 2. Aluminum air outlets that are not to be painted: anodized.
- G. Marred surfaces of prime coated equipment and piping: spot prime coat to match adjacent coat.
- H. Properly prepare Work under this Division to be finish painted under other Division.
- I. Provide moisture resistant paint for exterior painting and heat resisting paint for hot piping, equipment and materials.
- J. Factory Finishes:
- 1. Pumps, compressors, tanks and like items.
 - 2. Pumps, water heaters and like items were exposed.
- K. For the following, provide factory prime coat. Also, provide factory finish painting on each if not specified in Division 9.
- 1. Other air outlets.
- L. Paint all equipment out-of-doors and equipment supports with two coats of weather resistant enamel.

- M. Protect all finished surfaces of fixtures with heavy paper pasted thereon, or by other means, throughout the period of construction.
- N. Refinish Work supplied with final finish under this Division if damaged under this Division to satisfaction of Owner's Representative.

3.8 FIELD QUALITY CONTROL

- A. See Division I - General Requirements.
- B. Tests:
 - 1. Perform as specified in individual sections and as required by authorities having jurisdiction.
 - 2. Duration as noted.
- C. Provide required labor, material, equipment and connections for tests.
- D. Furnish written report and certification that tests have been satisfactorily completed.
- E. Repair or replace defective work, as directed by Owner's Representative in writing, at no additional cost to the Owner.
- F. Restore or replace damaged work due to tests as directed by Owner's Representative in writing, at no additional cost to the Owner.
- G. Restore or replace damaged work of others, due to tests, as directed by Owner's Representative in writing, at no additional cost to the Owner.
- H. Remedial work shall be performed to the satisfaction of the Owner's Representative, at no additional cost to the Owner.
- I. Remedial work shall include performing any commissioning or other tests related to remedial work an additional time at no additional cost to the Owner.
- J. Provide training to Owner's maintenance staff and Operating and Maintenance Manuals in pdf and (2) hard copy manuals in Three Ring Binders.

END OF SECTION

SECTION 22-0100 - BASIC PLUMBING MATERIALS, METHODS AND IDENTIFICATION

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.
- B. Other Sections of the Specifications:
 - 1. Mechanical Sections 23
 - 2. Electrical Sections 26
- C. This Section includes the following
 - 1. Piping materials and installation instructions common to most piping systems.
 - 2. Dielectric fittings.
 - 3. Mechanical sleeve seals.
 - 4. Sleeves.
 - 5. Escutcheons.
 - 6. Equipment installation requirements common to equipment sections.
 - 7. Supports and anchorages.
 - 8. Equipment nameplates, markers and signs.
 - 9. Pipe tags.
 - 10. Acoustical caulking.
 - 11. Access doors and panels.
 - 12. Pipe testing.

1.2 SUBMITALS

- A. Welding certificates.
- B. Product data.

1.3 DEFINITIONS

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.

- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
- D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.
- E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.
- F. Above Grade: Not buried in ground and not embedded in concrete slab or ground.
- G. Below Grade: Buried in ground or embedded in concrete slab on ground.
- H. Furnish: Supply and deliver complete.
- I. Install: Place, secure, and connect as required to make fully operational.
- J. Provide: Furnish and install as defined above; perform work.

1.4 QUALITY ASSURANCE

- A. The California State Health and Safety Code, Section 116875, effective January 1, 2010, states in part and requires that, no person shall use any pipe, pipe or plumbing fitting or fixture, or solder or flux that is not lead free in the installation or repair of any public water system or any plumbing in a facility providing for human consumption except when necessary for the repair of leaded joint of cast iron pipe. Plumbing fixtures, fittings and pipes that are installed where the water is not intended for human consumption through drinking or cooking are not subject to the requirements of this law.
- B. Steel Support Welding: Qualify processes and operators according to AWS D 1.1, "Structural Welding Code--Steel."
- C. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."
 - 1. Comply with provisions in ASME B 31 Series, "Code for Pressure Piping."
 - 2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current
- D. ASME Compliance: Comply with ASME A 13.1, "Scheme for the Identification of Piping Systems," for letter size, length of color field, colors, and viewing angles of identification devices for piping or required by these Specifications.
- E. Electrical Characteristics for Plumbing Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are

appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

- F. Manufacturer's Qualifications: Firms regularly engaged in the manufacture of the specified products of types, materials, and sizes required, and whose products have been in satisfactory use in similar service for not less than 5 years.
- G. By accepting to work, the Contractor agrees that he has reviewed all drawings and specifications as they relate directly or indirectly to his trade, that he has understood the intent of the design and the specifications requirements and is reasonably sure that they can be accomplished by proceeding in accordance with these drawings and specifications.

PART 2 - PRODUCTS

2.1 PIPE, TUBE, AND FITTINGS

- A. Refer to individual Division 22 Piping Sections for pipe, tube, and fitting materials and joining methods.
- B. Pipe Threads: ASME B 1.20.1 for factory-threaded pipe and pipe fittings.

2.2 JOINING MATERIALS

- A. Refer to individual Division 22 Piping Sections for special joining materials not listed below.
- B. Pipe-Flange Gasket Materials: ASME B 16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.
- C. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASMB 813.
- D. Brazing Filler Metals: AWS A 5.8, B-CuP Series or Bag-1, unless otherwise indicated.
- E. Welding Filler Metals: Comply with AWS D 10.12.

2.3 DIELECTRIC FITTINGS

- A. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.
- B. Insulating Material: Suitable for system fluid, pressure, and temperature.
- C. Dielectric Unions: Factory-fabricated, union assembly, for 250-psig minimum working pressure at 180°F.
- D. Dielectric Flanges: Factory-fabricated, companion-flange assembly, for 150- or 300-psig minimum working pressure as required to suit system pressures.

- E. Dielectric Couplings: Galvanized-steel coupling with inert and noncorrosive, thermoplastic lining; threaded ends; and 300-psig minimum working pressure at 225°F.
- F. Dielectric Nipples: Electroplated steel nipple with inert and noncorrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300-psig minimum working pressure at 225°F.

2.4 MECHANICAL SLEEVE SEALS

- A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.
- B. Sealing Elements: EPDM interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
- C. Pressure Plates: Carbon steel. Include two for each sealing element
- D. 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.

2.5 SLEEVES

- A. Galvanized-Steel Sheet 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint
- B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.
- C. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- D. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.
 - 1. Underdeck Clamp: Clamping ring with set screws.
- E. Molded PVC: Permanent, with nailing flange for attaching to wooden forms.
- F. PVC Pipe: ASTM D 1785, Schedule 40.
- G. Molded FE: Reusable, PE, tapered-cup shaped, and smooth-outer surface with nailing flange for attaching to wooden forms.

2.6 ESCUTCHEONS

- A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.
- B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.
- C. One-Piece, Cast-Brass Type: With setscrew. 1. Finish: Polished chrome-plated.

- D. Split-Casting, Cast-Brass Type: With concealed hinge and set screw. 1. Finish: Polished chrome-plated.

2.7 GROUT

- A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.
 - 1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
 - 2. Design Mix: 5000-psi, 28-day compressive strength.
 - 3. Packaging: Premixed and factory packaged.

2.8 EQUIPMENT AND SYSTEMS IDENTIFICATION DEVICES

- A. Equipment Nameplates: Metal, with data engraved or stamped, for permanent attachment on equipment
 - 1. Data:
 - a. Manufacturer, product name, model number, and serial number.
 - b. Capacity, operating and power characteristics, and essential data.
 - c. Labels of tested compliances.
 - d. Location: Accessible and visible.
 - 2. Fasteners: As required to mount on equipment
- B. Use color labels on ceilings to identify main equipment, shut-off valves and all other devices requiring maintenance and access. Coordinate with Architect and District Facilities Department

2.9 VALVE TAGS

- A. Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers, with numbering scheme. Provide 5/32-inch hole for fastener.
 - 1. Material: 0.032-inch thick brass.
 - 2. Valve-Tag Fasteners: Brass wire-link or beaded chain; or S-hook.

2.10 ACOUSTICAL CAULKING

- A. Acoustical caulking shall be applied in continuous beads. The material shall be resilient and non-setting.
- B. The following are acceptable:
 - 1. Acoustical Sealant, U.S. Gypsum.

2. Acoustical Sealant, The Tremco Manufacturing Company.
3. AS-1 0 Acoustical Sealant, Macco Adhesives.
4. BA-97, BA-98 Acoustical Sealant, Pecora Chemical Corp.
5. #313 Sound Control Sealant, The W.W. Henry Company or approved equal.

2.11 ACCESS DOORS AND PANELS

- A. Where required. Wherever a piece of equipment or valve, and operator, etc. is inaccessible and requires access for maintenance, repair, testing or adjustments.
- B. Access panels installed in walls shall be a minimum of 14" x 14" painted steel. If indicated on the drawings or if the accessed equipment, valve, etc. requires it, provide larger access door and panels to provide convenient access for the maintenance department. Where located in custodial or mechanical rooms they shall be painted steel.
- C. Access panels installed in ceilings shall be a minimum of 14" x 14" steel painted to match ceiling color. If indicated on the drawings or if the accessed equipment, valve, etc. requires it, provide larger access door and panels to provide convenient access for the maintenance department
- D. Refer to drawings for location and sizes and coordinate with Architect and District for exact locations and color (where painted).
- E. Manufacturers:
 1. Inryco/Milcor
 2. Bilco
 3. Cesco
 4. Karp
- F. Openings:
 1. Coordinate and fully dimension all openings in walls, floors, roofs and structural elements required for plumbing work.
 2. Provide all required fire-stopping around pipe and other penetrations required for plumbing work in rated partitions where required by code.
 - 3.

PART 3 - EXECUTION

3.1 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. Install piping according to the following requirements and Division 22 Sections specifying piping systems.

- B. 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.
- C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
- D. 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.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- F. Install piping to permit valve servicing.
- G. Install piping at indicated slopes.
- H. Install piping free of sags and bends.
- I. Install fittings for changes in direction and branch connections.
- J. Install piping to allow application of insulation.
- K. Select system components with pressure rating equal to or greater than system operating pressure.
- L. Install escutcheons for penetrations of walls, ceilings, and floors.
- M. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.
- N. Aboveground, Exterior-Wall Pipe Penetrations: Seal penetrations using 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.
 - 1. Install steel pipe for sleeves smaller than 6 inches in diameter.
 - 2. Install cast-iron "wall pipes" for sleeves 6 inches and larger in diameter.
 - 3. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.
- O. Underground, Exterior-Wall Pipe Penetrations: Install cast-iron "wall pipes" for sleeves. Seal pipe penetrations using mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
 - 1. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of

sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

- P. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Division 7 for materials.
- Q. Verify final equipment locations for roughing-in.
- R. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

3.2 PIPING JOINT CONSTRUCTION

- A. Join pipe and fittings according to the following requirements and Division 22 Sections specifying piping systems.
- B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
- E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A 5.8.
- F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B 1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- G. Welded Joints: Construct joints according to AWS D 10.12, using qualified processes and welding operators according to Part "Quality Assurance" Article.
- H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

3.3 EXCAVATION AND BACKFILL

- A. Refer to Division 2 for additional excavation and backfill requirements.
- B. Install underground piping with a minimum of 24" cover from finish grade, or as noted on drawings.

- C. Cut excavation for pipes a minimum of 6" below the required grade. Provide a 6" bed of sand or other approved material properly compacted to provide an accurate grade and uniform bearing throughout the length of the pipe.
- D. Backfill with a 6" layer of sand or other approved material over top of the pipe or pipes. Provide compaction to 90 percent at 6" layer increments, unless otherwise specified.
- E. Use sand certified to a resistance of not less than the surrounding soil when wet with distilled water and consisting of clean, natural washed sand with particles of size which will pass through a 3/8" screen, 90% will pass through a 1/4" screen, and 25% will pass through a No. 50 screen.
- F. Backfilling will not be placed until the work has been inspected, tested and approved.
- G. Clods or lumps 2" in size or larger will not be permitted in the backfill. If excavated material is not suitable, provide adequate material by hauling from other locations.
- H. Remove surplus earth or material remaining after backfilling from the site.
- I. Provide concrete cover. Concrete shall match existing concrete in thickness, color and finish. Provide wire mesh steel reinforcement. Provide a minimum of three days curing time. Keep concrete continuously moist during curing time.

3.4 PIPING CONNECTIONS

- A. Make connections according to the following, unless otherwise indicated:
 - 1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment
 - 2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment
 - 3. Dry Piping Systems: Install dielectric unions and flanges to connect piping materials of dissimilar metals.
 - 4. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.5 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

- A. Install equipment to allow maximum possible headroom unless specific mounting heights are indicated.
- B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
- C. Install plumbing equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations.
- D. Install equipment to allow right of way for piping installed at required slope.

3.6 ERECTION OF METAL SUPPORTS AND ANCHORAGES

- A. Refer to Division 5 for structural steel.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor plumbing materials and equipment
- C. Field Welding: Comply with AWS D1.1

3.7 ERECTION OF WOOD SUPPORTS AND ANCHORAGES

- A. Cut, fit, and place wood grounds, nailers, blocking, and anchorages to support, and anchor plumbing materials and equipment.
- B. Select fastener sizes that will not penetrate members if opposite side will be exposed to view or will receive finish materials. Tighten connections between members. Install fasteners without splitting wood members.
- C. Attach to substrates as required to support applied loads.

3.8 EQUIPMENT IDENTIFICATION

- A. Install and permanently fasten equipment nameplates on each major item of plumbing equipment that does not have nameplate or has nameplate that is damaged or located where not easily visible. Locate nameplates where accessible and visible. Include nameplates for the following general categories of equipment
 - 1. Pumps and water heaters.
 - 2. Identify on ceilings, main shut-off valves, etc.

3.9 VALVE-TAG INSTALLATION

- A. Install tags on valves and control devices in piping systems, except check valves; valves within factory-fabricated equipment units; plumbing fixture supply stops; shutoff valves; faucets; convenience and lawn-watering hose connections; and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.
- B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following (use same for piping):
 - 1. Valve-Tag Size and Shape:
 - a. Cold Water: 1-1/2 inches round.
 - b. Hot Water: 1-1/2 inches round.
 - c. Gas: 1-1/2 inches round.
 - 2. Valve-Tag Color:
 - a. Cold Water: Green.

- b. Hot Water: Yellow.
 - c. Gas: Black.
 - d. Compressed Air: Green
3. Letter Color:
- a. Cold Water: Black.
 - b. Hot Water: Black
 - c. Gas: Black.

3.10 PIPING IDENTIFICATION

A. Identify all pipelines with adhesive markers, indicating the contents and direction of flow. Marker spacing shall be 20 feet maximum and markers shall be installed where piping changes direction or passes through walls or floors. All piping at all equipment such as water heaters shall be marked. Markers to be Brady or Perma-Color, with the background color coding as follows. Coat with clear lacquer after installation.

- 1. Piping System Color
 - a. Domestic Cold Water Yellow
 - b. Domestic Hot Water and Return Yellow
 - c. Waste and Vent Green
 - d. Interior Rainwater Leaders Green
 - e. Natural Gas Yellow
 - f. Condensate Green

3.11 PENETRATIONS OF DRYWALL CONSTRUCTIONS

- A. The Contractor shall ensure that the sound control performance of structures be maintained in accordance with the drawings and specifications. All penetrations shall be installed in a manner that results in complete air tightness through structure. If a condition occurs where penetration of the structure by a pipe, conduit, etc., is not shown clearly on the drawings (or described in the specifications), the Contractor shall ask immediately for clarification of the method necessary to install the particular item.
- B. The following shall apply to all penetrations in walls requiring a minimum Sound Transmission Class STC 49 performance. For penetrations of pipes, conduit, etc., with minimum dimension or diameter exceeding 3/11, the gypsum board layers shall be framed around the penetration allowing for a 1" annular gap. The length of the pipe or conduit that penetrates the construction shall be wrapped with lit thick, 3 1b/ft³ density glass or mineral fiber. This shall be held in place at either end by a 1-1/4" diameter or 1-1/4" square polyethylene or neoprene closed cell sponge

backing rod. A total of 4 beads of acoustical caulking (2 at each end) shall be applied continuously around the penetration as shown in the drawings.

- C. For penetrations of pipes, conduit, etc., with maximum dimension or diameter not exceeding 3, the hole in the wall need not be framed out Pipes/conduits sized in the range 1" to 3" diameter shall be packed with glass or mineral fiber, held in place with backing rod and caulked as indicated above for larger size penetrations. Pipes/ conduits with diameters up to 1" may be fitted with 1-1/2" wide x 3/4" thick (compressed to 1/2") neoprene closed cell sponge collars as they penetrate each side of the wall.
- D. Confirm requirements with Owner's Representative.

3.12 PIPE TESTING

- A. Test piping as noted below with no leak or loss of pressure. Repair or replace defective piping until tests are accomplished successfully.

TEST SCHEDULE			
System	Test Medium	Test Pressure	Test Time
Gas	Air	50 psig	1 hour
Water	Water	150 psig	4 hours
Waste/Vent	Water	15 feet	2 hours
Rainwater Leaders	Water	15 feet	2 hours

END OF SECTION

SECTION 22-0500 - PLUMBING SPECIALTIES

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.
- B. Section 22 0000 - General Plumbing Provisions
- C. Section 22 0100 - Basic Plumbing Materials, Methods and Identification

1.2 SUMMARY

- A. This Section includes the following plumbing specialties:
 - 1. Backflow preventers.
 - 2. Balancing valves.
 - 3. Water tempering valves.
 - 4. Strainers.
 - 5. Trap seal primer valves.
 - 6. Drain valves.
 - 7. Miscellaneous piping specialties.
 - 8. Cleanouts.
 - 9. Floor drains.
- B. Refer to drawings for manufacturers' model numbers.

1.3 PERFORMANCE REQUIREMENTS

- A. A. Provide components and installation capable of producing piping systems with following minimum working-pressure ratings, unless otherwise indicated:
 - 1. Domestic Water Piping 125 psig.
 - 2. Sanitary Waste, Vent Piping and Condensate Drains: 15-foot head of water.
 - 3. Storm Drainage Piping 10-foot head of water.

1.4 SUBMITTALS

- A. Product Data: Include rated capacities and indicate materials, finishes, dimensions, required clearances, and methods of assembly of components; and piping and wiring connections for the following

1. Backflow preventers.
 2. Balancing valves and strainers.
 3. Thermostatic water mixing valves and water tempering valves.
 4. Water hammer arresters, air vents, and trap seal primer valves and systems.
 5. Hose bibs and water hydrants.
 6. Backwater valves, cleanouts, floor drains, open receptors, and trench drains.
- B. Field quality-control test reports.
- C. Operation and maintenance data for the following
1. Backflow preventers.
 2. Trap seal primer valves and systems.
 3. Water tempering valves

1.5 QUALITY ASSURANCE

- A. Plumbing specialties shall bear label, stamp, or other markings of specified testing agency.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. ASME Compliance: Comply with ASME B 31.9, "Building Services Piping," for piping materials and installation.
- D. NSF Compliance:
1. Comply with NSF 14, "Plastics Piping Components and Related Materials," for plastic domestic water piping components. Include marking "NSF-pw" on plastic potable-water piping and "NSF-dwv" on plastic drain, waste, and vent piping.
 2. Comply with NSF 61, "Drinking Water System Components--Health Effects, Sections 1 through 9," for potable domestic water plumbing specialties.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products specified.

2. Products: Subject to compliance with requirements, provide one of the products specified.
3. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.
4. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 BACKFLOW PREVENTERS

- A. Manufacturers: 1. Wilkins.
- B. General: ASSE standard, backflow preventers.
 1. NPS 2 and Smaller: Bronze body with threaded ends.
 2. Ni'S 2-1/2 and Larger: Bronze, cast-iron, steel, or stainless-steel body with flanged ends. a. Interior Lb-tin. AWWA C 550 or FDA-approved, epoxy coating for backflow preventers having cast-iron or steel body.
 3. Interior Components: Corrosion-resistant materials.
 4. Exterior Finish: Polished chrome plate if used in chrome-plated piping system.
 5. Strainer: On inlet
- C. Pipe-Applied, Atmospheric-Type Vacuum Breakers: ASSE 1001, with floating disc and atmospheric vent
- D. Hose-Connection Vacuum Breakers: ASSE 1011, nickel-plated, with non-removable and manual drain features, and ASME B 1.20.7, garden-hose threads on outlet. Units attached to rough-bronze-finish hose connections may be rough bronze, unless otherwise noted or shown on drawings.
- E. Refer to drawings for model number.

2.3 BALANCING VALVES

- A. Calibrated Balancing Valves: Adjustable, with two readout ports and memory setting indicator. Include manufacturer's standard hoses, fittings, valves, differential pressure meter, and carrying case.
- B. Manufacturers:
 1. Calibrated Balancing Valves:
 - a. Amtrol, Inc.
 - b. ITT Industries; Bell & Gossett Div.
 - c. Watts Industries, Inc.; Water Products Div.

2. NPS 2 and Smaller: Bronze body with brass ball, adjustment knob, calibrated nameplate, and threaded or solder-joint ends.
3. NPS 2 and Smaller: Bronze, Y-pattern body with adjustment knob and threaded ends.
4. NPS 2-1/2 and Larger: Cast-iron, Y-pattern body with bronze disc and flanged or grooved ends.

2.4 WATER TEMPERING VALVES

- A. Manufacturers: 1. Powers.
- B. Refer to drawings for model number.

2.5 STRAINERS

- A. Manufacturer: 1. Wilkins
- B. Strainers: Y-pattern, unless otherwise indicated, and full size of connecting piping. Include ASTM A 666, Type 304, stainless-steel screens with 3/64-inch round perforations, unless otherwise indicated.
 1. Pressure Rating: 125-psig minimum steam working pressure, unless otherwise indicated.
 2. NPS 2 and Smaller: Bronze body, with female threaded ends.
 3. NPS 2-1/2 and Larger: Cast-iron body, with interior AWWA C 550 or FDA-approved, epoxy coating and flanged ends.
 4. Y-Pattern Strainers: Screwed screen retainer with centered blowdown.
 - a. Drain: Pipe plug.
 5. T-Pattern Strainers: Malleable-iron or ductile-iron body with grooved ends; access end cap with drain plug and access coupling with rubber gasket
 6. Basket Strainers: Bolted flange or clamp cover, and basket with lift-out handle.
 - a. Type: Simplex with one basket
 - b. Drain: Pipe plug.
- C. Drainage Basket Strainers: Non-pressure-rated, cast-iron or coated-steel body; with bolted flange or clamp cover and drain with plug.
 1. Basket Bronze or stainless steel with 1/8- or 3/16-inch-diameter holes and lift-out handle.
 2. Female threaded ends for NPS 2 and smaller and flanged ends for NPS 2-1/2 and larger.

2.6 TRAP SEAL PRIMER VALVES

- A. Trap Seal Primer System: Factory-fabricated, adjustable, automatic-operation assembly for in wall mounting with the following:

1. Manufacturers:
 - a. Precision Plumbing Products, Inc.: PR500
2. Or approved equal

2.7 DRAIN VALVES

- A. Hose-End Drain Valves: MSS SP 110, NI'S 3/4 ball valve, rated for 400-psig minimum CWP. Include two-piece, copper-alloy body with standard port, chrome-plated brass ball, replaceable seats and seals, blowout-proof stem, and vinyl-covered steel handle.
1. Inlet Threaded or solder joint.
 2. Outlet Short-threaded nipple with ASME B 1.20.7, garden-hose threads and cap.
- B. Hose-End Drain Valve: MSS SP 80, gate valve, Class 125, ASTM B 62 bronze body, with NPS 3/4 threaded or solder-joint inlet and ASME B 1.20.7, garden-hose threads on outlet and cap. Hose bibbs are prohibited for this application.
- C. Stop-and-Waste Drain Valves: MSS SP 110, ball valve, rated for 200-psig minimum CWT or MSS SP 80, Class 125, gate valve; ASTM B 62 bronze body, with Ni'S 1/8 side drain outlet and cap.

2.8 MISCELLANEOUS PIPING SPECIALTIES

- A. Water Hammer Arresters: ASSE 1010 or I'DI WI-I 201, metal-bellows type with pressurized metal cushioning chamber. Sizes indicated are based on ASSE 1010 or PDI WI-I 201, Sizes A through F. Lifetime guarantee.
1. Zurn Industries, Inc.: Zurn WH2950XL for less than 2" piping or Z1700 "Shoktrol" for 2" and larger. Size shock absorbers based on fixture units of each branch. Locate between the last two fixtures of each branch.
 2. Or approved equal
- B. Hose Bibbs: Bronze body with replaceable seat disc complying with ASME A 112.18.1M for compression-type faucets. Include NI'S 1/2 or NI'S 3/4 threaded or solder-joint inlet, of design suitable for pressure of at least 125 psig; integral, nonremovable, drainable hose-connection vacuum breaker; and garden-hose threads complying with ASME B 1.20.7 on outlet, unless noted or shown otherwise on drawings.
1. Interior Hose Bibbs: Woodford MB-26-3/4" with anti siphon vacuum breaker and loose key option.
 2. Exterior Hose Bibbs (Wall Hydrants): Woodford MB65C-4 freezeless wall hydrant in stainless steel box with anti siphon vacuum breaker and 3/4" inlet.
- C. Air Vents: Float type for automatic air venting.

1. Bolted Construction: Bronze body with replaceable, corrosion-resistant metal float and stainless-steel mechanism and seat; threaded NPS 3/8 minimum inlet; 125-psig minimum pressure rating at 140 deg F; and threaded vent outlet.
2. Welded Construction: Stainless-steel body with corrosion-resistant metal float, stainless-steel mechanism and seat, threaded NPS 3/8 minimum inlet, 150-psig minimum pressure rating, and threaded vent outlet.
- D. Open Drains: Shop or field fabricate from ASTM A 74, Service class, hub-and-spigot, cast-iron, soil-pipe fittings. Include P-trap, hub-and-spigot riser section; and where required, increaser fitting, joined with ASTM C 564, rubber gaskets.
- E. Deep-Seal Traps: Cast-iron or bronze casting, with inlet and outlet matching connected piping and cleanout trap seal primer valve connection.
 1. NPS 2. 4-inch- minimum water seal.
 2. NPS 2-1/2 and Larger: 5-inch- minimum water seal.
- F. Floor-Drain Inlet Fittings: Cast iron, with threaded inlet and threaded or spigot outlet, and trap seal primer valve connection.
- G. Fixed Air-Gap Fittings: Manufactured cast-iron or bronze drainage fitting with semi-open top with threads or device to secure drainage inlet piping in top and bottom spigot or threaded outlet larger than top inlet Include design complying with ASME A 112.1.2 that will provide fixed air gap between installed inlet and outlet piping.
- H. Stack Flashing Fittings: Counter-flashing-type, cast-iron fitting, with bottom recess for terminating roof membrane, and with threaded or hub top for extending vent pipe.
- I. Vent Caps: Cast-iron body with threaded or hub inlet and vandal-proof design. Include vented hood and set-screws to secure to vent pipe.
- J. Vent Terminals: Commercially manufactured, shop- or field-fabricated, frost-proof assembly constructed of galvanized steel, copper, or lead-coated copper. Size to provide 1-inch enclosed air space between outside of pipe and inside of flashing collar extension, with counter-flashing.
- K. Downspout Boots: ASTM A 74, Service class, hub-and-spigot, cast-iron soil pipe. Refer to drawing detail.
- L. Conductor Nozzles: Bronze body with threaded inlet for connected conductor size, and bronze wall flange with mounting holes.
 1. Finish: Nickel bronze.

2.9 CLEANOUTS

- A. Cleanouts: Comply with ASME A 112.36.2M, ASME A 112.3.1.
 1. Application: Floor cleanout, wall cleanout, for installation in exposed piping.
 2. Manufacturers:

- a. Zurn Industries, Inc.
3. Body or Ferrule Material: Cast iron
4. Clamping Device: Required.
5. Outlet Connection: Per related piping type.
6. Closure: Brass plug with straight threads and gasket
7. Adjustable Housing Material: Cast iron with set-screws or other device.
8. Frame and Cover Material and Finish: Nickel-bronze, copper alloy.
9. Frame and Cover Shape: Round.
- B. CLEANOUTS:
 1. Floor (FCO): ZURN Z1400-K floor cleanout with anchor flange and adjustable top or approved equal.
 2. Wall (WCO): ZURN Z1443 Cleanout with nickel bronze access cover or approved equal.
 3. Grade (COTG): Z1474 Heavy duty cleanout housing with Bronze top or approved equal.

2.10 FLOOR DRAINS

- A. Floor Drains: Comply with ASME A 112.21.IM, ASME A 112.3.1.
 1. Application: Area drains, floor drains, funnel floor drains, floor sinks.
 2. Manufacturers:
 - a. Zurn Industries, Inc.: ZD-415-B
 - b. J.R. SMITH or approved equal
 3. Body Material: Cast iron.
 4. Seepage Flange: Required.
 5. Clamping Device: Required.
 6. Outlet Bottom, side.
 7. Top or Strainer Material: Nickel bronze.
 8. Top of Body and Strainer Finish: Nickel bronze.
 9. Inlet Fitting, Gray iron, with threaded inlet and threaded or spigot outlet, and trap seal primer valve connection.
 10. Trap Material: Cast iron.

11. Trap Features: Trap seal primer valve drain connection.

PART 3 - EXECUTION

- A. Refer to Section 220100 - Basic Plumbing Materials, Methods, and Identification for piping joining materials, joint construction, and basic installation requirements.
- B. Install backflow preventers in each water supply to mechanical equipment and systems and to other equipment and water systems that may be sources of contamination. Comply with authorities having jurisdiction.
 1. Locate backflow preventers in same room as connected equipment or system.
 2. Install drain for backflow preventers with atmospheric-vent drain connection with air-gap fitting, fixed air-gap fitting, or equivalent positive pipe separation of at least two pipe diameters in drain piping and pipe to floor drain. Locate air-gap device attached to or under backflow preventer. Simple air breaks are not acceptable for this application.
 3. Do not install bypass piping around backflow preventers.
- C. Install strainers on supply side of each control valve and solenoid valve.
- D. Install trap seal primer valves with outlet piping pitched down toward drain trap a minimum of 1 percent and connect to floor-drain body, trap, or inlet fitting. Adjust valve for proper flow.
- E. Install expansion joints on vertical risers, stacks, and conductors if indicated.
- F. Install cleanouts in aboveground piping and building drain piping according to the following, unless otherwise indicated:
 1. Size same as drainage piping up to NPS 4. Use NPS 4 for larger drainage piping unless larger cleanout is indicated.
 2. Locate at each change in direction of piping greater than 45 degrees.
 3. Locate at minimum intervals of 50 feet for piping NPS 4 and smaller and 100 feet for larger piping.
 4. Locate at base of each vertical soil and waste stack.
- G. Install cleanout deck plates with top flush with finished floor, for floor cleanouts for piping below floors.
- H. Install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall, for cleanouts located in concealed piping.
- I. Install flashing flange and clamping device with each stack and cleanout passing through floors with waterproof membrane.

- J. Install vent flashing sleeves on stacks passing through roof. Secure over stack flashing according to manufacturer's written instructions.
- K. Install frost-proof vent caps on each vent pipe passing through roof. Maintain 1-inch clearance between vent pipe and roof substrate.
- L. Install floor drains at low points of surface areas to be drained. Set grates of drains flush with finished floor, unless otherwise indicated. Comply with ADA requirements.
 - 1. Position floor drains for easy access and maintenance.
 - 2. Install floor-drain flashing collar or flange so no leakage occurs between drain and adjoining flooring. Maintain integrity of waterproof membranes where penetrated.
 - 3. Install individual traps for floor drains connected to sanitary building drain, unless otherwise indicated.
- M. Fasten wall-hanging plumbing specialties securely to supports attached to building substrate if supports are specified and to building wall construction if no support is indicated.
- N. Fasten recessed-type plumbing specialties to reinforcement built into walls.
- O. Install wood-blocking reinforcement for wall-mounting and recessed-type plumbing specialties.
- P. Install individual shutoff valve in each water supply to plumbing specialties. Use ball, gate, or globe valve if specific valve is not indicated. Install shutoff valves in accessible locations. Refer to Section 22 0523 - Valves for general-duty ball, butterfly, check, gate, and globe valves.
- Q. Install air vents at piping high points. Include ball, gate, or globe valve in inlet and drain piping from outlet to floor drain.
- R. Install traps on plumbing specialty drain outlets. Omit traps on indirect wastes unless trap is indicated.
- S. Install escutcheons at wall, floor, and ceiling penetrations in exposed finished locations and within cabinets and millwork. Use deep-pattern escutcheons if required to conceal protruding pipe fittings.

3.2 CONNECTIONS

- A. Install piping adjacent to equipment to allow service and maintenance.
- B. Connect plumbing specialties and devices that require power according to Division 26 Sections.

3.3 LABELING AND IDENTIFYING

- A. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplate or sign on or near each backflow preventer, thermostatic water mixing valve, water tempering valve, trap seal primer system.

1. Text: Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit.
2. Refer to Section 22 0100 - Basic Plumbing Materials, Methods, and Identification for nameplates and signs.

3.4 PROTECTION

- A. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.
- B. Place plugs in ends of uncompleted piping at end of each day or when work stops

END OF SECTION

SECTION 22-0523 VALVES

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.
- B. Section 22 0000 - General Plumbing Provisions
- C. Section 22 0100- Basic Plumbing Materials, Methods and Identification

1.2 SUMMARY

- A. This Section includes general-duty valves.

1.3 SUBMITTALS

- A. Product Data: For each type of valve indicated. Include body, seating, and trim materials; valve design; pressure and temperature classifications; end connections; arrangement; dimensions; and required clearances. Include list indicating valve and its application. Include rated capacities; furnished specialties; and accessories.

1.4 QUALITY ASSURANCE

- A. ASME Compliance: ASME B 31.9 for building services piping valves.
 - 1. Exceptions: Domestic hot- and cold-water, sanitary waste, and storm drainage piping valves unless referenced.
- B. ASME Compliance for Ferrous Valves: ASME B 16.10 and ASME B 16.34 for dimension and design criteria.
- C. NSF Compliance: NSF 61 for valve materials for potable-water service.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to the manufacturers listed.

2.2 VALVES, GENERAL

- A. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.

- B. Valve Sizes: Same as upstream pipe, unless otherwise indicated.
- C. Valve Actuators:
 - 1. Handwheel: For valves other than quarter-turn types.
 - 2. Lever Handle: For quarter-turn valves NPS 6 and smaller, except plug valves.
- D. Extended Valve Stems: On insulated valves.
- E. Valve Flanges: ASME B 16.1 for cast-iron valves, ASME B 16.5 for steel valves, and ASME B 16.24 for bronze valves.
- F. Valve Bypass and Drain Connections: MSS SP 45.

2.3 COPPER-ALLOY BALL VALVES

- A. Manufacturers:
 - 1. Watts Industries, Inc.; Water Products Div.
 - a. Watts B-6080, bronze body, full port, two piece, lever handle, 400 lb. WOG.

2.4 FERROUS-ALLOY BUTTERFLY VALVES

- A. Manufacturers:
 - 1. Crane Co.; Crane Valve Group; Stockham Div.
 - a. Stockham LG712-BS3-E-M series, cast iron body, aluminum bronze disc., lever handle, 200 lb.

2.5 BRONZE CHECK VALVES

- A. Manufacturers:
 - 1. Crane Co.; Crane Valve Group; Stockham Div.
 - a. Stockham B-345, bronze body, Y-pattern lift type, Class 200.

2. GATE VALVES

- B. Manufacturers:
 - 1. Crane Co.; Crane Valve Group; Stockham Div.
 - a. 3" and smaller shall be Stockham B-120 or B-124, bronze body, union bonnet, rising stem, solid wedge, 150 lb. with wheel handle.

PART 3 - EXECUTION

3.1 VALVE APPLICATIONS

- A. Refer to piping Sections for specific valve applications. If valve applications are not indicated, use the following:
 - 1. Shutoff Service: Ball valves.
 - 2. Throttling Service: Angle, ball, or globe valves.
- B. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP class or CWP ratings may be substituted.
- C. Applications covered by this specification include: Domestic Water Piping, Sanitary Waste and Storm Drain Piping.
- D. Select valves, except wafer and flangeless types, with the following end connections:
 - 1. For Copper Tubing, NPS 3 and Smaller: Solder-joint or threaded ends.
 - 2. For Copper Tubing, NPS 4: Flanged or threaded ends.
 - 3. For Copper Tubing, NPS 5 and Larger: Flanged ends.
 - 4. For Steel Piping, NPS 2 and Smaller: Threaded ends.
 - 5. For Steel Piping, NPS 2-1/2 to NPS 4: Flanged or threaded ends.
 - 6. For Steel Piping, NPS 5 and Larger: Flanged ends.

3.2 VALVE INSTALLATION

- A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install all shut-off valves for buildings, toilets rooms and/or as indicated on drawings with unions or flanges and at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
- C. Locate valves for easy access and provide separate support where necessary.
- D. Install valves in horizontal piping with stem at or above center of pipe.
- E. Install valves in position to allow full stem movement
- F. Install check valves for proper direction of flow and as follows:
 - 1. Swing Check Valves: In horizontal position with hinge pin level.
 - 2. Dual-Plate Check Valves: In horizontal or vertical position, between flanges.
 - 3. Lift Check Valves: With stem upright and plumb.
- G. Install all valves with unions.

3.3 JOINT CONSTRUCTION

- A. Refer to Section 22 0100 - Basic Plumbing Materials, Methods and Identification for basic piping joint construction.
- B. Grooved Joints: Assemble joints with keyed coupling housing, gasket, lubricant, and bolts according to coupling and fitting manufacturer's written instructions.
- C. Soldered Joints: Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy solder; and ASTM B 828 procedure, unless otherwise indicated.

3.4 ADJUSTING

- A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

END OF SECTION

SECTION 22-0529 - HANGERS, SUPPORTS, MECHANICAL VIBRATION AND SEISMIC
CONTROLS - PLUMBING

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.
- B. Section 22 0000 - General Plumbing Provisions
- C. Section 22 0100 - Basic Plumbing Materials, Methods and Identification

1.2 SUMMARY

- A. This Section includes hangers and supports as well as vibration and seismic control for plumbing system piping and equipment. Included in this Section are:
 - 1. Elastomeric isolation.
 - 2. Restrained elastomeric isolation mounts.
 - 3. Spring isolators.
 - 4. Spring hangers.
 - 5. Housed spring mounts.
 - 6. Spring hangers with vertical-limit stops.
 - 7. Restraining cables.
- B. Performance Requirements:
 - 1. All plumbing equipment shall be anchored or braced to meet the horizontal and vertical forces prescribed in the 2013 CBC - Chapter 16 and ASCE 7-10 - Chapter 13. The attachment of the following items shall be designed to resist the forces prescribed above, but need not to be detailed on the plans and the project inspector will verify that these items (equipment) have been anchored:
 - a. Equipment weighing less than 400 pounds supported directly on the floor or roof.
 - b. Temporary or movable equipment with flexible connection to power or utilities.
 - c. Equipment weighing less than 20 pounds supported by vibration isolators.
 - d. Equipment weighing less than 20 pounds suspended from a roof or floor or hung from a wall.

- e. For those elements that do not require details on approved drawings, the installation shall be subject to the approval of the plumbing engineer.
2. Piping plumbing distribution systems shall be braced to resist the forces prescribed in the 2013 CBC - Chapter 16 and ASCE 7-10 - Chapter 13. The bracing and attachments to the structure shall comply with one of the OSHPD pre-approvals with OPA#, such as Mason Industries (OPA 349), or ISAT (OPA 485) as modified to satisfy anchorage requirements of ACI 318, Appendix D. Copies of the manual shall be available on the jobsite prior to the start of hanging and bracing of the pipe, ductwork and electrical distribution systems. The structural engineer of record shall verify the adequacy of the structure to support the hanger and brace loads.
3. Piping shall be supported and braced per CBC 1616A.1.23, 24, 25, 26.
4. See structural drawings for expansion anchor and their proof testing requirements.
5. Cutting, boring, sawcutting or drilling through the new structural elements to be done only when so detailed on the drawings or accepted by the architect and structural engineer of record with the approval of DSA representative.
6. All welding shall be specifically inspected by an AWS-CWJ qualified inspector approved DSA.
7. Where bracing details are not shown on the drawings or in the guidelines, the field installation shall be subject to the approval of the architect, plumbing engineer and DSA field engineer.

1.3 SUBMITFALS

- A. Submittal shall be prepared by a licensed structural engineer and shall include appropriate preapproved details to reflect actual job conditions and all product data for hangers and support systems.
- B. Shop Drawings: Submit supports and seismic bracing layout for piping. Submit shop drawings for equipment support and anchorage. Shop and Layout drawings to include:
 1. All support and seismic brace locations.
 2. All anchorage connections to the structure. Quantity and Size.
 3. Brace reactions at all connection points to the structure for Structural Engineer of Record use in checking the suitability of the building structure.
 4. Type and size of brace member.
 5. Suspended pipe or duct max lbs per lineal foot or max pipe size at all seismic locations.
 6. Minimum all thread rod at all seismic locations.

- C. Submittals and shop drawings shall be wet signed and stamped by a California registered structural engineer.

1.4 QUALITY ASSURANCE

- A. Seismic-restraint devices shall have horizontal and vertical load testing performed as required by Division 1.
- B. Welding: Qualify procedures and personnel according to AWS D 1.1, "Structural Welding Code—Steel."
- C. Conform with "Equipment Anchorage Notes" on drawings and these Specifications.
- D. Piping supports not subject to seismic bracing shall be supported in conformance with the later SMACNA guidelines.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 HANGERS AND SUPPORTS

- A. Pipe Hangers, Supports, and Components: Seismically restrain all suspended utility systems per paragraph 1.2-B-2 requirements.
 - 1. Galvanized, Metallic Coatings: For piping and equipment that will not have field-applied finish.
 - 2. Nonmetallic Coatings: On attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- B. Channel Support Systems: Factory-fabricated components for field assembly.
 - 1. Coatings: Manufacturer's standard finish, unless bare metal surfaces are indicated.
 - 2. Nonmetallic Coatings: On attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- C. Thermal-Hanger Shield Inserts: 100-psi minimum compressive-strength insulation, encased in sheet metal shield.
 - 1. Manufacturers:
 - a. Carpenter & Patterson, Inc.
 - b. Michigan Hanger Co., Inc.
 - c. PHS Industries, Inc.

- d. Pipe Shields, Inc.
 - e. Rilco Manufacturing Co., Inc.
 - f. Value Engineered Products, Inc.
2. Material for Cold Piping: ASTM C 552, Type I cellular glass or water-repellent-treated, ASTM C 533, Type I calcium silicate with vapor barrier.
 3. Material for Hot Piping: ASTM C 552, Type I cellular glass or water-repellent-treated, ASTM C 533, Type I calcium silicate.
 4. For Trapeze or Clamped System: Insert and shield cover entire circumference of pipe.
 5. For Clevis or Band Hanger: Insert and shield cover lower 180 degrees of pipe.
 6. Insert Length: Extend 2 inches beyond sheet metal shield for piping operating below ambient air temperature.

2.3 VIBRATION ISOLATORS

- A. Manufacturers:
 1. Mason Industries, Inc.
 2. Kinetics Noise Control, Inc.
 3. MW Sausee & Co.
- B. Elastomeric Isolator Pads: Oil- and water-resistant elastomer or natural rubber, arranged in single or multiple layers, molded with a nonslip pattern and galvanized steel base plates of sufficient stiffness for uniform loading over pad area, and factory cut to sizes that match requirements of supported equipment.
- C. Elastomeric Mounts: Double-deflection type, with molded, oil-resistant rubber or neoprene isolator elements with factory-drilled, encapsulated top plate for bolting to equipment and with base plate for bolting to structure. Color-code or otherwise identify to indicate capacity range.
- D. Restrained Elastomeric Mounts: All-directional elastomeric mountings with seismic restraint
- E. Spring Isolators Freestanding: Laterally stable, open-spring isolators.
- F. Restrained Spring Isolators: Freestanding, steel, open-spring isolators with seismic restraint.
- G. Housed Spring Mounts: Housed spring isolator with integral seismic snubbers.
- H. Spring Hangers: Combination coil-spring and elastomeric-insert hanger with spring and insert in compression.

- I. Spring Hangers with Vertical-Limit Stop: Combination coil-spring and elastomeric-insert hanger with spring and insert in compression and with a vertical-limit stop.

2.4 SEISMIC-RESTRAINT DEVICES

- A. Manufacturers:
 1. Mason Industries, Inc.
 2. Kinetics Noise Control, Inc.
 3. MW Sausee & Co.
- B. Resilient Isolation Washers and Bushings: 1-piece, molded, bridge-bearing neoprene complying with AASHTO M 251 and having a durometer of 60, plus or minus 5, with a flat washer face.
- C. Restraining Cables: Galvanized steel aircraft cables with end connections made of steel assemblies that swivel to final installation angle and utilize two clamping bolts for cable engagement.
- D. Anchor Bolts: Seismic-rated, drill-in, and stud-wedge or female-wedge type. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488/E 488M.

2.5 MISCELLANEOUS MATERIALS

- A. Powder-Actuated Drive-Pin Fasteners: Powder-actuated-type, drive-pin attachments with pullout and shear capacities appropriate for supported loads and building materials where used.
- B. Mechanical-Anchor Fasteners: Insert-type attachments with pull-out and shear capacities appropriate for supported loads and building materials where used.
- C. Structural Steel: ASTM A 36/A 36M, steel plates, shapes, and bars, black and galvanized.
- D. Grout ASTM C 1107, Grade B, factory-mixed and -packaged, nonshrink and nonmetallic, dry, hydraulic-cement grout
 1. Characteristics: Post hardening and volume adjusting; recommended for both interior and exterior applications.
 2. Properties: Nonstaining, noncorrosive, and nongaseous.
 3. Design Mix: 5000-psi, 28-day compressive strength.

PART 3 - EXECUTION

3.1 INSTALLATION-VIBRATION AND SEISMIC CONTROL

- A. Install roof curbs, equipment supports, and roof penetrations as specified in Division 7 and as shown on Drawings.

- B. Install thrust limits at centerline of thrust, symmetrical on either side of equipment
- C. Install restraining cables at each trapeze and individual pipe hanger. At trapeze anchor locations, shackle piping to trapeze. Install cables so they do not bend across sharp edges of adjacent equipment or building structure.
- D. Install steel angles or channel, sized to prevent buckling, clamped with ductile-iron clamps to hanger rods for trapeze and individual pipe hangers. At trapeze anchor locations, shackle piping to trapeze. Requirements apply equally to hanging equipment. Do not weld angles to rods.
- E. Install resilient bolt isolation washers on equipment anchor bolts.

3.2 FIELD QUALITY CONTROL-VIBRATION AND SEISMIC CONTROL

- A. Tests and Inspections:
 - 1. Inspect isolator seismic-restraint clearance.
 - 2. Test isolator deflection.
 - 3. Inspect minimum snubber clearances.

3.3 ADJUSTING-VIBRATION AND SEISMIC CONTROL

- A. Adjust isolators after piping systems have been filled and equipment is at operating weight.
- B. Adjust limit stops on restrained spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.
- C. Attach thrust limits at centerline of thrust and adjust to a maximum of 1/4-inch movement during start and stop.
- D. Adjust air spring leveling mechanism.
- E. Adjust active height of spring isolators.
- F. Adjust snubbers according to manufacturers written recommendations.
- G. Adjust seismic restraints to permit free movement of equipment within normal mode of operation.
- H. Torque anchor bolts according to equipment manufacturer's written recommendations to resist seismic forces.

3.4 INSTALLATION-HANGERS AND SUPPORT

- A. Pipe Hanger and Support Installation: Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.

- B. Channel Support System Installation: Arrange for grouping of parallel runs of piping and support together on field-assembled channel systems. Field assemble and install according to manufacturer's written instructions.
- C. Heavy-Duty Steel Trapeze Installation: Arrange for grouping of parallel runs of horizontal piping and support together on field-fabricated, heavy-duty trapezes. Support pipes of various sizes together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified above for individual pipe hangers. Field fabricate from ASTM A 36/A 36M, steel shapes selected for loads being supported. Weld steel according to AWS D1.1.
- D. Install building attachments within concrete slabs or attach to structural steel or wood. Space attachments within maximum piping span length as required. Install additional attachments at concentrated loads, including valves, flanges, guides, strainers, and expansion joints, and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts. Attach to wood members as shown on drawings.
- E. Install powder-actuated drive-pin fasteners in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
- F. Install mechanical-anchor fasteners in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.
- G. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.
- H. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- I. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment
- J. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and so maximum pipe deflections allowed by ASME B 31.9, "Building Services Piping," is not exceeded.
- K. Insulated Piping: Comply with the following-
 - 1. Attach clamps and spacers to piping.
 - a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
 - b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert
 - c. Do not exceed pipe stress limits according to ASME B 31.9.

2. Install MSS SP 58, Type 39 protection saddles, if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
3. Install MSS SP 58, Type 40 protective shields on cold piping with vapor barrier. Shields shall span arc of 180 degrees.
4. Shield Dimensions for Pipe: Not less than the following:
 - a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
 - b. NPS 4: 12 inches long and 0.06 inch thick
 - c. NPS 5 and NPS 6: 18 inches long and 0.06 inch thick.
 - d. NPS 8 to NPS 14: 24 inches long and 0.075 inch thick.
 - e. NPS 16 to NPS 24: 24 inches long and 0.105 inch thick
5. Insert Material: Length at least as long as protective shield.
6. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.5 EQUIPMENT SUPPORTS

- A. Fabricate structural-steel stands to suspend equipment from structure above or to support equipment above floor. Place grout under supports for equipment and make smooth bearing surface.

3.6 METAL FABRICATION

- A. Cut, drill, and fit miscellaneous metal fabrications for heavy-duty steel trapezes and equipment supports. Fit exposed connections together to form hairline joints. Field-weld connections that cannot be shop-welded because of shipping size limitations. Comply with AWS D 1.1 procedures for shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work, and with the following:
 - B. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - C. Obtain fusion without undercut or overlap.
 - D. Remove welding flux immediately.
 - E. Finish welds at exposed connections so no roughness shows after finishing and contours of welded surfaces match adjacent contours.

3.7 ADJUSTING-HANGERS AND SUPPORT

- A. Hanger Adjustment: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

3.8 PAINTING-HANGERS AND SUPPORT

- L. Touching Up: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PAI requirements for touching up field-painted surfaces. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils. See Division 9 for paint materials and application requirements.
- M. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

3.9 PIPE HANGER SPACING

- N. Space hangers for horizontal above ground pipes with the maximum distance between hangers per latest California Plumbing Code.

END OF SECTION

SECTION 22-0700 PIPING & EQUIPMENT INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division I Specification Sections, apply to this Section.
- B. Section 22 0000 - General Plumbing Provisions
- C. Section 22 0100 - Basic Plumbing Materials, Methods and Identification

1.2 SUMMARY

- A. The Contractor will use the requirements of this Section for procurement and installation. He shall bring any proposed deviations or changes from this specification to the General
- B. Contractor's attention. All approved changes and deviations will be recorded on the as-built documents and O&M manuals.

1.3 SCOPE

- A. The work covered by this specification consists of furnishing all labor, equipment, materials and accessories, and performing all operations required, for the correct fabrication and installation of thermal insulation applied to the following commercial piping systems, in accordance with applicable project specifications and drawings, subject to the terms and conditions of the contract:
 - 1. Domestic cold water systems: All exterior piping and interior piping installed exterior to the building envelope insulation.
 - 2. Domestic hot water systems up to 140°F (supply and return).
 - 3. Condensate drain piping inside building.

1.4 REFERENCES

- A. Thermal insulation materials shall meet the property requirements of one or more of the following specifications as applicable to the specific product or end use:
 - 1. American Society for Testing of Materials Specifications:
 - a. ASTM C 547, "Standard Specification for Mineral Fiber Pipe Insulation"
 - B. ASTM C 585, "Standard Practice for Inner and Outer Diameters of Rigid Thermal Insulation for Nominal Sizes of Pipe and Tubing (NPS System)"
 - C. ASTM C 1136, "Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation"

1.5 DEFINITIONS

- A. The term "mineral fiber" as defined by the above specifications includes fibers manufactured of glass, rock, or slag processed from a molten state, with or without binder.

1.6 SYSTEM PERFORMANCE

- A. Insulation materials furnished should meet the minimum thickness requirements of Title 24. However, if other factors such as condensation control or personnel protection are to be considered, the selection of the thickness of insulation should satisfy the controlling factor.
- B. Insulation materials furnished and installed hereunder shall meet the fire hazard requirements of applicable building codes when tested in composite form per one of the following nominally equivalent test methods:
 - 1. American Society for Testing of Materials: ASTM E 84.
 - 2. Underwriters' Laboratories, Inc.: UL 723, CAN! ULC-S102-M88.
 - 3. National Fire Protection Association: NFPA 255.

1.7 QUALITY ASSURANCE

- A. Insulation materials and accessories furnished and installed hereunder shall, where required, be accompanied by manufacturers' current submittal or data sheets showing compliance with applicable specifications listed in 1.2 above.
- B. Insulation materials, including all weather and vapor barrier materials, closures, hangers, supports, fitting covers, and other accessories, shall be furnished and installed in strict accordance with project drawings, plans, and specifications.
- C. Insulation materials and accessories shall be installed in a workmanlike manner by skilled and experienced workers who are regularly engaged in commercial insulation work.

1.8 DELIVERY AND STORAGE OF MATERIALS

- A. All of the insulation materials and accessories covered by this specification shall be delivered to the job site and stored in a safe, dry place with appropriate labels and/or other product identification.
- B. The contractor shall use whatever means are necessary to protect the insulation materials and accessories before, during, and after installation. No insulation material shall be installed that has become damaged in any way. The contractor shall also use all means necessary to protect work and materials installed by other trades.
- C. If any insulation material has become wet because of transit or job site exposure to moisture or water, the contractor shall not install such material, and shall remove it from the job site. An exception may be allowed in cases where the contractor is able to demonstrate that wet insulation when fully dried out (either before installation or afterward following exposure to system operating temperatures) will provide installed performance that is equivalent in all respects

to new, completely dry insulation. In such cases, consult the insulation manufacturer for technical assistance.

PART 2 - PRODUCTS

2.1 PIPE INSULATION

- A. Manufacturers: 1. Owens-Corning, Certainteed, Knauf or approved alternate.
- B. Model No.'s are based on Owens-Corning.
- C. Molded pipe insulation shall be manufactured to meet ASTM C 585 for sizes required in the particular system. It shall be of a type suitable for installation on piping systems as defined in Section 1.3 above.
- D. Molded fibrous glass pipe insulation shall comply with the requirements of ASTM C 547. The following types shall be used:
 - 1. Fiberglas® Pipe Insulation, Owens Corning Fiberglas Pipe Insulation with factory applied all-service jacket (ASJ) and two-component adhesive closure system, rated for a maximum service temperature of 850°F. For large pipe sizes where SSL-II is not available, the single adhesive SSL closure may be substituted. Circumferential joints shall be sealed by butt strips having a two-component sealing system. Stapling is not required to complete the closure. When self sealing lap systems are used, sufficient thickness of insulation shall be used to maintain the outer surface temperature of the operating system below +150°F. Manufacturer's data regarding thickness constraints in relation to operating temperature shall be followed.
- E. When multiple layers are required, all inner layer(s) shall be No Wrap.
- F. On cold systems, vapor barrier performance is extremely important. All penetrations of the ASJ and exposed ends of insulation shall be sealed with vapor barrier mastic. If humidities in excess of 90% RH are expected, the ASJ shall be protected with either a mastic coating or a suitable vapor retarding outer jacket Vapor seals at butt joints shall be applied at every fourth pipe section joint and at each fitting to provide isolation of water incursion.
 - 1. For systems operating at temperatures to +850F and always above the ambient temperature:
 - a. No Wrap Pipe Insulation rated for maximum operating temperature of 850F may be installed using appropriate banding materials and then covered with either metal or PVC jacketing or otherwise jacketed and/or finished in accordance with details shown
- G. Fittings and valves shall be insulated with pre-formed fiberglass fittings, fabricated sections of Owens Corning Fiberglas Pipe Insulation, Owens Corning Pipe and Tank Insulation, Owens Corning blanket insulation, or insulating cement. Thickness shall be equal to adjacent pipe insulation. Finish shall be with pre-formed PVC fitting covers or as otherwise specified on contract drawings.
 - 1. Flanges, couplings and valve bonnets shall be covered with an oversized pipe insulation section sized to provide the same insulation thickness as on the main pipe section. An oversized insulation section shall be used to form a

collar between the two insulation sections with low-density blanket insulation being used to fill gaps. Jacketing shall match that used on straight pipe sections. Rough cut ends shall be coated with suitable weather or vapor resistant mastic as dictated by the system location and service. On hot systems where fittings are to be left exposed, insulation ends should be beveled away from bolts for easy access.

- H. On cold systems, particular care must be given to vapor sealing the fitting cover or finish to the pipe insulation vapor barrier. All valve stems shall be sealed with caulking to allow free movement of the stem but provide a seal against moisture incursion.
- I. Piping located outdoors and exposed to the weather shall be insulated as indicated above except the thickness shall be determined according to the worst weather extremes expected. The insulation shall then be protected with one of the following weatherproof finishes or as indicated on contract drawings:
 - 1. Metal jacketing shall be 0.016" minimum aluminum or stainless steel with moisture barrier, secured in accordance with the jacket manufacturer's recommendations. Joints shall be applied so they will shed water and shall be sealed completely.
 - 2. UV resistant PVC jacketing may be applied in lieu of metal jacketing provided jacketing manufacturer's limitations with regard to pipe size, surface temperature, and thermal expansion and contraction are followed.
 - 3. Fittings shall be insulated as prescribed above, jacketed with preformed fitting covers matching outer jacketing used on straight pipe sections, with all joints weather sealed.
- J. All piping shall be supported in such a manner that neither the insulation nor the vapor/weather barrier is compromised by the hanger or the effects of the hanger. In all cases, hanger spacing shall be such that the circumferential joint may be made outside the hanger. On cold systems, vapor barrier shall be continuous, including material covered by the hanger saddle.
 - 1. Piping systems 3" in diameter or less, insulated with Owens Corning insulation, may be supported by placing saddles of the proper length and spacing under the insulation as designated in Owens Corning Pub. 1-IN-14210.
 - 2. For hot or cold piping systems larger than 3" in diameter, operating at temperatures less than +200°F and insulated with fiber glass, high density inserts such as wood or foam with sufficient compressive strength shall be used to support the weight of the piping system. At temperatures exceeding +200°F, high temperature pipe insulation shall be used for high density inserts.
 - 3. Where pipe shoes and roller supports are required, insulation shall be inserted in the pipe shoe to minimize pipe heat loss. Where possible, the pipe shoe shall be sized to be flush with the outer pipe insulation diameter.
 - 4. Thermal expansion and contraction of the piping and insulation system can generally be taken care of by utilizing double layers of insulation and staggering both longitudinal and circumferential joints. Where long runs are

encountered, expansion joints may be required where single layers of insulation are being used and should be so noted on the contract drawings.

5. On vertical runs, insulation support rings shall be used as indicated on contract drawings.

2.2 ACCESSORY MATERIALS

- A. Accessory materials installed as part of insulation work under this Section shall include (but not be limited to):
 1. Closure Materials - Butt strips, bands, wires, staples, mastics, adhesives; pressure-sensitive tapes.
 2. Field-applied jacketing materials - Sheet metal, plastic, canvas, fiber glass cloth, insulating cement, PVC fitting covers.
 3. Support Materials - Hanger straps, hanger rods, saddles, support rings.
- B. All accessory materials shall be installed in accordance with project drawings and specifications, manufacturer's instructions, and/or in conformance with the current edition of the Midwest Insulation Contractors Association (MICA) "Commercial & Industrial Insulation Standards."

PART 3 - EXECUTION

3.1 SITE INSPECTION

- A. Before starting work under this Section, carefully inspect the site and installed work of other trades and verify that such work is complete to the point where installation of materials and accessories under this Section can begin.
- B. Verify that all materials and accessories can be installed in accordance with project drawings and specifications and material manufacturers' recommendations.
- C. Verify, by inspecting product labeling, submittal data, and/or certifications which may accompany the shipments, that all materials and accessories to be installed on the project comply with applicable specifications and standards and meet specified thermal and physical properties.

3.2 PREPARATION

- A. Ensure that all pipe and fitting surfaces over which insulation is to be installed are clean and dry.
- B. Ensure that insulation is clean, dry, and in good mechanical condition with all factory-applied vapor or weather barriers intact and undamaged. Wet, dirty, or damaged insulation shall not be acceptable for installation.
- C. Ensure that pressure testing of piping and fittings has been completed prior to installing insulation.

3.3 INSTALLATION

- A. General:
1. Install all insulation materials and accessories in accordance with manufacturer's published instructions and recognized industry practices to ensure that it will serve its intended purpose.
 2. Install insulation on piping subsequent to installation of heat tracing, painting, and acceptance tests.
 3. Install insulation materials with smooth and even surfaces. Insulate each continuous run of piping with full-length units of insulation, with single cut piece to complete run. Do not use cut pieces or scraps abutting each other. Butt insulation joints firmly to ensure complete, tight fit over all piping surfaces.
 4. Maintain the integrity of factory-applied vapor barrier jacketing on all pipe insulation, protecting it against puncture, tears or other damage. All staples used on cold pipe insulation shall be coated with suitable sealant to maintain vapor barrier integrity.
- B. Fittings:
1. Cover valves, fittings, and similar items in each piping system using one of the following,
 - a. Mitered sections of insulation equivalent in thickness and composition to that installed on straight pipe runs.
 - b. Insulation cement equal in thickness to the adjoining insulation.
 - c. Owens Corning PVC Fitting Covers insulated with material equal in thickness and composition to adjoining insulation.
- C. Penetrations:
1. Extend piping insulation without interruption through walls, floors, and similar piping penetrations, except where otherwise specified.
- D. Joints:
1. Butt pipe insulation against hanger inserts. For hot pipes, it is recommended all joints be staggered when operating temperature is over 400°F double layer. Seal jacketing according to type being used. For cold piping, seal self-sealing laps by firmly rubbing down surface of tape and flap.
 2. All pipe insulation ends shall be tapered and sealed, regardless of service.
- E. Vertical Piping,
1. If specified on contract drawings, all insulated, exposed vertical piping within the building and all insulated piping exposed to the outdoors shall be additionally jacketed with 0.016" thick (minimum) aluminum. Vertical piping shall be protected to a height of 8-0" above the floor.

3.4 FIELD QUALITY ASSURANCE

- A. Upon completion of all insulation work covered by this specification, visually inspect the work and verify that it has been correctly installed. This may be done while work is in progress, to assure compliance with requirements herein to cover and protect insulation materials during installation.

3.5 PROTECTION

- A. Replace damaged insulation, which cannot be satisfactorily repaired, including insulation with vapor barrier damage and moisture-saturated insulation.
- B. The insulation contractor shall advise the general and/or the mechanical contractor as to requirements for protection of the insulation work during the remainder of the construction period, to avoid damage and deterioration of the finished insulation work.

3.6 SAFETY PRECAUTIONS

- A. Insulation contractor's employees shall be properly protected during installation of all insulation. Protection shall include proper attire when handling and applying insulation materials, and shall include (but not be limited to) disposable dust respirators, gloves, hard hats, and eye protection.
- B. The insulation contractor shall conduct all job site operations in compliance with applicable provisions of the Occupational Safety and Health Act, as well as with all state and/or local safety and health codes and regulations that may apply to the work.

3.7 INSULATION THICKNESS

- A. UNLESS OTHERWISE NOTED SHALL BE MINIMUM 1" FOR ALL SYSTEMS AND COMPLY WITH T24 REQUIREMENTS.

3.8 MINIMUM PIPING INSULATION THICKNESS SCHEDULE

Piping Type	Runout Sizes to 2"	Branches, Mains, Loops in Size				
		0"-1"	1-1/4"-2"	2-1/2"4"	5"-6"	8"-up
Domestic Cold Water	1/2"	1/2'	1"	1"	1"	1"
Domestic Hot Water and Hot Water Return	1/2"	1"	1"	1-1/2"	1-1/2"	2"
Condensate Drain	1/2"	1/2"	1"	-	-	-

- A. "Runouts" are piping that is 12'-0" inches long or less, and that is connected to individual fixtures or terminal units.
- B. "Branches, Mains, and Loops" are circulating piping and piping that is over 12'-0" long and that is connected to fixtures or individual terminal units.

END OF SECTION

SECTION 22-1100 POTABLE WATER PIPING

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.
- B. Section 22 0000 - General Plumbing Provisions.
- C. Section 22 0100 - Basic Plumbing Materials, Methods and Identification

1.2 SUMMARY

- A. This Section includes potable domestic water piping inside the building and to a point 5'-0" outside building unless otherwise indicated or shown. Connect to civil and coordinate exact locations with site contractor.

1.3 SUBMITTALS

- A. Field quality-control test reports.
- B. Shop Drawings

1.4 QUALITY ASSURANCE

- A. Comply with NSF 61, 'Drinking Water System Components - Health Effects; Sections 1 through 9, for potable domestic water piping and components.
- B. Conform to DSA Bulletin BU-09-10 regarding installation of "LEAD FREE" plumbing fixtures, fittings and pipes.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A. Refer to Part 3 "Pipe and Fitting Applications" Article for applications of pipe, tube, fitting, and joining materials.
- B. Transition Couplings for Aboveground Pressure Piping Coupling or other manufactured fitting the same size as, with pressure rating at least equal to and ends compatible with, piping to be joined.
- C. Soft Copper Tube: ASTM B 88, Types K and L, water tube, annealed temper.
 - 1. Copper Pressure Fittings: ASME B 16.18, cast-copper-alloy or ASME B 16.22, wrought-copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.
 - 2. Bronze Flanges: ASME B 16.24, Class 150, with solder-joint ends. Furnish Class 300 flanges if required to match piping.

3. Copper Unions: MSS SP 123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.
- D. Hard Copper Tube: ASTM B 88, Type L, water tube, drawn temper.
 1. Copper Pressure Fittings: ASME B 16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.
 2. Bronze Flanges: ASME B 16.24, Class 150, with solder-joint ends. Furnish Class 300 flanges if required to match piping.
 3. Copper Unions: MSS SF 123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.

2.2 VALVES

- A. Bronze and cast-iron, general-duty valves are specified in Section 22 0523 - Valves.
- B. Balancing and drain valves are specified in Section 220500 - Plumbing Specialties.

PART 3 - EXECUTION

3.1 EXCAVATION

- A. Excavating, trenching, and backfilling are specified in Division 31.

3.2 PIPE AND FITTING APPLICATIONS

- A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below, unless otherwise indicated.
- B. Fitting Option: Extruded-tee connections and brazed joints may be used on aboveground copper tubing.
- C. Under-Building-Slab and to a point 5'-0" outside of building, Domestic Water Piping, NIS 4 and Smaller: Hard copper tube, Type K; copper pressure fittings; and soldered joints. No fittings under slabs.
- D. Aboveground Domestic Water Piping Use the following piping materials for each size range:
 1. NPS 1 and Smaller: Hard copper tube, Type L; copper pressure fittings; and soldered joints.
 2. NPS 1-1/4 and NPS 1-1/2: Hard copper tube, Type L; copper pressure fittings; and soldered joints.
 3. NPS 2: Hard copper tube, Type L; copper pressure fittings; and soldered joints.

4. NPS 2-1/2 to NPS 3-1/2: Hard copper tube, Type L; copper pressure fittings; and soldered joints.
5. NPS 4 to NPS 6: Hard copper tube, Type L; copper pressure fittings; and soldered joints.

3.3 VALVE APPLICATIONS

- A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:
 1. Shutoff Duty: Use bronze ball for piping NI'S 3 and smaller. Use cast-iron butterfly or gate valves with flanged ends for piping NI'S 4 and larger.
 2. Throttling Duty: Use bronze ball valves for piping NI'S 2 and smaller. Use cast-iron butterfly valves with flanged ends for piping NI'S 2-1/2 and larger.
 3. Hot-Water-Piping, Balancing Duty: Memory-stop balancing valves.
 4. Drain Duty: Hose-end drain valves.
- B. Install shutoff valve with unions close to water main on each branch and riser serving plumbing fixtures or equipment, on each water supply to equipment, and on each water supply to plumbing fixtures that do not have supply stops. Use ball or gate valves for piping NPS 3 and smaller. Use butterfly or gate valves for piping NI'S 4 and larger.
- C. Install drain valves for equipment at base of each water riser, at low points in horizontal piping, and where required to drain water piping.
 1. Install hose-end drain valves at low points in water mains, risers, and branches.
 2. Install stop-and-waste drain valves where indicated.
- D. Install balancing valve in each hot-water circulation return branch and discharge side of each pump and circulator. Set balancing valves partly open to restrict but not stop flow. Use ball valves for piping NPS 3 and smaller and butterfly valves for piping NPS 4 and larger. Balancing valves are specified in Section 220500 - Plumbing Specialties.
- E. Install calibrated balancing valves in each hot-water circulation return branch and discharge side of each pump and circulator. Set calibrated balancing valves partly open to restrict but not stop flow. Calibrated balancing valves are specified in Section 22 0500 - Plumbing Specialties.

3.4 PIPING INSTALLATION

- A. Basic piping installation requirements are specified in Section 22 0100 - Basic Plumbing Materials, Methods, and Identification.
- B. Install under-building-slab copper tubing according to Copper Development Association's "Copper Tube Handbook."

- C. Install cast-iron sleeve with water stop and mechanical sleeve seal at each service pipe penetration through foundation wall. Select number of interlocking rubber links required to make installation watertight. Sleeves and mechanical sleeve seals are specified in Section 22 0100 - Basic Plumbing Materials, Methods, and Identification.
- D. Install shutoff valve at each domestic water service entrance. 1. Install domestic water piping level and plumb.

3.5 JOINT CONSTRUCTION

- A. Basic piping joint construction requirements are specified in Section 22 0100 - Basic Plumbing Materials, Methods, and Identification.
- B. Soldered Joints: Use ASTM B 813, water-flushable, lead-free flux; AS1'M B 32, lead-free-alloy solder; and ASTM B 828 procedure, unless otherwise indicated.
- C. Extruded-Tee Connections: Form tee in copper tube according to ASTM F 2014. Use tool designed for copper tube; drill pilot hole, form collar for outlet, dimple tube to form seating stop, and braze branch tube into collar.

3.6 HANGER AND SUPPORT INSTALLATION

- A. Pipe hanger and support devices are specified in Section 22 0529 - Hangers, Supports, Mechanical Vibration and Seismic Controls - Plumbing. Install the following:
 - 1. Vertical Piping: MSS Type 8 or Type 42, clamps.
 - 2. Individual, Straight, Horizontal Piping Runs: According to the following:
 - a. 100 Feet 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: MSS Type 49, spring cushion rolls, if indicated.
 - 3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
 - 4. Base of Vertical Piping MSS Type 52, spring hangers.
- B. Install supports according to Section 22 0529 - Hangers, Supports, Mechanical Vibration and Seismic Controls - Plumbing.
- C. Support vertical piping and tubing at base and at each floor.

3.7 CONNECTIONS-PIPING

- A. Install piping adjacent to equipment and machines to allow service and maintenance.
- B. Connect domestic water piping to exterior water-service piping. Use transition fitting to join dissimilar piping materials. EPCO, Plico or equal.

- C. Connect domestic water piping to water-service piping with shutoff valve, and extend and connect to the following:
 - 1. Water Heaters: Cold-water supply and hot-water outlet piping in sizes indicated, but not smaller than sizes of water heater connections.
 - 2. Plumbing Fixtures: Cold- and hot-water supply piping in sizes indicated, but not smaller than required by plumbing code.
 - 3. Equipment Cold- and hot-water supply piping as indicated, but not smaller than equipment connections. Provide shutoff valve and union for each connection. Use flanges instead of unions for NPS 2-1/2 and larger.

3.8 CLEANING

- A. Clean and disinfect potable domestic water piping using purging and disinfecting procedures prescribed by authorities having jurisdiction.
- B. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedures if biological examination shows contamination.
- C. Prepare and submit reports of purging and disinfecting activities.

END OF SECTION

SECTION 22-2200 DRAINAGE AND VENT PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division I Specification Sections, apply to this Section.
- B. Section 22 0000 - General Plumbing Provisions
- C. Section 22 0100 - Basic Plumbing Materials, Methods and Identification

1.2 SUMMARY

- A. This Section includes soil and non-process waste, sanitary, vent, condensate, rainwater leaders and, storm drainage piping inside the buildings and to a point 5'-0" outside of buildings unless otherwise indicated or shown. Connect to civil drawings and coordinate with site contractor.

1.3 SUBMITTALS

- A. Field quality-control test reports.
- B. Shop Drawings.

1.4 QUALITY ASSURANCE

- A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A. Flexible Transition Couplings for Underground Nonpressure Piping: ASTM C 1173 with elastomeric sleeve. Include ends of same sizes as piping to be joined and include corrosion-resistant metal band on each end.
- B. Transition Couplings for Underground Pressure Piping: AWWA C 219 metal, sleeve-type coupling or other manufactured fitting same size as, with pressure rating at least equal to and ends compatible with, piping to be joined.
- C. Hubless Pipe and Fittings: ASTM A 888 or CISPI 301. Pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institution and be listed by NSF International. 1. Shielded Couplings: ASTM C 1277 assembly of metal shield or housing, corrosion resistant fasteners, and rubber sleeve with integral, center pipe stop.
 - 1. Aboveground Standard - Shielded, Stainless Steel Couplings: CISPI 310 with stainless steel corrugated shield; stainless steel bands and tightening devices and ASTM C 564, rubber sleeve and bear the NSF Trademark.

- a. Manufacturers: ANACO, Mission Rubber Co. and Tyler Pipe - Soil Pipe Div.
2. Underground Pipe - Heavy-Duty, Shielded, Stainless Steel Couplings: With stainless steel shield, stainless-steel bands and tightening devices and ASTM C 564, rubber sleeve.
 - a. Manufacturers: ANACO/Husky SD 4000 and Clamp-All Corp.-125.
- D. Steel Pipe: ASTM A 53, Schedule 40, galvanized. Include ends matching joining method.
 1. Steel Pipe Nipples: ASTM A 733, made of ASTM A 53 or ASTM A 106, Schedule 40, galvanized, seamless steel pipe. Include ends matching joining method.
 2. Malleable-Iron Unions: ASME B 16.39; Class 150; hexagonal-stock body with ball-and-socket, metal-to-metal, bronze seating surface; and female threaded ends.
 3. Cast-Iron, Threaded, Drainage Fittings: ASME B 16.12, galvanized.
 4. Gray-Iron, Threaded Fittings: ASME B 16.4, Class 125, galvanized, standard pattern.
 5. Cast-Iron Flanges: ASME B 16.1, Class 125.
 6. Cast-Iron, Flanged Fittings: ASME B 16.1, Class 125, galvanized.
- E. Copper DWV Tube: ASTM B-306, drainage tube, drawn temper.
 1. Copper Drainage Fittings: ASME B 16.23, cast copper or ASME B 16.29, wrought copper, solder-joint fittings.

PART 3 – EXECUTION

3.1 GENERAL

- A. Transition and special fittings with pressure ratings at least equal to piping pressure ratings may be used in applications below, unless otherwise indicated.
- B. Flanges may be used on aboveground pressure piping, unless otherwise indicated.
- C. Underground, Soil, Waste, Storm Drainage and Vent Piping: Use any of the following piping materials for each size range:
 1. NPS 2 to NPS 6: Hubless, cast-iron soil piping and fittings.

2. NPS 1-1/2" and smaller: Copper DWV tube, copper drainage fittings, and lead-free soldered joints.

D. Condensate drains shall be DMV tube OR TYPE M.

3.2 PIPING INSTALLATION

- A. Refer to Division 33 for project-site piping.
- B. Refer to Section 22 0100 - Basic Plumbing Materials, Methods, and Identification for basic piping installation.
- C. Install cleanouts at grade and extend to where building drains connect to building sewers. Install cleanout fitting with closure plug inside the building in storm drainage force-main piping.
- D. Install cast-iron sleeve with water stop and mechanical sleeve seal at each service pipe penetration through foundation wall. Select number of interlocking rubber links required to make installation watertight. Refer to Section 22 0100 - Basic Plumbing Materials, Methods, and Identification for sleeves and mechanical sleeve seals.
- E. 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."
 1. Encase underground piping with PE film according to ASTM A 674 or AWWA C 105.
 2. US Pipe polyethylene encasement or approved equal.
- F. 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 2 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.
- G. 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 manufacturers written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.
- H. Install soil and waste drainage and vent piping at the following minimum slopes, unless otherwise indicated:
 1. Building 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.
 2. Horizontal Drainage Piping: 2 percent downward in direction of flow.
 3. Vent Piping: Level.

- I. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.
- J. The contractor shall furnish and install all condensate piping with trap/vent for all heating and ventilating and/or mechanical equipment where required. Included is connection to the equipment (verified with mechanical contractor) and installation of the condensate drain to a code approved receptor. When condensate drains are installed on the roof, supports shall be MIFAB C-port CIOSS spaced every 6 feet.

1.5 JOINT CONSTRUCTION

- A. Refer to Section 220100 -Basic Plumbing Materials, Methods, and Identification for basic piping joint construction.
- B. Cast-Iron, Soil-Piping Joints: Make joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter N, "Installation of Cast Iron Soil Pipe and Fittings."
 - 1. Hubless Joints: Make with rubber gasket and sleeve or clamp.
- C. Soldered Joints: Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy solder; and ASTM B 828 procedure, unless otherwise indicated.

1.6 VALVE INSTALLATION

- A. Refer to Section 220523 - Valves for general-duty valves.
- B. Backwater Valves: Install backwater valves in piping subject to sewage backflow.
 - 1. Horizontal Piping: Horizontal backwater valves. Use normally closed type, unless otherwise indicated.
 - 2. Floor Drains: Drain outlet backwater valves, unless drain has integral backwater valve.
 - 3. Install backwater valves in accessible locations.
 - 4. Refer to Section 22 0500 - Plumbing Specialties for backwater valves.

1.7 HANGER AND SUPPORT INSTALLATION

- A. Refer to Section 22 0529 - Hangers, Supports, Mechanical Vibration, and Seismic Controls - Plumbing for pipe hanger and support devices. Install the following:
 - 1. Vertical Piping: MSS Type 8 or Type 42, clamps.
 - 2. Individual, Straight, Horizontal Piping Runs: According to the following-
 - a. 100 Feet 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.

3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
 4. Base of Vertical Piping: MSS Type 52, spring hangers.
- B. Install supports according to Section 22 0529 - Hangers, Supports, Mechanical Vibration, and Seismic Controls - Plumbing.
- C. Support vertical piping and tubing at base and at each floor.

1.8 CONNECTIONS

- A. Connect soil, waste, and storm drain piping to exterior sewage piping. Use transition fitting to join dissimilar piping materials.
- B. Connect storm drainage piping to roof drains and storm drainage specialties.
- C. Connect drainage and vent piping to the following:
1. Plumbing Fixtures: Connect drainage piping in sizes indicated, but not smaller than required by plumbing code. Refer to Section 22 4000 - Plumbing Fixtures.
 2. Plumbing Fixtures and Equipment Connect atmospheric vent piping in sizes indicated, but not smaller than required by UPC.
 3. Plumbing Specialties: Connect drainage and vent piping in sizes indicated, but not smaller than required by plumbing code. Refer to Section 22 0500 - Plumbing Specialties.
 4. 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.

1.9 FIELD QUALITY CONTROL

- A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made and/or as required by Division 1. Perform tests specified below in presence of authorities having jurisdiction.
1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
 2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
- B. Reinspection: 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.

1. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
2. Prepare reports for tests and required corrective action.

1.10 CLEANING

- 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.

END OF SECTION

SECTION 22-4000 PLUMBING FIXTURES

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.
- B. Section 22 0000 - General Plumbing Provisions
- C. Section 22 0100 - Plumbing Materials, Methods and Identification

1.2 SUMMARY

- A. Provide plumbing fixtures approved for water conservation and for accessibility regulations.
- B. Provide complete fixture assemble, including all trim and appurtenances for proper operation and neat, finished appearance. Procure all rough-in data from manufacturer and rough-in and connect to fixtures as required.

1.3 QUALITY ASSURANCE

- A. Contractor Qualifications: All equipment and accessories to be the product of a manufacturer regularly engaged in its manufacture. Supply all equipment and accessories new, free from defects. All items of a given type shall be the product of the same manufacturer.
- B. Requirements of Regulatory Agencies:
 - 1. In all cases where CS, ANSI, NSF or other standards are indicated or required, products shall meet or exceed the standards established for material, quality, manufacture, and performance.
 - 2. Fixtures and trim designated for accessibility shall have prior approval of the applicable sections of the California Administrative Code prior to submissions of Shop Drawings and Product Data. The submission shall contain proof of the required State approvals.
 - 3. General Requirements:
 - a. Coordinate height of accessible fixtures with those indicated in construction drawings.
 - b. Refer to drawings and fixture schedule at the end of this section for manufacturer and model numbers for plumbing fixtures.
 - c. Covers for cold and hot water and drainpipes under accessible sinks and lavatories. (CBC 11B-309.4)
 - 4. Conform to DSA Bulletin BU-09-10 regarding installation of "LEAD FREE" plumbing fixtures, fittings and pipes.

C. Reference Standards:

1. ANSI - American National Standards Institute.
2. ASSE - American Society of Sanitary Engineers.
3. CS - Commercial Standards, Commodity Standards Division, U.S. Department of Commerce.
4. NSF - National Sanitation Foundation.

1.4 SUBMITTALS

A. Drawings and Product Data: See Division I and Section 220000 - General Plumbing Provisions for requirements and include the following

1. Descriptive Data:
 - a. Plumbing fixtures.
 - b. Plumbing fixture supplies.
 - c. Fixture supports.
2. Shop Drawings:
 - a. Fixture backing.
 - b. Rough-in Drawings.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Shop equipment in its original package, to prevent damage or entrance of foreign matter. Perform all handling and shipping in accordance with manufacturers recommendations. Provide protective coverings during conversation.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Manufacturers:

1. Fixtures: American Standard, Kohler or Crane.
2. Fixture Trim: Refer to Plumbing Fixture Connection Schedule on drawings.
3. Flush Valves: Refer to Plumbing Fixture Connection Schedule on drawings.
4. Water Closet Seats: Church, Sperzel, or Beneke.
5. Carriers:
 - a. Water Closets: Zurn 1203 and 1204 series or Smith, unless otherwise noted or shown on drawings.

- b. Urinals: Zurn 1222 series or Smith, unless otherwise noted or shown on drawings.
 - c. Lavatories: Zurn 1231 series.
- B. Fixture Supplies and Stops:
 - 1. Lavatories: Speedway CRSST-1912-A, or approved substitute.
 - 2. Sinks: Speedway CRSST-1912-K, or approved substitute.
 - 3. Valves: Lockshield key operated stops.
 - 4. Wall mounted faucets: Screwdriver stops or faucets may have integral stops in lieu of separate stops.
- C. Fixture Flow Controls: To comply with Title 24 at each fixture as follows:
 - 1. Water Closet 1.28 gpm.
 - 2. Urinals: 0.13 gpf (quart).
 - 3. Lavatories: 0.35 gpm.
 - 4. Sinks: 1.5gpm.
- D. Lavatory and Sink Traps: 17 gauge adjustable 'P traps, tubing to wall. Polished chrome plated.
- E. Fixture Color: White.
- F. Trim Finish: Polished chrome plated.
- G. G. Plumbing Fixtures: Refer to Schedule on drawings. 1. Accessibility Compliant Requirements:
 - a. All designated fixtures for accessibility shall be installed per California Code of Regulations, Title 24, Part 2, accessibility compliant requirements.
 - b. Wrap P-Trap, cold and hot water tubing and stops with TRUEBRO to protect against scalding and scraping. Refer to drawings.
- H. Other Materials:
 - 1. All other materials not specifically described but required for a complete and proper installation shall be new, first quality of their respective kinds, and subject to the approval of the Architect.

2.2 MATERIALS

- A. General:

1. Provide fixtures and trim complete for proper installation as described in the manufacturer's catalog with the modifications as shown on Plumbing Fixture Schedule.
 2. All fixtures, specified to be of vitreous ware, shall be of a quality known commercially as "twice fired" vitreous chinaware of the best quality, nonabsorbent, burned so that the whole mass is thoroughly fused and vitrified, producing a material white in color which, when fractured, will show a homogeneous mass, close-grained and free from pores. The glazed and vitreous china fixtures shall be white, thoroughly fused and united to the body, without discoloration, chips, or flaws and shall be free from cracks. Warped or otherwise imperfect fixtures will not be acceptable.
 3. Factory grind back and bases of fixtures smooth.
 4. Enamel ware to be white cast iron with acid-resisting enamel.
 5. Unless otherwise specified, water closets to have a waste passage to pass a 2-1/2 inch ball minimum. Bolt water closets to flanges with a 1 inch thick rubber foam gasket.
 6. Fixture trim and exposed metal items shall be polished chrome-plated unless otherwise noted, and pipes passing through walls shall have polished chrome-plated escutcheon plates. All stainless steel shall be satin brushed (US32D) finish unless noted otherwise.
 7. Fixtures shall be free from imperfections, true as to line, angles, curves, and color; smooth, watertight and practically noiseless in operation.
 8. Exposed Pipe, Trim Including Fittings, Traps, Escutcheons, Valves, Valve Handles, and Accessories; Above and below fixtures:
 - a. Polished chrome plated CF brass.
 - b. Set-screw cast brass escutcheons for piping.
 - c. Traps: Cast brass with cleanout plugs.
 9. Supply fixtures with:
 - a. Renewable seats or replaceable internal units.
 - b. Compositional washers.
 - c. All metal indexed handles.
 - d. Screwdriver or lockshield stops.
- B. Plumbing Fixtures Schedule: As shown on drawings.

2.3 FIXTURE SCHEDULE

SEE DRAWINGS FOR SCHEDULE.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Plumbing Fixtures:

1. Install fixtures as recommended by the fixture manufacturer except as shown differently on Drawings or where required by handicap codes.
2. Set fixtures level and equally spaced when installed in bank of more than two.
3. Rough-in supplies level, equally spaced and symmetrical with the fixture.
4. Rough-in wastes in alignment with the fixture drain. Install flush valves level with flush connections vertically. Offsetting and misalignment will not be acceptable.
5. Caulk all deck mounted trim at the time of assembly, including fixture and casework mounted. Caulk all self-rimming sinks installed in casework. The butted space between fixtures and the wall, counter or floor on which they are mounted shall be sealed with white acrylic plastic caulking compound.
6. Point up fixtures at joints with walls and floors with nonhardening Tile-Fix.
7. Cover exposed fixture fastening nuts and bolts with china bolt caps. Fill with putty.
8. Make-up trim with care and with the proper tools in order that no tool marks show after installation.

B. Water Supplies:

1. Provide each water supply to each fixture, equipment or faucet, with a stop in the branch connecting thereto. The stop shall be a screwdriver partition stop at finished wall locations and a rough brass globe valve at rough locations. Angle stops for deck mounted faucets shall have an IFS inlet.
2. Cover unoccupied fixture faucet holes with faucet hole covers.
3. Securely fasten screwed adapter fittings behind water supply stubouts to the structure.

C. Waste Outlets: Caulk strainers set in sanitary waste fixtures with glazing putty.

D. Supports:

1. Support wall-hung sinks and lavatories by concealed chair carriers, commercial type, with block feet and thrust nuts. Securely anchor the carrier to the structure.
2. Bolt chair carrier foot anchors and rear lugs to floor.
3. Coordinate wall dimensions required.

3.2 SPECIAL EQUIPMENT

- A. General: Rough-in and connect to all special equipment specified in other Divisions or furnished by Owner.
- B. Trim:
 - 1. Provide pipe extension pieces, couplings, flanges, unions, cocks, valves, 'P' traps, pressure reducing valves, vents, wastes and all other trim required for proper operation which are not furnished integral with special equipment

3.3 ADJUSTMENT AND CLEANING

- A. In accordance with the requirements of Sections 22 0000 - General Plumbing.

END OF SECTION

SECTION 26-0000 -

ELECTRICAL GENERAL REQUIREMENTS AND
BASIC MATERIALS AND METHODS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The General Conditions, Supplementary Conditions, and General Requirements, Division 1, are a part of and to apply to all works of this Section..

1.2 DESCRIPTION

- A. The work in this section applies to works specified in all sections of Division 16 – Electrical.
- B. Other sections of Division 16– Electrical:
1. Lighting - Section 26-0800
 2. Structured data System - Section 23-000
- C. The work includes, but is not necessarily limited to, the providing of work as shown and noted on the drawings and specified herein. The following summary is included to indicate some items common to work. It is not necessarily all inclusive.
1. Labor, material, equipment, tools, rigging, hoisting, temporary scaffolding, temporary power, transportation, supervision inspection, services, insurance, fees and taxes required to furnish and install the electrical systems as shown on drawings and/or described in specification complete and including that which is reasonably inferred.
 2. Carpentry, masonry, steel and concrete materials and labor required for construction of proper stands, bases and supports for electrical materials and equipment.
 3. Cooperation and coordination with other crafts in putting the installation in place at a time when the space required for this installation is accessible. Work done without regard to other crafts shall be removed at the Contractor's expense.
 4. Coordination and Verification: When equipment requiring electrical connection is furnished by other Divisions, verify location, voltage, control method and other connection requirements prior to rough-in. If connection requirements are in conflict with what is shown on drawings or specification, promptly inform the Architect for resolution. Verify exact location of electrical devices (receptacle, switches, etc.), lighting fixtures and equipment which their location may have esthetical impact, with the Architect prior to rough-in.
 5. Cutting and patching of holes required by this installation (including provision for holes in concrete before concrete is poured), flashing and counterflashing of roof and wall penetrations.

6. Excavating, pumping, trenching, backfill and conduit for all site lighting, power and signal as shown on drawings and as required for this installation.
7. Fire caulking/sealing of all penetrations.
8. Repair of damage to the premises resulting from activities in connection with installation of this section of the work, and during process of work removal of debris left by those engaged in this installation.
9. Identification of equipment and raceways.
10. Cleanliness of fixtures, equipment and apparatus when the complete work is accepted by the Owner. Cleaning of electrical materials and installation that will remain.
11. Provide testing as specified and as may be required by authorities having jurisdiction. Refer to Part 3 of each section for testing requirements.
12. Preparation of submittal, shop drawings and project record drawings.

1.3 RELATED WORK

A. Related requirements specified elsewhere to include:

1. Basic Mechanical Materials and Methods - Section 23-0000.
2. Fire Stopping – Section 07 8413.
3. Joint Sealing - Section 07 9200.
4. Painting - Section 09 9100
5. Equipment - Division 11.
6. General Plumbing Requirements- Section 22-0000

1.4 POWER AND SIGNAL SYSTEMS INTERRUPTION:

- A. If interruption of existing power or signal services is required for installation of new work, provide schedule of time and duration of power shut-down.
- B. Submit request for interruption of services to the Owner at least one week before scheduled shutdown. Do not shutdown any services before Owner's approval.
- C. If the Owner does not approve proposed power shut down in all or certain types of the work, the contractor may either provide temporary power to energize the affected area or perform power shut down, after hours or weekends, as allowed by the Owner, at no additional expense to the Owner.

- D. Carry out shut down so as to cause the least disruption to operation of the facility.

1.5 QUALITY ASSURANCE

- A. All work and materials shall be in full accordance with the latest rules and regulations of the Local Building Department and Fire Marshal, the 2016 California Electrical Code, 2015 Title 24 of the California Code of Regulations, and other applicable local and State laws or regulations. Nothing in these plans or specifications is to be construed to permit work not conforming to these codes. The latest requirements of the following publications and regulations shall also be complied with:

1. American Disabilities Act.
2. Applicable codes of the National Fire Protection Association.
3. Occupational Safety and Health Act (OSHA) Standard.
4. Applicable regulations and rules of the local utility companies.
5. Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems, International Electrical Testing Association (NETA)

- B. All materials shall be new, packed in original containers, installed and turned over free of rust, corrosion or defects. For uniformity, only one manufacturer will be accepted for each type of product.
- C. All materials shall bear the label of, or be listed by, Underwriter's Laboratories (U.L.). If listing is not offered by U.L., labeling and listing by other organizations, such as ETL Testing Laboratories, may be accepted if approved by authority having jurisdiction.
- D. Whenever the indicated material, workmanship, arrangement or construction is of higher quality or capacity than that required by the above rules and regulations, the drawings and/or specifications shall take precedence. Should there be any direct conflict between rules and regulations and drawings and/or specifications, the rules shall govern.
- E. Furnish, without extra charge to the Owner, all additional material and labor when and where required to comply with these codes, rules and regulations, though the work may have not been mentioned in these specifications or shown on the plans.

1.6 PERMITS, FEES AND INSPECTIONS

- A. Licenses, Permits, Fees and Charges: Obtain and pay for all licenses and permits and pay for fees and charges connected with the work of this Section.
- B. Inspections, Tests and Certificates: Arrange and pay for all inspections, tests and certificates required for completion and approval of the work.

1.7 SHOP DRAWINGS, MATERIALS AND SUBSTITUTIONS

- A. Submit complete shop drawing submittals, including catalog cuts on specified items and proposed substitutions as per requirements of Division 1. Shop drawing shall be

provided for the following items: (Refer to other sections for items requiring submittal, related to those sections).

1. Panelboards
 2. Devices and Plates.
 3. Cables and Signal System Cables.
- B. Requests for approval of a substitution will not be considered unless accompanied by complete data to prove full equality to the specified item, and unless submitted within 35 days. Contractor shall pay for tests of substitute materials required by the Architect. Only one substitution proposal will be considered; if the proposal is rejected, provide the specified material. Tests shall be made by a laboratory satisfactory to the Architect.
- C. Responsibility for conflicts due to space limitations is not relieved by approval of a substitution. If revision of wiring, piping, or arrangement of other equipment is required by substitution, prepare drawings showing such revisions, and after approval furnish the Architect with six (6) copies for file and future reference. Approval of a substitution does not authorize any deviation from the utility, size or function of the specified item unless specifically pointed out and approval requested in the letter of submittal.
- D. Unless otherwise shown or specified, material shall be new, full weight, standard, the best quality of its kind and satisfactory to the Architect. Unless otherwise shown or specified, major equipment shall be the product of a manufacturer who has, for a period of not less than five years, been in successful manufacture of the equipment, and who has a nationally distributed catalog covering ratings and specifications of said equipment.
- E. Material shall be stored and protected as necessary and/or as required by the Architect, and the Contractor shall be entirely responsible for damage or loss. Protect materials from dust, corrosion, water or construction operations.

1.8 CUTTING OF STRUCTURAL MEMBERS

- A. Unless specifically detailed on the structural drawings, cutting of joists, mullions, studs, grade beams, and similar structural members is prohibited. Refer to structural drawings for limitations for installing conduit in Floor Slabs and other structural members.

1.9 WORKMANSHIP

- A. Keep a competent foreman in charge of the work and give personal supervision at the site and/or shop when necessary. Workmanship quality shall match or exceed that of industry standard for similar construction.
- B. Perform all labor using qualified craftsmen, who have had experience on similar projects. Ensure that all equipment and materials fit property. Perform any required work to correct improperly fit installations at no additional expense to the Owner.

1.10 DRAWINGS AND ARRANGEMENTS

- A. Drawings are diagrammatic, and they indicate general arrangement and locations of equipment and materials; this arrangement shall be followed as nearly as possible. Should it be necessary to deviate from the arrangement indicated in order to meet structural conditions, such deviations shall be made without expense to the Owner. Where there appears to be a discrepancy in drawings and/or specifications, the bidder shall secure written instructions from the Architect.
 - B. Working parts shall be readily accessible for inspection, repair and renewal. The right is reserved to make reasonable changes in location of equipment shown on drawings prior to roughing in without additional expense to the Owner. Field verify scaled dimensions on drawings.
- 1.11 MANUFACTURER'S DIRECTIONS
- A. Follow manufacturer's directions where these directions cover points not included on drawings or in specifications.
- 1.12 EXAMINATION OF THE SITE
- A. The Contractor shall be held to have visited the site and satisfied himself as to the conditions under which the work is to be performed. He shall check existing conditions which may affect his work. No allowance shall subsequently be made in his behalf for any extra expense to which he may be put due to failure or neglect to discover conditions affecting his work.
- 1.13 CLOSING IN OF UNINSPECTED WORK
- A. Work under this section shall not be enclosed or covered up until it has been inspected, tested, and approved by the Owner or authorized representative and governmental authorities having jurisdiction over the work. If any of the work is enclosed or covered up before such inspection and test, it shall be uncovered, inspected, tested, and all necessary repairs made with matching materials to restore the work to its original condition. All costs for the above work will be the expense of the Contractor.
- 1.14 ACCURACY OF DATA
- A. Data given herein and on drawings are as exact as could be secured, but their extreme accuracy is not guaranteed. Drawings and specifications are for the assistance and guidance of the Contractor and exact locations, distances, levels, etc., will be governed by the building and site. Contractor shall take the contract with this understanding.
- 1.15 INSTRUCTIONS TO OWNER'S REPRESENTATIVE
- A. Employ manufacturers' representatives for each "Signal System", to demonstrate and instruct the Owner's representatives in the operation and maintenance of all respective equipment. Schedule the demonstration with Architect for coordination with the Owner.
- 1.16 COMPLETE WORKING INSTALLATION

- A. A complete working installation shall be furnished with all equipment called for on drawings or specifications in operating condition. Drawings and specifications do not undertake to list every item that is to be installed. When an item is necessary for the operation of the equipment drawn or specified, furnish a suitable item that will allow the system to function properly at no extra charge to the Owner.

1.17 SHORT CIRCUIT RATING

- A. Equipment and devices, for which short circuit rating has been specified or shown on drawing, shall have the required rating independent of other devices. Series short circuit ratings are not allowed.

1.18 RECORD DOCUMENTS

- A. Furnish As-Built drawings per Division 1.

1.19 WARRANTY

- A. All work and materials under this contract shall be warranted to be free of defects in material and workmanship for a period of minimum 1 year, from the date of Owner acceptance.
- B. Submit manufacturer product warranties to the Owner upon final acceptance.

PART 2 - PRODUCTS

2.1 CONDUITS: (SEE PART 3 FOR TYPE USED)

- A. Rigid Galvanized Steel (GRS): Hot dip galvanized conforming to ANSI C80-1, U.L. 6. Type of fittings shall be as follows:
 - 1. Standard threaded couplings, locknuts, bushings and elbows shall be malleable iron or steel. Use bonding type locknuts
 - 2. Three-Piece Couplings: O.Z./Gedney 4-50 series or equal.
 - 3. Insulated Bushings: Threaded insulated bushing shall be PVC, rated 150 degree C minimum.
 - 4. Metallic Bushing: Threaded cast malleable iron with insulated busing T&B 1222 series or equal. Insulated grounding bushing shall have ground lug with compression screw, T&B 3870 series or equal.
- B. Coated Rigid Steel: Hot dip galvanized conforming to NEMA RN1, with factory applied PVC coating, 40 mil thick. Fittings shall be as specified for GRS, but with PVC coating equivalent of that for the conduit.
- C. Intermediate Metal Conduit (IMC): Hot dip galvanized conforming to U.L. 1242. Fitting same as described for GRS.

- D. Electrical Metallic Tubing (EMT): Galvanized steel conforming with ANSI C80.3, U.L. 797, fitting shall be as follows:
 - 1. Set Screw Type: Electroplated, steel or cast malleable O.Z./Gedney 5000 series for couplings and 4000 series for connectors with insulated bushings.
 - 2. Compression Rain Tight: Electroplated steel or cast malleable U.L. listed rain tight, using gland and ring compression type construction, as made by T&B.
- E. Rigid Non-Metallic Conduit (PVC Schedule 40): PVC conduit, Schedule 40 conforming to NEMA TC2 and U.L. 652, suitable for 90 degrees C conductor insulation, as made by Carlon, or equal. Fittings shall be molded PVC, slip on, solvent weld type as furnished by conduit manufacturer.
- F. Flexible Metal Conduit: Galvanized steel strip, spirally wound and formed to provide interlocking design, conforming to U.L.1. Fitting shall be single screw clamp with steel or cast malleable iron body and threaded male hubs with insulated throat
- G. Liquid Tight Flexible Conduit: Flexible galvanized steel tubing covered with PVC liquid tight jacket conforming to U.L. 360, Anaconda type UA, or equal. Connectors shall be electro plated steel or cast malleable iron, seal tight O.Z.-Gedney type Dx, or equal.
- H. Flexible Conduits, if used for hazardous locations, shall have U.L. listing for applicable NEC Division and Class.
- I. Expansion and Deflection Couplings: Shall be as per U.L. standard 514B, O.Z./Gedney type Dx, or equal.

2.2 ELECTRICAL SUPPORTING DEVICES

- A. Concrete Fasteners: Expansion type anchor by Philips "Read-Head", or equal. Powder-driven concrete fasteners, low velocity type by Remington.
- B. Conduit Straps: Hot-dip galvanized cast malleable iron, one hole type strap with cast clamp-backs and spaces are required. O.Z./Gedney #14-50G strap and #141G spacer, Efcor #231 strap and #131 spacer, or approved equal.
- C. Construction Channel: 1-1/2 inch by 1-1/2 inch 12 gauge galvanized steel channel with 17/32 inch diameter bolt holes, 1-1/2 inches on center, in the base of the channel: Kindorf 905 series, Unistrut P-1000-HS or approved equal.
- D. Fasteners (General): Wood screws for fastening to wood. Machine screws for fastening to steel. Toggle bolts for fastening to hollow concrete block, gypsum board or plaster walls. Steel beam clamps for attachment to beams.
- E. Fixture Support Wires: No. 12 galvanized steel.
- F. Threaded Rod: 1/4-inch diameter minimum. Hot-dip galvanized.
- G. All supports and attachments for panels, terminal cabinets, pull boxes. Luminaries, and other equipment shall be designed for seismic load as per CBC-Title 24.

2.3 FIRE STOPPING AT RATED WALLS, FLOORS AND CEILINGS

- A. Provide U.L. approved "Firestop-Seals" at all penetrations through fire-rated ceilings, floors or walls: 3M type CP-25, Nelson type CLK, or approved equal. Fire stop material shall be a reusable non-toxic, asbestos-free, non-shrinking, putty type material with a 3hour rating in accordance with U.L. 1479. Provide products indicated by the manufacturer to be suitable for type and size of penetration and apply as per manufacturer's instruction.
- B. Provide U.L. listed "moldable putty" 3M type MPP-1 and MPS-2, or equal, and caulk around outlets and cable penetrations in rated walls or ceilings as required by code.

2.4 BOXES

- A. Standard Boxes:
 - 1. Steel Boxes: Comply with ANSI/NEMA OS1, as manufactured by Raco, Steel City, Appleton or equal. One piece galvanized, knock-out type, size as required by code, minimum size 4" square, 1-1/2" deep.
 - 2. Cast Metal Boxes: Die cast steel or aluminum with threaded hub, with neoprene gaskets and die cast covers, as made by Appleton FD series with wet location cover, or equal.
 - 3. Boxes for explosion-proof installation shall comply with NEC associated classification, as made by appropriate model made by Appleton, or equal.
- B. Steel Pull and Splice Boxes:
 - 1. Code gauge, galvanized of required size. Cover shall be secured with cadmium plated machine screw, 6" on center. Exterior pull boxes shall be finished with one coat of Di-chromate primer and two coats of baked enamel. Product as made by Circle AW Products, Hoffman, or approved equal.
 - 2. Flush mounted pull boxes shall have overlapping covers with flush-head cover retaining screw.
 - 3. Size as per NEC Article 370, unless larger size shown on plans.

2.5 CONDUCTORS

- A. Manufacturer: General Cable, Essex, Rome, or equal.
- B. General building wires (single conductor) used for feeders, branch circuits and line voltage control.
 - 1. Solid copper THHN/THWN or XHW, minimum size #14 AWG, unless otherwise noted. Conductors #8 AWG or larger shall be standard, Class B.
 - 2. All conductors shall be color coded and shall have 600 volt insulation.
 - 3. Conductors inside fixture shall be type UL, Type SF-2 (200 degree C).

- C. Multi Conductor Cables: (See Part 3 for allowed application and color coding.)
 - 1. Multi Conductor Cables for Signaling System: Type shall be as per signal manufacturer's recommendations and shall comply with applicable codes and NEC Classification (NEC – Article 725).
 - D. Wire/Cable in Plenum Spaces: Where wire or cables are run in ducts, plenum space or other spaces used for environmental air, they shall be in conduit or shall be a type listed as being resistant to spread of fire and low smoke producing, as per NEC Articles 300-22 SPLICING AND TERMINATION MATERIALS.
 - E. Spring Wire Connector: As made by 3M "Scotchlock" or Ideal, product as recommended for wire sizes.
 - F. Bolted Pressure Connectors: Cast bronze compression bolts, as made by Burndy "Hilug".
 - G. Compression Type Termination Lug: T&B color-keyed one hole lugs (two hole lugs for size 4/0 or larger, or where equipment connection lug has double holes), type to suit application.
 - H. Insulating Tape: 3M "Super 33 + Scotch" vinyl tape or equal conforming to U.L. 510. Three layers half-lapped minimum.
 - I. Underground where subjected to moisture (in junction boxes, exterior post lights, etc.): 3M "Scotch Cast" or equal U.L. approved "cast-resin", completely watertight type.
- 2.6 GROUNDING
- A. General: The complete electrical installation, including neutral conductor, metallic conduits and raceways, boxes, cabinets, cable tray, equipment and machinery shall be completely and effectively grounded in accordance with all code requirements, whether or not such connections are specifically shown or specified.
 - B. Ground Rods (Driven)
 - 1. Provide copper clad steel, minimum ¾", 10 feet long ground rod, type as made by Weaver, Cadweld or equal.
 - C. Ground Conductors:
 - 1. Equipment ground conductors shall be type THW/THWN, insulated copper, green in color.
 - D. Ground Connections
 - 1. Provide connection between cables, cable to ground rod or cable to structural steel using exothermic welds (as manufactured by Cadweld), or high pressure connectors as manufactured by Thomas & Betts #5300 series, or approved equal. High pressure connection where buried shall be coated by electrical joint compound.

2.7 WIRING DEVICES

- A. All products shall be as made by Hubbell, Pass & Seymour (P&S), or Leviton, specification grade, color shall be white, unless otherwise selected by the Architect. Model for switches is for single pole switches. Double pole, three-way and four-way switches shall be of same type series as single pole switches.
- B. General Use Switches:
 - 1. Wall switch, 20 ampere, toggle handle, quiet type: Hubbell 1221, P&S 20AC1-I. Wall switch with pilot light (red light on when load on): Hubbell 1221 PL, P&S 20AC1-PRL.
 - 2. Lock type wall switch, 20 ampere: Hubbell 1221L, P&S 20AC1-L.
 - 3. Locking attachment (to lock access to switches): Hubbell 96061DCH.
- C. General Use Receptacle:
 - 1. Duplex: 20 ampere, NEMA 5-20R. Regular: Hubbell 5362I, P&S 5362-AI. Isolated ground: Hubbell IG 5362, P&S IG 6300I. Ground fault: Hubbell GF 5362I.
 - 2. QUAD (4 plex receptacles): 15 ampere, NEMA 5-15R. Regular: Hubbell 4151I, P&S 1254I. Isolated ground: Hubbell IG4415, P&S IG 1254-I.
- D. Special Purpose Receptacle: NEMA type and configuration shall match requirement of equipment served.

2.8 DEVICE PLATES

- A. General:
 - 1. As made by Hubbell, Pass & Seymour or Leviton, comply with NEMA WD1 U.L. 514.
 - 2. Provide gang type plates where two or more devices are mounted on same location.
 - 3. Color shall be Ivory as approved by the Architect.
- B. Non-Metallic: Used in interior for recessed box, shall be nylon, smooth finish with contoured edges.
- C. Weatherproof Plates: Cast metal gasketed and corrosion resistant. Cover plates shall have weatherproof, spring loaded, vertically self-closing covers. Cover for receptacles shall comply with NEC 410-57.

2.9 DISCONNECT SWITCHES

- A. Manufacturer: General Electric, Square D, Cutler Hammer or Siemens, to conform with NEMA KS1.

- B. Heavy duty quick make, quick break, horse power rated load interrupter enclosed knife switch with externally operable handle, interlocked to prevent opening front cover with switch in ON position, handle shall be lockable in OFF position.
- C. Where fusible disconnect switches are called out, they shall be equipped with fuse clips to accommodate Class RK-1 fuses for switches up to 600 amperes and Class "L" fuses for 800 amperes and larger. Provide fuses, size as required to protect equipment served.
- D. Enclosures shall be suitable for location used.

2.10 MOTOR CONTROLS

- A. Shall be made by Square D, Cutler Hammer, Siemens, Allen Bradley or equal, conforming to NEMA 1C2.
- B. Manual Motor Starters: For single phase motors of less than one horse power, shall be A.C. general-purpose manually operated toggle with thermal overload. Enclosure shall be suitable for location installed.

2.11 PANELBOARDS

- A. Manufactured by Siemens, Cutler Hammer, General Electric, Industrial Electric, or approval equal to comply with provisions of U.L. 50 and 77 and NEMA PB-1 and shall be Class CTL.
- B. Refer to panel schedule for rating and circuit arrangement. In all cases, panels shall be bolt on, circuit breaker type. Panels fed from a transformer shall have a main breaker sized to provide full capacity of the transformer rating. Minimum short circuit rating shall be 10,000 AIC for 208 and 240 volt applications, and 22,000 for 480 volt applications.
- C. Enclosure shall be code gauged galvanized steel, minimum 20 inches wide, hinged door (concealed hinges) with keyed alike corrosion-proof lock latch. Enclosure type shall be as indicated on panel schedule and shall suit location used. Trim shall be suitable for flush or surface installation as indicated and shall have ANSI-61 light gray finish.
- D. Bus shall be bolted copper with taps arranged for distributed phase connection to branch breakers. Neutral bus shall be minimum same capacity as phase buses. Provide full size ground bus with lugs for each outgoing branch circuit. Termination lug shall be suitable for aluminum/copper conductors.
- E. Circuit directory shall be minimum 6" x 8" frame and card with clear plastic covering provided in inner panel door. Starting at top, indicate odd numbered circuits, in sequence, down the left hand side and even numbers down the right hand side.
- F. Where "SPACE" is indicated in the panelboard schedule, install cross connectors and mounting hardware to match frame size ampere rating noted. Provide blocking clips "Lock on Device" on breakers serving security and alarm circuits.
- G. Panelboard used as service entrance shall have U.L. listing for service entrance.

2.12 CABINETS

- A. As manufactured by Hoffman, or approved equal.
- B. Surface mount or flush mount, as shown on plan, provide NEMA 1 enclosure for interior and NEMA 3R for exterior, size as indicated on plans, or, if not, as recommended by manufacturer to contain equipment installed in the cabinet (minimum 4" deep).
- C. Shall be code gauge steel (#16 gauge minimum), with concealed continuous hinged door and flush latch/lock, key alike with panelboards.
- D. Provide ¾" fire retardant plywood mounting backboard. Provide barriers to separate compartments operating at low voltage (less than 50 volts) from high voltages.
- E. Finish shall be manufacturer's standard gray.
- F. Refer to other sections of the Specification for type of terminal block and/or relay or other components which shall be installed in the cabinet.

2.13 OVERCURRENT PROTECTIVE DEVICES

- A. General:
 - 1. Devices shall be U.L. listed and meet NEMA standards AB1, 2 and 3 and U.L. standards 486A, 486B, 489, 1066 and 1087, as applicable to specific device. Devices may be installed in switchboards, panelboards, motor control center, fusible switches and individual enclosures.
 - 2. Manufacturer: Circuit breakers and switches shall be manufactured by General Electric, Siemens, Square D or Cutler Hammer. Fuses shall be made by Bussmann, Gould, Siemens or Littlefuse.
 - 3. Short circuit rating of overcurrent protective devices shall match or exceed the fault rating of the panel, switchboard or equipment in which the device is installed. Series rated devices are not allowed.
- B. Molded Case Circuit Breakers:
 - 1. Thermal magnetic, bolt-on type (except that circuit breakers used for single phase load centers may be plug-in type). Breakers 100 Amp. and smaller shall be of the 1" per pole type.
 - 2. Circuit breakers shall have toggle, quick-make and quick-break operating mechanism with trip-free feature to prevent contacts being held closed against overcurrent condition.
 - 3. When frame size and trip setting (AF/AT) is indicated next to circuit breaker symbol on plans (refer to Single Line Diagram) and for all circuit breakers rated 800 ampere and higher, it shall be equipped with electronic trip unit (similar to Cutler Hammer Digi Trip series). Sensors on electronic trip units shall sense current RMS and provide adjustable setting for short delay protection, instantaneous protection and ground fault protection. To

establish breaker continuous current rating, interchangeable rating plugs shall be provided.

4. Provide 100% rated circuit breaker, where called for on the plans. All branch circuit breakers (up to 60 ampere) feeding HVAC equipment shall be HACR rated.
5. Provide ground fault circuit breakers (GFCI), where required by code or called for. The breakers shall be designed to detect phase to ground current of 4 – 6 milli ampere and to automatically disconnect the circuit upon detection.

C. Insulated Case Circuit Breakers:

1. Manually operated stored energy circuit breakers shall provide adjustable inverse time overload, adjustable instantaneous short circuit, adjustable short time delay, and adjustable ground fault protection by means of solid state trip element with two step stored energy mechanism. Provide interchangeable rating plug (circuit breaker continuous current rating) for 100% of frame size.
2. Where indicated, provide electrically operated circuit breaker. Provide motor drive operator for charging mechanism, with open, close and charge push buttons.

D. Fuses:

1. All power fuses shall be silver link, current limiting type, unless otherwise noted on the Drawings. Types of fuses shall be as follows:
2. 0-600 amperes: U.L. Class RK-1 dual element, time delay type fuse, Bussmann Low-Peak LPN-RK (250 VAC), LPS-RK (600 VAC) or approved equal.
3. Motor branch circuit fuses (0-600 amperes): U.L. Class RK-1 dual element, time delay type fuse, Bussmann Low-Peak LPN-RK (250 VAC), LPS-RK (600 VAC). Motor branch circuit fuses shall be sized for back-up motor overload protection and shall be coordinated with motor starter overload relay heaters.
4. Control and instrument fuses shall be suitable for installing in blocks or fuseholders. Exact type and rating shall be as recommended by the manufacturer of the equipment being protected.

2.14 PUBLIC ADDRESS, CLOCK AND BELL SYSTEM

- A. Extend existing Bogen Quantum Multicom I Clock/speaker/Intercom system. Furnish all equipment including, but not limited to, outlet boxes, conduit, wiring, clocks, speaker and telephones. Provide all necessary components at Quantum Multicom for a complete installation. Equipment and accessories and accessories furnished under the terms of this specification shall be manufactured by Bogen. Provide equipment as follows:

1. Clocks: Match existing in Building "I"
2. Exterior speakers: Match existing in Building "I"
3. Classroom Speakers: Match existing in Building "I"
4. Telephones: Match existing.

2.15 FIRE ALARM SYSTEM

- A. Extending existing low voltage, addressable fire alarm systems as described herein, and as shown on the plans. Equipment and accessories furnished under the terms of this specification shall be manufactured by Gamewell.
- B. Electrical contractor shall retain the services of the duly appointed manufacturer's representative, who shall furnish all equipment, make all connections to same, and place system in operation. Technician and workman employed shall be particularly skilled in this type of work. Fire alarm system contractors shall possess a valid C10 California Electrical Contractors license. Only contractors holding a valid license may perform any fire alarm work.
- C. All equipment shall be approved and listed by Underwriters Laboratories, Inc., and by California State Fire Marshal. Provide equipment as follows:
 1. Existing Control Panel: No. E3-INCC with 33-INX amplifier subpanel.
 2. Strobe: Wheelock NS Exceeder
 3. Smoke Detector: No. XP95-P/XP95 B2
 4. Exterior Horn: No> AH-24WP
 5. Heat Detectors Above Ceiling: No. 5602/MMF-301
 6. Speaker: Wheelock No. E70
- D. Fire Alarm Requirements:
 1. Applicable Standard 2010 NFPA 72
 2. Installation of the systems shall not be started until detailed design documents and specification, including State Fire Marshal listing numbers for each component of the system has been approved by DSA.
 3. Upon completion of the installation of the systems, a satisfactory test of the entire system shall be made in the presence of a DSA Project Inspector.
 4. A stamped set of approved fire alarm design documents shall be on the job site and used for installation.
 5. Any discrepancies between the drawings and the code or recognized standards shall be brought to the attention of DSA and the Architect/Engineer of the project.

6. DSA, Architect/Engineer and Owner shall be notified a minimum of 48 hours prior to the final inspection and/or testing.
7. All penetrations through rated assemblies, requiring opening protection shall be provided with a penetration fire stop system as identified in CBC Chapter 7, UL or other lab testing criteria. Approved type of materials shall be identified within the specification within the fire alarm section.
8. Wall mounted visual notification devices shall have their tops mounted at 80" minimum and 96" maximum from finished floor.
9. Wall mounted audible notification devices shall have their tops mounted at 90" minimum and 100" maximum from finished floor and no closer than 6" to a horizontal structure.
10. Audible devices to be at least 15 DBA above the average ambient sound level but not less than 75 DBA at 10 feet or more than 110 DBA at the minimum hearing distance. Sound level shall be maintained for duration of at least 60 seconds 5 DBA must be maintained.
11. Audible devices shall be synchronized Temporal Code 3 pattern.
12. The contractor shall adjust/install all devices to maximize performance and to minimize false alarms.
13. Visual devices should not exceed 2 flashes per second and should not be slower than 1 flash every second. The device shall have a pulsing light source not less than 15 candella. Visual devices with 55' from each other shall be synchronized.
14. Underground and exterior conduits to have watertight fittings and wire to be approved for wet locations.
15. All fire alarm wiring shall be FPL or FPLP (Fire Power Limited or Fire Power Limited Plenum) as required for application. Indicating circuits shall be type THWN. Install all wiring in conduit.
16. Per CEC Standards, all wiring is to be pulled through each junction box and connected directly to each fire device. Do not splice the wire. There must be at least 6' of lead wire from the box to the device. All boxes to be sized per CEC.
17. Smoke detectors shall not be any closer than 1' from fire sprinklers or 3' from any supply diffuser. In area of construction or possible damage/contamination on newly installed fire alarm, devices shall be covered until that area is ready to be turned over to the Owner.
18. All fire alarm circuits shall be in conduit or surface raceway. Exposed circuits are only permitted when noted as exposed on design documents.
19. Fire alarm panel, remotes, and components shall be secured to mounting surfaces per manufacturers specifications. No single device shall exceed the weight of 20 lbs. without special mounting details.

20. A dedicated branch circuit shall be provided for fire alarm equipment. This circuit shall be energized from the common use area panel and shall have no other outlets. The breaker shall have a red locking device to block the handle in the "on" position. The circuit breaker shall be labeled "Fire Alarm Circuit Control". Circuit ID to be labeled at fire panel/extendere.
21. The installing contractor shall provide a record of completion per NFPA 72, Figure 10.18.2.1.1.
22. Control panels, remote annunciators shall be installed with their bottoms mounted at 48".
23. The installing contractor shall provide system programming for supervisory monitoring CBC Section 901.6.2.
24. Supervisory monitoring shall be tested and verified as sending correct signals in conjunction with final acceptance test.
25. Owner shall be responsible for establishing a fire system monitoring contract or provision

PART 3 - EXECUTION

3.1 INSTALLATION – GENERAL

- A. Work shall be performed only by competent and experienced workmen in a manner satisfactory to the Architect.
- B. Local Codes: Prior to any work, the Contractor shall review the job with local electrical inspector and bring any special requirement to the attention of the Architect. Special requirements of local codes shall be included as part of this work
- C. Coordination: The Contractor shall coordinate the electrical work with the work of other trades. The Contractor shall not be reimbursed for any work installed but not usable due to improper coordination of work.
 1. Mechanical Equipment: The Contractor shall check with the mechanical contractor for space requirements and electrical requirements of mechanical equipment. Change in electrical requirements due to the substitution of mechanical equipment shall be brought to the Engineer's attention prior to installing any work.
 2. Architectural Drawings: The Contractor shall check the architectural drawings for the exact location of outlets installed over counters, in cabinets adjacent to mirrors, etc. Before rough-in, contractor shall review with the Architect at the site the exact location of all outlets, fixtures, routing, excavations, and exposed conduits. Minor modification as to location of these items shall be done without increase in the contract price.
 3. Ceiling Diffusers: Prior to installing any work, the Contractor shall check with the mechanical contractor for the exact location of heating and ventilating ceiling diffusers and maintain clearances between lighting fixtures and ceiling diffusers.

4. Ensure that all equipment and materials fit properly in their installation.
5. Materials: Prior to placing orders for materials, the Contractor shall check equipment ratings, equipment catalog numbers, and equipment dimensions as to applicability and correctness for installation.
6. Piping Systems: Prior to installing lighting fixtures in a building, the Contractor shall check with the mechanical contractor for the exact location of piping system, overhead doors, etc.. Lighting fixtures shall not be installed directly over pipes, piping systems, etc., and the lighting shall not be impaired by pipes, piping systems, etc.

D. SEISMIC CONTROL

1. Provide seismic restraint and anchorage for equipment in compliance with latest California Building Code (CBC) for seismic Zone 4.
2. Anchor all equipment weighing more than 500 lbs.
3. Contractor shall be responsible for design and acquiring of approval for anchoring equipment which varies from the design. Where anchorage detail is not shown on specified, the field installation shall meet approval of the building inspector.
4. Lighting Fixture Supports: Provide independent seismic support system for all fixtures not directly anchored to concrete wall or concrete ceilings.

3.2 RACEWAYS

- A. All raceways shall be concealed, except in electrical and mechanical rooms and where exposed conduits are permitted by the Architect.
- B. Installation Schedule:

Location of Use	Raceway Permitted
Exterior exposed.	Rigid steel.
Interior exposed.	IMC or EMT (electrical metallic tubing).
Concealed lighting and power.	IMC, EMT.
Concealed control, tel/data and other signal systems.	IMC, EMT.
Flexible connection – interior.	Liquid tight flexible conduit or galvanized flex conduit.
Flexible connection – exterior and damp or wet locations.	Liquid tight flexible conduit.
Concrete slab or below grade.	Coated rigid steel or PVC Schedule 40.

- C. Raceway size, where not indicated on the plans, shall be in compliance with the National Electrical Code. Minimum conduit size shall be ½ inch for lighting and control and ¾” for power. All conduits underground or in concrete slab shall be ¾” minimum.
- D. Penetrations:

1. Seal the interior of all raceways entering the structures at point of entrance and at handholes, manholes or pull boxes with listed expandable plastic compound to prevent liquid, gases and rodents from entering the structure.
 2. Dry pack with non-shrink grout around raceways, penetrating concrete walls, floors, manholes, handholes and pullboxes.
 3. Where an underground raceway enters a structure through non-waterproofed wall, install schedule 40 sleeve. Fill the space between sleeve and conduit with expandable plastic compound on each side of the wall.
 4. Penetrations through fire rated wall, floor, ceiling shall be caulked with approved fire rated material to maintain wall, floor, ceiling fire rating.
 5. Terminate in approved sealing type fittings when leaving refrigerator or freezer, or when leaving hazardous area.
 6. Run conduits through roof openings for piping and ductwork to avoid penetration. Where opening is not available or too far from penetration point, use suitable roof jack with pitched pocket.
 7. Seal around signal cables penetrating gyp board walls (thermostat, etc.).
- E. All conduits shall be installed with code radius bends with not more than three bends per run. Where more than four bends are required in a particular run, pullboxes shall be installed. Signal system conduits (Tel/Data, CATV, etc.) conduits require pullbox so that no conduit run is longer than 100' or contain more than two 90 degree bends. Use factory made elbows for all bends 30° degrees or larger where using PVC conduits.
- F. Underground Installation:
1. Coordinate installation of underground raceways with other construction work. Where other utility piping systems are encountered or being installed along a raceway route, maintain 12-inch minimum separation between electrical and other piping system unless otherwise shown. Do not backfill until work is inspected by building inspector.
 2. Conduit embedded in concrete slab shall be installed between grids of reinforcing steel. Multiple conduits shall be spaced minimum 3 conduit diameters apart. Running conduits in slab, where conduit is 1-inch diameter or larger shall meet structural engineer's approval. Installation of conduits below slab is not allowed, unless encased in concrete integrated with slab. Do not run conduits under pads serving fans, pumps, boilers, or other machinery.
 3. Where rigid steel conduits are installed under floor slabs or underground, they shall be double wrapped with 3M Scotchwrap tape. Wrapping shall extend 12 inches above ground slab. Where PVC conduit is installed, raceway joints in concrete or underground shall be waterproof. Where extended above grade, install adapter fittings on non-metallic section and attach rigid steel galvanized conduit elbow thereto, wrapped with 3M Scotchwrap. (Conduit extension above grade shall be rigid steel.)

4. Underground conduits shall be installed minimum 24" below grade. In streets and parking area, subject to vehicular traffic (and any other location indicated on plans), provide 3" minimum thickness red-colored concrete cap, with top of concrete not less than 24" from grade. Slope underground raceways to provide drainage, toward manholes and/or handholes. Bury warning tapes approximately 12" above all conduit runs and duct banks. Align parallel to and within 12 inches of the center line of runs.
- G. Conduit terminations at cabinets and boxes shall be rigidly secured with two locknuts. All conduit ends shall be reamed after cutting and, if not secured to boxes or cabinets, shall be capped and protected during construction. All conduits containing phase or neutral conductor size 4 or larger shall have insulated bushing at termination.
- H. Spare or empty conduits shall be permanently capped at each end of each conduit. Empty conduits shall have a 350-lb. nylon pullwire installed. Identify with tags at each end the origin and destination of each spare or empty conduit.
- I. Flexible conduit shall be used for connection of recessed lighting fixtures, motors, heating, and ventilating and plumbing equipment, transformers, and any other equipment subject to vibration, or locations where it is not practical to use rigid conduit or electrical metallic tubing.
- J. Exposed conduit shall be run parallel to, or at right angles to, building lines and center lines of beams and columns. Exposed conduit work shall be neat, of good appearance and free from irregularities and damage.
- K. Conduit Support:
 1. Support single runs of conduit using galvanized pipe clamps. In damp or wet locations, install clamp-backs to space conduit off surface. Support conduits at distances and intervals not exceeding NEC requirements for the type of conduit used.
 2. Support multiple conduit run using trapeze hangers (approved construction channel), mounted to 3/8-inch diameter threaded steel rods secured to building structure. Install conduit runs so as not to interfere with operations of valves or any other equipment, and keep at least 6" clear from any pipe which may operate at more than 100° F.
 3. Conduits shall not be supported from T-bar ceiling suspension wires.
- L. Bond metallic raceways, pull boxes, panel enclosures and other non-current-carrying metal parts to the grounding conductor with approved bonding bushings and fittings. Raceways entering service switchboard or panel, or raceways containing circuits over 250 volt to ground (480/277 volt systems) shall be bonded to enclosure with approved bonding bushings as required by NEC Article 250.
- M. When expansion joints are crossed (whether conduit is concealed, embedded or exposed), provide appropriate expansion fitting and bonding jumpers.

- N. Make raceways free from obstructions, remove burrs and clean raceway interior before pulling wires. Immediately after installation of conduits seal ends, dust-tight, until the time when wires are pulled.
- O. All conduits installed for utility incoming services shall comply with respected utility company requirements.

3.3 OUTLET BOXES AND PULL BOXES

A. Outlet, Junction and Floor Boxes:

1. Provide flush mounted boxes in interior area, except where surface mounting installation is allowed. Boxes for exterior surface mount shall be cast metallic, NEMA type 4. Floor boxes in slabs on grade shall be cast metal and stamped steel elsewhere.
2. Accurately place, securely fasten, and set front edge of outlet box flush with finished surface of construction. Install plaster rings on outlets in plaster or finished dry-wall construction surfaces. Where installed behind splashbacks, or cabinet work, equip outlets with box-extension rings deep enough to bring front edge of box flush with finished cabinet surface. Attach outlets with wood screws, toggle bolts, expansion bolts or equivalent devices to building structure independent of conduits entering or exiting the boxes. Check approximate location of outlets as marked on drawings and consult with the Architect as to exact location so boxes will center properly with interior trim, beams, paneling, etc. Make outlet boxes, junction boxes and pull boxes accessible; and install access plates over boxes that are furred in. Set covers of floor outlets perfectly flush with finished floor surfaces, and provide carpet rings for outlets in carpeted areas. Align adjacent wall mounted outlet boxes for switches, thermostats and similar devices with each other.
3. Offset back to back outlets at least 24 inches in fire rated walls as required by UBC Code. Offset back to back outlets at least 12 Inches on "party walls" to avoid sound transmission; additionally, provide acoustical pads (1/8" high density mastic) and sealant around boxes in "party walls". As an alternative to 24" spacing for fire rated walls, the spacing may be reduced to 6" if approved listed fire retardant pad is wrapped and sealed around the outlets as per manufacturer's direction, and if such alternative meets with approved of local Fire Marshal.

B. Pull Boxes:

1. Install pull boxes where shown on drawings and provide additional boxes where required to facilitate pulling of wires and cables. Locate pull boxes where they are readily accessible. Pull boxes shall be built of code gauge galvanized sheet steel in dry locations, and cast metal in moist locations. All pull boxes shall have removable screw-on covers, and shall be of dimensions indicated on the drawings or, if now shown, as required by NEC Article 370 to accommodate wiring without crowding and to suit location. Pull boxes shall be provided with conduit knockouts or hubs as required. All exterior surfaces shall be given one prime coat, for "finish coat" by others.

3.4 CONDUCTORS

- A. Install all conductors in raceway system; pull all conductors into raceway at same time. Parallel circuit conductors and terminations shall be identical and equal in length. Minimum conductor size is #12 for power and lighting and #14 for control (except conductors in site underground installation, which shall be minimum #10.)
- B. Conductors shall not be installed in conduit until all work of any nature that may cause injury is completed. Care shall be taken in pulling conductors that insulation is not damaged. All wires and cables shall be hand-pulled with exception of cables of size #1/0 AWG and larger, which may be pulled by mechanical means. Prior to the pulling of conductors in raceways, the raceway shall be thoroughly swabbed. Use U.L. listed, non-petroleum based and insulating type pulling compound for lubrication. Conductors, where run in vertical runs, shall be supported per NEC-300-19.
- C. Splicing and Terminating:
 - 1. Splice cables and wires only in outlet boxes, junction boxes, pull boxes, manholes or handholes. No splicing is allowed inside raceways. Splices for signal systems, conductors and cables is not allowed in below grade or slab and underground pull boxes, where subject to water submerge.
 - 2. Provide U.L. listed, factory fabricated, solderless metal connectors of size, ampacity rating, material, type and class of applications and for services indicated. Connector temperature ratings shall be equal or greater than the wires being terminated.
 - 3. All aspects of splicing and terminating shall be in accordance with cable manufacturer's published procedures. All splices in outlet boxes with connectors as specified herein shall be made up with separate tails of correct color. At least 6" of tails packed in box after splice is made up shall be provided. Bolted assembly for terminations shall be torqued as per manufacturer's recommendation.
 - 4. Joints in wires in dry locations, copper conductors:
 - a. No.8 AWG and smaller: wires shall be twisted and secured with cap or twist-on, expandable spring type solderless connectors.
 - b. No.6 AWG and larger: wire shall be joined with solderless gutter tap compression type connectors with rounded edges, two-bolt type for sizes No.6 AWG to 350 MCM and four-bolt type of 500 MCM and larger wire. Joints shall be insulated with half-lapped layers of vinyl plastic, 7 mil thick, electric tape, or factory-supplied insulating device.
 - 5. Joints in wires in moist locations, copper conductors:
 - a. No.8 AWG and smaller: wire shall be securely joined as specified above, then encapsulated in epoxy (Scotchcast or approved equal). No.6 AWG and larger shall be joined with solderless connection as specified above, or taped and painted with Scotchkote or approved equal.

- b. Signal, Automation and Fire Alarm: conductors shall be joined by approved connectors and waterproofing materials.
- D. Color Coding:
- 1. Color Coding: Provide color coding for all circuit conductors. Insulation color shall be white for neutrals and green for grounding conductors. An isolated ground conductor shall be identified with an orange tracer in the green body. Ungrounded conductor colors shall be as follows:
 - a. 120/208 Volt, 3 Phase: Red, black and blue.
- E. All wire and cables in panels, equipment enclosures and pull boxes shall be bundled and clamped. Neatly train and tie cables in individual circuits. In panels, bundle incoming wire and cables, No. 6 AWG and smaller, lace at intervals not greater than 6 inches, neatly spread into trees and connect to their respective terminals. Allow sufficient slack in cables for alterations in terminal connections. Perform lacing with plastic cable ties or linen lacing twine. Where plastic panel wiring duct is provided for cable runs, lacing is not necessary when the cable is properly installed in the duct.
- F. Identification:
- 1. Identify all conductors in outlets and junction boxes (where more than two (2) ungrounded conductors), pull boxes, panelboard and handholes, using vinyl wrap-around wire markers. All electrically common conductors shall have same number. Identify branch circuits with panel and designated circuit number. Identify other circuits, noting purpose of each.
 - 2. In manholes and handholes, provide tags of the embossed brass type, and also show the cable type and voltage rating. Attach the tags to the cables with slip-free plastic cable lacing units.

3.5 PANELBOARD

- A. Set panels and load centers plumb and symmetrical with building lines. Furnish all construction support and anchoring as per CBC seismic requirements. Mount panels such that top of the box is 6'-6" above floor with highest breaker operating handle no more than 6' above floor.
- B. In damp and wet locations, surface mount panels shall be mounted on channels with minimum 1" air space between cabinet and wall.
- C. Provide filler plates for unused spaces in panelboards.
- D. Provide typewritten circuit directory for each branch circuit panelboard and load center to reflect actual circuiting. Provide locking devices on handles of branch circuits which supply power to time switches, alarm, signal and security circuits and controls.
- E. Check and tighten all bolts and connections with torque wrench, using manufacturer's recommended values.

- F. Repair all damage to enclosures and components, and touch up paint and marks. Thoroughly clean enclosures of all construction debris.

3.6 DISCONNECT SWITCHES, MOTOR CONTROLS, AND OVERCURRENT PROTECTION

- A. Coordinate location of switches and equipment in the field to provide code clearance in front of switches and ensure switches are "in-sight" from controller as required by NEC Article 430.
- B. Select and adjust overcurrent elements in motor starters to match installed motor characteristics.
- C. Install overcurrent protective devices and accessories in accordance with manufacturer's written instructions.
- D. Where fuse is used as protective device (in fuse disconnects or fusible switches), locate spare fuse cabinet in main electrical room. They shall be keyed to match fusible devices and have appropriate fuse schedules mounted in a frame inside the cabinet. Three spare fuses of each size and type, or a minimum of 10% of the number installed, whichever is greater, shall be provided.

3.7 WIRING DEVICES

- A. Install devices with the vertical center line plumb and with all edges of the devices flush against the adjacent wall surfaces.
- B. Mounting height shall be as noted on drawings. For devices which are to serve equipment and mounting height is not indicated, verify with Architect for mounting height.
- C. Coordinate exact location of devices with Architect prior to rough-in, specifically for counter tops, sinks and furniture arrangement.
- D. All devices mounted in exterior or damp/wet areas shall be suitable for application with gasketed cover plates.
- E. Install switches with off position down.
- F. Except for devices on isolated ground circuit, connect grounding terminal to equipment ground and outlet box with bonding jumper.

3.8 EQUIPMENT CONNECTIONS

- A. Verify that equipment is ready for electrical connection. Verify equipment manufacturer's requirements, and promptly inform the Architect if any conflict exists between the requirements and circuiting shown on plans, for resolution.
- B. Connection to equipment shall be flexible conduit, run between connection outlet box and equipment connection terminal box. Use liquid tight flexible conduits for connectors in damp or wet locations. Install connections neatly and inconspicuously.
- C. Where connection with attachment plug is indicated, provide cord and cap as per manufacturer's requirements.

- D. Make connections using wire and cable with insulation suitable for temperature encountered in heat producing equipment.
- E. Motors are furnished under other sections, but disconnect and motor controllers shall be provided under electrical work unless otherwise indicated or furnished integral as part of the equipment. All exterior mounted disconnect and motor controllers shall be NEMA type 3R or NEMA type 4.

3.9 CABINETS

- A. Set cabinets plumb and symmetrical with building lines. Furnish all construction support and anchoring to comply with anchoring and bracing required by Title 24-CBC seismic requirements.
- B. Terminate wiring on terminal strips and identify strips with heat shrink tags.
- C. All exterior mounted or wet location cabinets shall be NEMA type 3R or 4 unless higher rating is called for.

3.10 SUPPORTING DEVICES

- A. Fasten hanger rods, conduit clamps, outlet and junction boxes to building structure using precast inserts, expansion anchors, preset inserts or beam clamps.
- B. Use toggle bolts or hollow wall fasteners in hollow masonry, plaster or gypsum board partitions and walls.
- C. Use expansion anchors or preset inserts in solid masonry walls.
- D. Use self-drilling anchors or expansion anchor on concrete surfaces.
- E. Use sheet metal screws in sheet metal studs and wood screws in wood construction.
- F. Do not fasten supports to piping, ductwork, mechanical equipment, or conduit.
- G. Do not drill structural steel members unless first approved in writing by the Architect.
- H. Fabricate supports from structural steel or steel channel, rigidly welded or bolted to present a neat appearance. Use hexagon head bolts with spring lock washers under all nuts.
- I. Install surface-mounted cabinets and panelboards with minimum of four anchors. Provide additional support backing in stud walls prior to sheet rocking as required to adequately support cabinets and panels.
- J. Bridge studs top to bottom with channels to support flush-mounted cabinets and panelboards in stud walls.

3.11 GROUNDING

- A. General:

1. The complete electrical installation, including the neutral conductor, metallic conduits and raceways, boxes, cabinets, equipment and devices shall be permanently and effectively grounded in accordance with NEC Article 250 requirements, whether or not such connections are specifically shown or specified.
 2. System neutral grounded by connection to ground bus at one point only at main switchboard. At all other locations, system neutral shall be isolated from other conductors.
 3. Provide copper equipment ground conductor, size as shown on plans (if not shown, provide as per NEC 250), in all line voltage conduits.
 4. Where isolated ground wire is called for, it shall be connected to the isolated ground terminal of the equipment or device which it serves and shall be insulated and isolated from both equipment grounding wire and neutral, except at the main switchboard, where it shall be bonded to the ground lug. If circuit is originated from step down transformer (separately driven system), the isolated ground shall be bonded to the transformer ground.
 5. Provide building reference ground bus in the main electrical room (location of main service board) where called for; otherwise, ground bus in main service switchboard or panel shall be building reference ground. Connect all grounding electrodes, equipment grounds and building structural steel or metal enclosure (metal framed buildings) to the referenced ground.
- B. Grounding Electrodes:
1. All ground connections shall be accessible for inspection and shall be sized per NEC.
 2. Metal Water Pipe: Connect main cold water pipe to building reference ground bus, as close as possible to service entry.
 3. Where shown on drawings, provide driven ground rods installed in precast concrete ground pull box. Interconnect ground rods using minimum #4 bare copper conductor. Ground rods shall be space minimum of 8' from each other.
 4. Provide bonding between building structural steel and metal enclosure (for metal buildings) and building ground reference bus.
 5. Additional Ground Rod: Provide additional ground rods wherever minimum ground resistance (5 OHM) can not be obtained, with other grounding electrodes described. Bond equipment grounds as required to achieve minimum required resistance.
- C. Equipment and Raceway Bonding/Grounding:
1. All switchboards, panelboards and motor control centers shall have separate ground bus. All other enclosures and equipment shall have ground connection point. Bond all ground bus and ground points as per NEC Article 250.

2. Conduits terminating in concentric, eccentric or oversized knock out at service switchboard and panels or serving systems over 250 volts to ground shall be terminated with ground bushing and jumper as required by NEC Article 250-E.

3.12 EXCAVATION AND BACKFILL:

- A. Trenching shall be performed and stabilized in accordance with local, state, and OSHA standards. Trench backfill material shall not contain rocks over 4-inches in greatest dimension nor soil lumps larger than 2-inches.
- B. Adjustments to accommodate existing underground facilities shall be made as required and as approved by the Architect. Excavate a sufficient distance in advance of installing conduit or pipe to uncover such facilities and to permit checking and adjustments in alignment.
- C. Excavate trenches to the required line and grade and scarify and compact bottom in accordance with requirements for excavation and structural filling as described above. Compacted bottom of trenches shall provide uniform bearing throughout entire length of conduit or pipe.
- D. Conduit or pipe shall be bedded in sand at least 6-inches around the outside diameter. Bedding and back fill shall be installed and compacted in accordance with requirements for filling as described above. Backfill and compact trenches in maximum 8-inch thick layers where trench is under structures. Restore trenches to original surface.
- E. Trenches for utility shall be made per utility company requirements.

3.13 MANHOLES AND HANDHOLES

- A. Provide manholes and handholes complete with accessories as indicated. Provide additional handholes as needed so that spacing between handholes does not exceed 300'.
- B. Installation of Cable in Manholes and Handholes: Do not install cables utilizing the shortest route, but route along those walls providing the longest route and the maximum spare cable lengths. Form all cables to closely parallel walls, not to interfere with duct entrances, and support on brackets and cable insulators at a maximum of 18 inches. In existing manholes, handholes and vaults where new ducts are to be terminated or where new cables are to be installed, provide cable supports and grounding as required for a neat and workmanlike installation with all cables properly arranged and supported. Support cables splices in underground structures by racks, leaving top space open for future cables, except as otherwise indicated for existing installations. Provide one spare three-insulator rack arm for each cable rack in each underground structure. Provide additional cable racks in each existing underground structure through which new cable in run.

3.14 IDENTIFICATION.

- A. Nameplate:

1. Provide engraved nameplates on switchboard and metering boards, panelboards, transformers, terminal cabinets, externally operated safety-switches, time-switches, relays, pushbuttons, and similar equipment, to properly identify each item. Nameplate material shall be laminated phenolic, 1/16-inch thick, with white core (pressure sensitive "stamped-tape" is not acceptable) with letters machine engraved through black facing to white core. Attach nameplates to equipment with machine screws or "pop rivets". Engrave nameplates with minimum $\frac{3}{8}$ " high lettering for panelboard, transformer and other large equipment and $\frac{1}{4}$ " lettering for small equipment.
- B. Panel Directory:
 1. Provide 6" x 8" minimum circuit directory frame and cord with clear plastic covering, mount inside panel door with circuit numbering starting on top, odd numbered circuits in sequence down the left hand side and even numbered circuits down to the right side.
- C. Wire and Terminal Markers:
 1. Provide self-adhering, machine printouts or write-on, self-laminating vinyl wrap around strips, as made by Thomas and Betts or Brady. Install on all conductors in panels, cabinets, pull boxes, J boxes, outlets (which contain more than 2 ungrounded conductors) and terminations. Identify conductors with circuit number (for conductors serving equipment, indicate equipment name).
- D. Underground Conduit Markers:
 1. Provide yellow polyethylene tape with black imprinting "Caution-Buried Electric Line Below" as made by T&B or Tera-Tape and install over all underground conduit installation, 12" below grade.
- E. Grounding Electrodes:
 1. At main ground reference bus, identify each ground electrode connection with laminated tag indicating type (example, "ufer ground", "ground rod", "cold water", etc.).

3.15 FIELD INSPECTION AND TESTS

- A. General:
 1. Certified test report shall be submitted at the completion of project. Tests shall be carried under supervision and certified by a technician who is currently certified by the International Electrical Testing Association (NETA) or the National Institute for Certification in Engineering Technologies (NICET) in Electrical Testing. Pay all costs of performing the inspections and tests as specified herein.
 2. The contractor shall follow recognized safety procedures and techniques during energizing and de-energizing of all equipment to ensure employee safety and protect the work.

- B. Inspection and Testing of Main Distribution System and Equipment:
1. Perform tests in accordance with applicable procedure as described in International Electrical Testing Association (NETA) Publication "Acceptance Testing Specification for Electrical Power Distribution Equipment and System", referred to as NETA herein for the following:
 - a. Feeders (600 volt maximum): Section 7.3.1: (As indicated, insulation test shall be performed on each conductor with resistance to ground and adjacent conductors, applying 1000 volt DC potential for one minimum. The insulation values shall be less than 50 megohms.)
 - b. Switchboard: Section 7.1
 - c. Circuit Breakers: Section 7.6.1.
 - d. Grounding Systems and Ground Fault Protection" Section 7.13 and 7.14.
 - e. Motor Controls and Starters: Section 7.16. Check motor phasing connection (3 phase motors) to ensure proper rotation prior to the test.
- C. Branch Circuit Wiring: Provide insulation test for all branch circuits, after installation and before connection to equipment and fixtures. Test phase to phase and phase to ground for each branch circuit with 600 volt DC megger, insulation value shall be 20 megohms or higher, when tested for 10 seconds. Test for continuity of circuits.
- D. Signal Cables and Conductors (less than 300 volts): Test cabling for continuity, ground and insulation as per signal cable manufacturer recommendation.
- E. Receptacle and Devices: Verify that each receptacle device is energized and has proper polarity. Test each GFI receptacle device for proper operation. Operate each wall switch with circuit energized and verify proper operation.
- F. Voltage Adjustment: Make voltage reading and adjust taps on step down transformers to give proper voltage (118-122 volts; for 120 volt nominal systems) prior to building occupancy.
- G. When testing results are not acceptable, the deficiencies shall be rectified and system shall be retested until satisfactory results are obtained.
- H. Report: Signed test report shall be submitted at the completion of the project and shall include summary of visual inspection, test description, test results, and name and certification of individual or company conducting the test.

3.16 ACCEPTANCE

- A. Upon completion of work, arrange for inspection of electrical system to be witnessed by the Owner's representative. Inspection conducted at the expense of and by contractor at the mutually agreed times. Give ample time, but not less than five (5) days' notice to arrange for inspection.

- B. Demonstrate that circuit and equipment have been properly installed and adjusted and are ready for fulltime service. Demonstrate that all equipment operates satisfactorily and as specified.
- 3.17 INTERCOM TELEPHONE/CLOCK SYSTEM
- A. Install all raceway wiring and devices for a complete operating system. Extend wiring to existing central equipment, etc.

END OF SECTION

”

SECTION 26-0800 - LIGHTING
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Section.
- B. SECTION 26-0000 —ELECTRICAL GENERAL REQUIREMENTS AND BASIC MATERIALS AND METHODS

1.2 SUMMARY

- A. Work Included:
 - 1. Lighting designed by lighting designer as well as electrical engineer.
 - a. Light fixtures for interior public spaces.
 - b. Light fixtures attached to building exteriors.
 - c. Site light fixtures.
 - d. Light fixtures for back-of-house service spaces and garage (lights with °1" prefix).
 - e. Emergency egress lighting and exist signs.
 - f. Lighting controls for all public and exterior areas.
 - g. Lighting power distribution.
 - 2. Completely lamp each fixture installed per type and wattage given in fixture schedule.

1.3 INCORPORATED DOCUMENTS

- A. Published specifications, standards, tests, or recommended methods of trade, industry, or governmental organizations apply to work of this Section where cited by abbreviations noted below.
 - 1. (CEC) - California Electrical Code - 2016.
 - 2. (AEIC) - Association of Edison Illuminating Companies.
 - 3. (ANSI) - American National Standards Institute.
 - 4. (CBM) - Certified Ballast Manufacturers.
 - 5. (ETL) - Electrical Testing Laboratories.

”

6. (IES) - Illuminating Engineering Society.
7. (RLM) - Reflectors and Lighting Equipment Manufacturers Standards Institute, Inc.
8. (UL) - Underwriters' Laboratories.

1.4 QUALITY ASSURANCE

- A. Quality standards: Comply with applicable codes, current UL, NFPA, and ANSI standards, and Division 26: Electrical. If other sections of Division 26: Electrical conflict with this section, this section takes precedence.
- B. Equipment energy-efficiency standards: Comply with applicable standards, including, but not limited to:
 1. Federal Energy Independence and Security Act (EISA)-2013.
 2. California Title 24 Energy Standards 2013 as applicable.
- C. Labelling: Provide products with labels from UL, or other Nationally Recognized Testing Laboratory (per OSHA <http://www.osha.gov/dts/otpcalnrllindex.html>) whose results are acceptable to Authority Having Jurisdiction, showing compliance with UL standards. Labels in light fixtures must be concealed from viewing angles shallower than 45o above nadir. Provide products with labels suitable for installation conditions: dry, damp, wet (1P65), submersible, shower/tub/spa, etc.
- D. Pre-bid prequalification: Manufacturers other than those listed may request prequalification to bid. To request prequalification, submit complete materials to Architect at least 14 calendar days before bid date.
 1. Standard light fixtures: For each light fixture type, submit the following in accordance with 1.3:
 - a. Product data sheets and photometry.
 - b. Calculations when requested by Architect to demonstrate equal performance to specified products. Architect will indicate required calculations and assumptions to be used (dimensions, room reflectances, lamp lumens, light loss factors, etc.).
 - c. Samples when requested by Architect.
 2. Custom light fixtures: For each manufacturer, submit the following in accordance with 1.3:
 - a. List of three projects similar to this one in size, materials, fabrication techniques, and finishes, with Owner's, Architect's, and Lighting Designer's names and telephone numbers or email addresses. At least one project must have been completed at least three years prior to bid date.

"

- b. One set of approved shop drawings and one complete fixture from one of the previous projects. These will be returned after review.
3. If Architect determines that manufacturer is prequalified to bid, Architect will issue an addendum to Contract Documents indicating additional manufacturer's name. Prequalification does not relieve Contractor from full compliance with Contract Documents. Contractor is responsible for identifying and making changes in wiring, rough-in, dimensions, clearances, and installation that may be required as a result of adding prequalified manufacturer to list of acceptable manufacturers.
- E. After-bid substitutions: Product substitutions may be proposed after bid date in accordance with Division 01: General Requirements and as follows:
 1. Unless noted otherwise in Division 01, submit proposed substitutions within 14 calendar days after bid opening.
 2. Contractor will reimburse Owner for Architect's time, materials, and expenses associated with review of proposed substitutions or for changes to Contract Documents required as a result of acceptance of substitutions.
 3. Submit proposed substitutions separately from other non-substitution submittals.
 4. For each proposed substitute fixture type, submit the following in accordance with 1.3:
 - a. Product data and photometry.
 - b. Submittal drawings for modified or custom fixtures.
 - c. Calculations to demonstrate equal performance to specified products. Architect will indicate required calculations and assumptions to be used (dimensions, reflectance, lamp lumens, light loss factors, etc.).
 - d. List describing how proposed substitution varies from Contract Documents.
 - e. List of all changes to Contract Documents that will be required to accommodate proposed substitution, including changes to wiring, dimensions, supports, locations or sizes of other equipment, clearances, etc.
 - f. Change in project schedule for each proposed substitution.
 - g. Unit cost of specified product, unit cost of proposed substitution, and total change in contract price for each fixture type.
 - h. List of three projects in which the proposed substitution was used, with completion date and Owner's, Architect's, and Lighting Designer's names and telephone numbers or email addresses. At

"

least one project must have been completed at least three years prior to bid date.

- i. Samples when requested by Architect. For custom fixtures, submit one complete fixture from one of the projects listed in 1.2E4h above. Samples will be returned after review.

5. If proposed substitution is accepted by Architect, include in submittals package as described in 1.3. Acceptance of substitution does not relieve Contractor from full compliance with Contract Documents. Contractor is responsible for identifying and making changes in wiring, rough-in, dimensions, clearances, and installation that may be required as a result of acceptance of substitution.

F. Design Criteria:

1. Lighting fixtures conform to the detail drawings, NEC 410, and UL 57, "Electric Lighting Fixtures".
2. Control systems shall meet latest California Title 24 requirements.

G. Requirements of Regulatory Agencies:

1. Manufacturing and installation workmanship of the best quality and conform to Code requirements and accepted practices of the electrical industry.

1.5 SUBMITTALS

A. General: Submit in accordance with Division 01: General Requirements and as follows:

1. Prepare submittals promptly and deliver to Architect, leaving sufficient time for review and possible resubmittals without jeopardizing project schedule.
2. Electronic submittals in PDF format are acceptable. If hard copies are submitted, provide quantity as noted in Division 01, or quantity required by Contractor plus three (for Architect, Electrical Engineer, and Lighting Designer), whichever is greater.
3. Make initial submittal in complete package at one time. Incomplete submittals will be returned unreviewed.
4. Architect will review only one initial submittal and one resubmittal.
5. Do not release orders for fabrication until review of submittals is complete.
6. Review is for conformance with design concept as expressed in Contract Documents. Contractor is responsible for dimensions, voltages, quantities, row lengths, scheduling, methods of construction, coordination between trades, and compliance with Contract Documents. Review does not authorize any deviation from Contract Documents unless each deviation is highlighted by Contractor in submittal and each deviation is specifically noted "OK" in

”

submittal review comments.

- B. Cost summary: Within 14 calendar days of Notice to Proceed, provide total cost for all light fixtures, including lamps and subcontractor's markup, but not including sales tax or installation.
- C. Product data: Submit data sheets for all standard products.
 - 1. Summary table: Indicate fixture type, catalog number, and lamp.
 - 2. Light fixtures: Submit data sheet for each type with cover sheet, header/footer, or other indication that the submittal was prepared by the manufacturer's representative, organized alphabetically or numerically by fixture type, showing manufacturer's name, catalog numbers, fixture specifications, mounting details, finishes, dimensions, accessories, lamps to be used, and evidence of compliance with UL standards.
 - 3. Photometry: For proposed pre-qualifications and substitutions only, submit IESformat photometric file from independent testing laboratory, calculated according to Illuminating Engineering Society standards.
 - 4. Linear fixtures: For linear recessed, pendant, ceiling, or wall lights, submit complete row drawings. For lights in coves, slots, and other field-built conditions, fixture row configurations shown in Contract Documents are approximate; Contractor must check row configurations against as-built conditions and provide submittals to indicate that fixture rows will fit spaces as specified.
 - 5. Ballasts, remote power supplies, and remote transformers: Submit data sheets. Indicate fixture types on applicable data sheets so reviewer can see which devices are used with which fixtures.
 - 6. Lamps: Submit data sheets. Indicate fixture types on applicable data sheets so reviewer can see which lamps are used with which fixtures. For fluorescent lamps, indicate compliance with TCLP test for mercury limitations.
- D. Shop drawings: Submit drawings for all modified or custom light fixtures, other non-standard products, and for coordination between trades.
 - 1. Include complete scale drawings showing materials and details of fabrication and wiring, with dimensions and notes to fully describe items, including field dimensions and coordination with other trades as required.
 - 2. Copies of light fixture details or design sketches from Contract Documents are not acceptable.
- E. Finish samples: Submit all light fixture finishes at same time so Architect can make coordinated review.
 - 1. Standard colors: Submit fixture manufacturer's painted samples of available standard and premium colors.

"

2. RAL colors: Submit Tiger Drylac charts of standard RAL and metallic powdercoat colors. After Architect makes preliminary color selection, submit 3" x 6" (75 mm x 150 mm) painted samples to confirm selection.
3. Custom colors: After Architect provides chip of desired color, submit 3" x 6" (75 mm x 150 mm) painted samples to confirm color match.
4. Oil-rubbed, antiqued, pre-weathered, or other special metal finishes: Submit 3" x 6" (75 mm x 150 mm) samples of at least five different shades so Architect can establish acceptable range of finished appearance.

F. Product samples: Submit one of each as noted.

1. Submit samples of proposed substitutions when requested by Architect.
2. Submit samples when indicated by "submit sample" notation on drawings or Lighting Schedule.
3. Submit samples with specified lamps, 6-0" (1800 mm) cords, grounded Edison plugs, and 120V ballasts or power supplies.
4. Samples of custom fixtures must be complete, working, finished pre-production prototypes. Do not begin full production runs for components or fixtures until review of samples is complete.
5. Samples of custom fixtures cannot be used in finished project unless the submitted samples are approved without comment.

G. Mockups: Provide one of each, unless noted otherwise, with specified lamps, 6-0" (1800 mm) cords, grounded Edison plugs, and 120V ballasts or power supplies, and install as directed by Architect. Also provide personnel to assist Architect at after-dark review of mockup.

H. Record documents: Submit documents per closeout procedures in Division 01:

1. As-built drawings.
2. Complete set of approved lighting submittals and manufacturer's maintenance instructions organized alphabetically or numerically by light fixture type.

I. Lighting Control Submittals:

1. Provide complete manufacturer's catalog data for occupancy sensors, lighting control systems and dimming systems.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Ordering lighting fixtures for the project shall not commence until unqualified acceptance of submitted lighting fixtures has been received.
- B. Shipping cartons shall have sufficient strength to prevent damage or scratching

"

during transportation and storage at the job site. Blemished, damaged, or unsatisfactory fixtures shall be removed and replaced in a manner satisfactory to the Architect.

1.7 WARRANTY

- A. A. All work performed under this section must be warranted to be free of defects in products or workmanship for one year after Substantial Completion date or as noted in Division 01: General Requirements, whichever is longer. Warranty includes parts and labor for light fixtures, ballasts, transformers, power supplies, and induction or LED components that stop working within warranty period as defined above.
- B. Warranty also includes parts and labor for lamps that stop working after Substantial Completion date as follows:
 - 1. Incandescent lamps: 30 days.
 - 2. Fluorescent lamps: 90 days.
 - 3. HID lamps: 90 days.
 - 4. LED retrofit lamps: 1 year as noted above.
 - 5. Induction lamps: 1 year as noted above.
- C. Extended warranty for ballasts, LED components, and LED retrofit lamps: Three-year parts-only full-replacement non-prorated warranty from date of manufacture.
- D. Replacement components provided under warranty to be provided by contractor, not taken from spare stock listed in 2.1 B.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Provide products as indicated in Lighting Schedule or as noted on drawings.
 - 1. Where one manufacturer is listed with complete catalog number and other acceptable manufacturers are listed by name only, the other acceptable manufacturers must provide products of same quality and with same features as the specified manufacturer.
 - 2. Provide light fixtures new and complete with housings, mounting hardware, provisions for connection to branch circuits, trims, accessories, and lamps. Coordinate mounting hardware with outlet boxes.
 - 3. Pre-bid prequalification and after-bid substitutions: See 1.2.
- B. Spares ("attic stock"): Deliver to Owner in sealed cartons.

”

1. Spare lamps: See 23B.
2. Spare LED components: See 2.4 and Lighting Schedule. Provide spare components in cartons labelled by fixture type.
3. Spare fixtures: Provide complete fixtures as noted, in cartons labelled by fixture type.

2.2 LED ARCHITECTURAL LIGHTING

- A. Definitions of LED Components:
 1. LED light source: LED chip in suitable circuit board or subassembly.
 2. LED module or light engine: LED light source plus mechanical, electrical, optical, and heat-management components which comprise a replaceable item in a luminaire.
 3. LED luminaire: Complete product including LED module, power supply/driver (integral or remote), trim, provisions for code-compliant connections to branch circuit conduit and wiring (including through-wiring if specified), housing suitable for installation conditions and water resistance for dry, damp, or wet (1P65) location as specified, and mounting hardware as required.
- B. Modularity and spares: LED modules and power supplies/drivers must be replaceable in field. Provide 10% spare LED modules (two minimum) and 10% spare power supplies (two minimum) of each type used in project, or as noted in Lighting Schedule, whichever is greater. For linear fixtures, provide two spare luminaires of each type and length used in project, with wiring adaptors/connectors as required so they can replace luminaires at beginning, middle, or end of run.
- C. Power supplies/drivers: Provide UL-labelled (or other label acceptable to AHJ) components provided by, or as recommended by, LED module or luminaire manufacturer. If remote, provide enclosure suitable for installation conditions and with provisions for connection to branch circuit conduit and wiring (including through-wiring if specified). Constant-current or constant-voltage to suit LEDs, 0.90 mm. power factor. Verify compatibility with specified dimmers.
- D. LM-79 report: For LED luminaires, provide test report from nationally-recognized independent testing laboratory, showing absolute initial photometry and color characteristics per IESNA-LM-79-2008: Electrical and Photometric Measurements of Solid-State Lighting Products. Also provide IES-format data file for use in calculations.
- E. LM-80 report using TM21: For LED module, provide test report from nationally-recognized independent testing laboratory, showing lumen output curve with readings every 1,000 hours, failure percentage, and chromaticity shift of LED module after 6,000-hour mm. operation per IESNA-LM-80-2008: Measuring Lumen Maintenance of LED Light Sources, and prediction of useful life at 70% output (L70 hours) using IESNATM21-2011: Method for Extrapolating LED Lumen Maintenance. 10% max. failure percentage at 6,000 hours.

”

- F. Lumen output, wattage, and efficacy (lumens/watt): As noted in Lighting Schedule, for entire LED luminaire. not components.
- G. Flicker: No perceptible flicker when undimmed or dimmed.
- H. Color: As noted in Lighting Schedule.
 - 1. Color temperature: Nominal correlated color temperature (CCI) 2700 or 3000oK as specified.
 - 2. Initial color tolerance ("binning"): Expressed as +1- oK from nominal CCI or within MacAdam ellipse steps as specified. If not specified, must be within 7-step MacAdam ellipse or tolerances below, which is allowable tolerance under ANSI C78-337A-2008:
 - a. 2700oK: 2725oK+/-145
 - b. 3000oK: 3045oK+/-175
 - c. 3500oK: 3465oK +1-245
 - d. 4000oK: 3985oK +/-275
 - e. 4500oK: 4503oK +/-243
 - f. 5000oK: 028oK +/-283
 - g. 5700oK: 5665oK+/-355
 - h. 6500oK: 6530oK+I-510
 - 3. Color rendering index (CRI): Ra average for 8 standard CIE samples. For accent lighting, also comply with specifications for R9 (red) CR1.
 - 4. Color shift after 6,000 hours: CR1 no more than 3 points lower than initial, color tolerance same as for initial.
- I. Warranty: Minimum three years from date of manufacturer's invoice, includes full material replacement cost of module, luminaire, or power supply/driver. Replacement modules or luminaires provided in response to warranty claims must match light color and output of remaining modules.
- J. Labelling: Provide evidence of compliance with UL 8750. See 1.3 in this section.
- K. Energy Star: For products where Energy Star specifications exist, provide Energy Star-labelled products. Evidence of compliance (e.g. lumens-per-watt from Lighting Facts label based on LM-79 test data) may be acceptable instead of Energy Star label, but Contractor is responsible for determining if this is acceptable to Authority Having Jurisdiction and/or Owner.
- L. California Title 24: For "high-efficacy" products, provide certification from California Energy Commission. Evidence of compliance (e.g. lumens-per-watt from Lighting

"

Facts label based on LM-79 test data) may be acceptable instead of CEC certification, but Contractor is responsible for determining if this is acceptable to Authority Having Jurisdiction and/or Owner.

- M. Samples: Submit per 1.3.
 - 1. Non-dim luminaires: See Lighting Schedule for "submit sample" notations.
 - 2. Dimmable luminaires: For every dimmable fixture type, provide complete luminaire and specified dimmer with manual control.

2.3 FINISHES

- A. Light fixture manufacturer to prepare surfaces and apply primer and topcoats suitable for base metal and installation conditions.
- B. RAL or custom colors: Where "RAL color" is noted, color will be selected by Architect from powder-coating manufacturer's range of standard products (Tiger Drylac or equal). Where "custom color" is noted, Architect will provide chip for light fixture manufacturer to exactly match with wet-coating system. For bid, allow one color per fixture type, assume one color coat plus clear low-gloss topcoat. See 1.3 for submittal procedures.

2.4 FABRICATION AND FINISHES

- A. Metal parts possess sufficient mechanical strength and rigidity to eliminate the possibility of damage or distortion from normal wear-and-tear in use, weight of fixtures, or moderate misalignment of supporting structure. Formed metal parts suitable treated by phosphatization or surface passivation to prevent growth of corrosion and to insure a permanent bonding with priming material.
- B. Sheet metal formed to prevent warping and sagging. Housing trim and lens frame, true and straight (unless intentionally curved), and parallel to each other as designed. Wireways and fittings free of burrs and sharp edges and accommodate internal and branch circuit wiring without damage to wiring. Hinged door closure frames operate smoothly without binding when fixture is in installed position. Latches function easily by finger action without use of tools and the positive spring loaded latch type.
- C. Housing with trim designed to prevent extraneous light leakage and rattling of door or lens. Surface treatment to be done after forming and punching or drilling. Prime coating consists of a heavy full-bodied application of the color, surface application of a suitable permanently compatible priming or undercoating and priming media to all surfaces. Finish coating as designated and shall consist of heavy, full-bodied application of the color, surface, and type of material specified. Visible metal surfaces finished with a matte or prime finish suitable for final finish after installation when not otherwise specified.
- D. Finishing coating to comply with applicable color, media, and texture requirements of the ASA and ASTM Standards, including approved methods of application. Indoor type of lighting fixtures, as a minimum, successfully withstand 250 hours of ASTM B 117 Salt Spray Test and 3000 hours of ASTM D609 Humidity Test, without appreciable deterioration of finish, or growth or a penetration test scratch. Finished

”

surfaces of outdoor exposed lighting fixtures suitable for application and environment
Interior light reflecting finishes white with not less than 85 percent reflectance except
where indicated otherwise on drawings.

- E. Reflectors and reflecting surfaces treated as described under individual fixtures. Aizak treatment Type I of the color required or stated.
- F. Metal fastening devices corrosion-resistance plated. Visible plated surfaces have a brushed, polished or stain finish as stated or required. Plated or polished new metal surfaces properly and neatly touched up.
- G. Where aluminum members are to be fastened to dissimilar metal parts, other than steel, the aluminum separated from such parts by a coat of zinc chromate, aluminum, or bituminous paint applied to contact surfaces of metals and allowed to dry thoroughly before assembling. Surfaces of aluminum coatings or aluminum sheet placed in contact with brick, plaster, gypsum, concrete, or similar masonry construction, as in the case of recessed housing, etc., back painted with zinc chromate, aluminum or bituminous paint and allowed to dry thoroughly before installation.
- H. Wiring: Lighting fixtures completely premiered and ready for connection to branch circuits, except as stated otherwise herein. Factory prewiring as stated under individual fixture description and consist of wiring to an attached junction box, wiring into an approved wireway, or finishing fixtures with two 4-foot length of conductor with AF insulation as required by codes. Holding clips or other devices to hold wiring in place provided as necessary.

2.5 OCCUPANCY SENSORS AND MOTION SENSORS

- A. Provide occupancy sensors wherever indicated on the drawings. Sensors shall be as made by Sensor Switch, Inc., Watt Stopper or Mytech. Detectors shall be dual technology (passive infra-red/microphonic). Sensor switch models have been specified as referenced.
 - 1. Wall Mounted: Type WSD-1 (infra-red only).
 - 2. Ceiling Mounted: Type CM-PDT (including relay power pack PP-20, number as required to control associated sensors/circuits).
 - 3. Wide View (large area): Type W-V-PDT (including relay power pack PP-20, number as required to control associated sensors/circuits).
 - 4. Exterior Mount Motion Sensors: As made by Watts Stopper, model EW-205, 120 volt and 277 volt as applicable. Field-orient the sensors as per Owner's direction.
- B. Install occupancy sensors in conjunction with manual switching. Wiring of lighting fixture circuits through sensors and switches shall be as per manufacturer, to provide required control of each separate area designated by control zone (switch zone and sensor zone). Location of control relays shall be proposed and approved and reflected in as built plans.

”

- C. Field Test: After installation, field test each area to ensure functionality of control zones and re-aim/relocate as necessary to achieve zone control called for.

2.6 LIGHTING CONTROL SYSTEMS

- A. Daylighting Dimming Control:

- 1. Provide Wattstopper model specified on plans, or approved equal.

2.7 DIMMING SYSTEM AND DIMMING WALL SWITCHES

- A. Dimming System, when specified on drawings, shall be as made by Lutron, Strand, Century, or Lightolier.

PART 3 - EXECUTION

3.1 PREPARATION/COORDINATION

- A. Coordinate work with other trades. Location of lighting has priority over location of new framing (except major structural members), ducts, diffusers, sprinklers, speakers, smoke detectors, and other obstructions.
- B. If obstructions are encountered which prevent installation of lighting according to drawings, notify Architect and do not proceed until conflict has been resolved.

3.2 INSTALLATION

- A. General:

- 1. Install light fixtures securely, level, plumb, aligned, and in straight rows. Light fixtures must be installed so they do not shift during relamping or aiming.
- 2. Install in accordance with manufacturer's instructions and applicable codes.
- 3. Locations:
 - a. Architectural drawings take precedence over electrical drawings.
 - b. Point-source fixtures: Locate as dimensioned, or in center of ceiling panel or on joint as drawn; 1/4" (6 mm) max. variation off-of-true. If not dimensioned, locate as scaled on drawings, and align groups of fixtures within 1/4" (6 mm) max. variation off-of-true in relation to each other.
 - c. Linear fixtures: 1/8" (3 mm) max. horizontal or vertical variation off-of-true at any point.
- 4. Install fixtures with lamps oriented in same direction within each room.
- 5. If light fixtures have adjustable lampholders or reflector assemblies to

"

accommodate different lamps or to create different light distributions, adjust these to suit the specified lamps and light distributions.

B. Recessed Fixtures:

1. Supports: Provide hanger bars to adjacent ceiling framing members and fasten securely. Hanger bars can be 1-1/2" black iron, short pieces of metal conduit, or as provided by fixture manufacturer. Install bottom of housing aligned with finished ceiling.
2. Lights in suspended ceilings: Provide holddown clips per code. Coordinate housings and trims with specified ceiling grid and ceiling panels so bottom of fixture is aligned with bottom of adjacent ceiling panels.
3. Seismic slack wires: For fixtures in suspended ceilings, provide #12 solid wires from fixture to structure above, hand-pulled tight and secured with a minimum of four wire turns at top and bottom. Two wires per fixture, at diagonally-opposite corners. Slack wires must comply with Section 09 5000: Ceilings.
4. Keep ceiling insulation at least 3" (75 mm) away from fixture unless approved for insulated ceiling.
5. Light fixtures in fire-rated ceilings: Provide field-built enclosures or 1-hour-rated housings designated by manufacturer for use with specified fixtures. If field-built and fixtures are non-IC-rated, leave 3" (75 mm) mm. clear space from all sides of enclosure to fixture rough-in plate and thermal protection device and 1" (25 mm) mm. clear space above top of fixture. If field-built and fixtures are IC-rated, leave 1/2" (12 mm) clear space from enclosure to sides and top of fixture.
6. Install trims after painting of spaces. Install trims tightly, with no gaps or light leaks.

C. Ceiling-Mounted and Pendant Fixtures:

1. Supports: Provide support for feed and non-feed suspension points so fixtures can be installed securely, including horizontal bars secured to ceiling framing members and seismic wires to structure as required. Horizontal bars can be "Caddy"-style bars, 1-1/2" black iron, or strut.
2. Fixture weight less than 50 lb. (23 kg) at each suspension point: At feed suspension point, hang from strap or stud in outlet box. At non-feed cable suspension point, provide 1/4"-20 stud projecting 3/4" (20 mm) below ceiling.

D. Wall-Mounted Fixtures:

1. Mounting heights: Install per architectural elevations or as noted in lighting schedule. Light fixtures with their leading edges between 26-3/4" and 80-1/4" above the finished floor shall protrude no more than 4" into interior or exterior circulation paths.

”

2. Supports: Verify fixture weights and provide backing in wall and supports as required so fixtures do not sag or tilt away from wall.
3. Wet locations: For surface-mounted fixtures, install continuous bead of sealant between fixture and wall. For recessed fixtures, install continuous bead of sealant between recessed housing and wall, no sealant around removable faceplates.

3.3 FIELD QUALITY CONTROL

- A. Upon completion of installation of lighting fixtures and lighting equipment, it must be in first class operating order, in perfect condition as to finish and free from defects. At time of final inspection, all fixtures and equipment must be completely lamped and be complete with required glassware, reflectors, side panels, louvers or other components necessary to complete fixtures.
 1. Replace burnt out lamps during construction and up to date of final acceptance of project by Architect.
 2. Upon completion of installation of all recessed lighting fixtures, contractor to inspect each fixture from above in attic area and verify that ceiling insulation has been spaced away from each fixture housing as required by code.
- B. Upon completion of installation, test each occupancy sensor operation and operation of lighting control and dimming system in presence of Architect and Owner's representative to demonstrate that systems are operating as intended. Set On-Off scheduling on lighting control time clock as desired by the Owner.

3.4 PROJECT CLOSEOUT

- A. Clean light fixtures and lamps, replace damaged materials, check for full operation, and relamp as required (see 2.3C).
- B. Deliver spare fixtures, lamps, LED components, and light pole touch-up paint to Owner (see 2.1 B, 2.313, 2.413, and 2.6A).
- C. Install and aim adjustable light fixtures as directed by Architect.
 1. Provide personnel, lifts, ladders, and walkie-talkies as required.
 2. Aiming sessions will occur after dark, outside of normal working hours, when spaces are finished and all construction-related obstructions are removed.
- D. Submit record documents (see I .3J).

END OF SECTION

SECTION 31-0165 - CONSTRUCTION SITE BEST MANAGEMENT PRACTICES PLAN

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work included: Establish a Construction Storm Water Pollution Control and Prevention Plan (SWPPP) to ensure the orderly progress of work through the dry and rainy seasons.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.

1.2 REFERENCES:

- A. State of California Department of Transportation Storm Water Quality Handbooks:
 - 1. Storm Water Pollution Control Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual
 - 2. Construction Site Best Management Practices (BPM) Manual.

1.3 SWPPP AND WINTERIZATION PLAN

- A. For all construction that will occur during dry and rainy season the Contractor shall submit a plan to the Architect and the Owner for review, showing proposed methods to prepare the site for unimpeded progress of the work during all seasons.
- B. Minimum requirements of the plan is to demonstrate management of the following categories during construction activities:
 - 1. Dust Control
 - 2. Storm water run-on or run-off
 - 3. Disturbed soil area and stockpile control
 - 4. Soil Stabilization and Sediment Control at slopes, drop inlets and basins.
 - 5. Traffic Tracking Controls
- C. The plan shall make clear all provision necessary to allow vehicle and equipment access to the site and building of the project during all seasons. The plan shall also indicate provisions that will be made for staging and material storage areas. The plan shall make provisions to prevent sediment from entering storm drain systems.
- D. The plan shall take into account the progression of work and protect completed construction or elements of the project.

- E. Any proposed revisions of previously submitted plans shall be submitted to the Architect and Owner for review.
- F. The Architect's and Owner's review of the SWPPP plan does not constitute an approval of the plan or the procedures of the plan. The review only establishes that the Contractor has made provisions for seasonal variations and storm water management.

1.4 SUBMITTALS

- A. Submit copies of the Contractor's SWPPP - Construction Best Management Practices Plan Comply with pertinent provisions of Section 01-3300 Submittals for its review by the Architect and Owner.
- B. Submittal shall contain submittal Number, Title, Project Name and address, Contractor's name and address, DSA building permit number.

END OF SECTION

SECTION 31-1000 –CLEARING

PART 1 - GENERAL

SECTION INCLUDES

- A. Removal of surface debris, trees, shrubs, stumps and vegetation.
- B. Removal of existing rock surfacing, asphalt concrete surfacing, and portland cement concrete where shown to be removed on the drawings.

1.2 RELATED SECTIONS

- A. Section 31-2000 - Rough Grading.
- B. Section 31-5700 - Aggregate Base Course

1.3 REGULATORY REQUIREMENTS

- A. Conform to applicable Air Quality Management District Regulations, and fire codes.
- B. Coordinate clearing Work with utility companies. At least 48 hours before commencing work call Underground Service Alert (USA) at 1-800227 -2600.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.1 PREPARATION

- A. Identify a waste area for placing removed materials.

3.2 PROTECTION

- A. Locate, identify, and protect utilities that remain, from damage.
- B. Protect trees, plant growth, and features designated to remain, as final landscaping.
- C. Protect benchmarks, survey control points, and existing structures from damage or displacement.

3.3 CLEARING

- A. Clear areas required for access to site and execution of Work.
- B. Remove trees and shrubs within marked areas. Remove stumps, main root ball, and roots.

3.4 REMOVAL

- A. Remove debris, and extracted plant life from site, except that grass strippings may be retained on site and stockpiled for use in future landscape areas.

- B. All top soil and or non engineered fill shall be removed and disposed of or stockpiled onsite for us in landscape or non-structural fill areas

END OF SECTION

SECTION 31-2000 – ROUGH GRADING

PART 1 - PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Import approved soil materials.
- B. Cutting and Filing, grading, rough contouring, and compacting, the site for site structures, roadways, and parking areas.

1.2 RELATED SECTIONS

- A. Section 01060 - Regulatory Requirements
- B. Section 01410 - Testing Services: Testing fill compaction.
- C. Section 02010 - Subsurface Investigation.
- D. Section 02110 - Site Clearing.
- E. Section 02222 - Excavating: General excavation.
- F. Section 02221 - Trenching: Trenching and backfilling for utilities.
- G. Section 02223 - Backfilling: General building area backfilling.

1.3 REFERENCES

- A. ASTM C 136 - Method For Sieve Analysis of Fine and Coarse Aggregates.
- B. ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb Rammer and 18 inch Drop.
- C. ASTM D2419 - Test Method For Sand Equivalent Value of Soils and Fine Aggregate.
- D. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with codes referenced on drawings and in Section 01060 Regulatory requirements.

1.5 PROJECT RECORD DOCUMENTS

- A. Submit under provisions of Section 01700 - Project Closeout.
- B. Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Structural Fill: Granular material, free from stones and lumps more than 3 inches in largest diameter and free from deleterious materials. Expansion Index shall not exceed 20 for borrow materials which must be imported to site for filling.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify site conditions.
- B. Verify that survey bench mark and intended elevations for the Work are as indicated.

3.2 PREPARATION

- A. Identify required lines, levels, contours, and datum.
- B. Stake and flag locations of known utilities.
- C. Verify location of and protect utilities that remain, temporarily or permanently, from damage.
- D. Protect above and below grade utilities that remain.
- E. Protect plant life and other features beyond any stated limits of clearing or work.
- F. Protect bench marks, survey control points, existing structures, fences, paving, and curbs from excavating equipment and vehicular traffic.

3.3 CUT AND FILL INBALANCE

- A. Contractor at time of preparing their bid is to determine to their own satisfaction and responsibility the amount of removal or import of soil to meet the completed design. Cut and fill is not a balanced site material quantity.

3.4 SUBSOIL EXCAVATION

- A. Excavate subsoil from areas to be further excavated, such as the area under buildings, under roadway, and under driveways.
- B. Excavate and process wet material to obtain optimum moisture content.
- C. When excavating through roots, perform work by hand and cut roots with sharp axe.
- D. Under buildings, and to a distance of five feet beyond the perimeter, subexcavate to a depth of one and one half feet below existing surface, or to bottom of

disturbed soil, whichever is deeper. Under driveways and parking areas, subexcavate to a depth of one foot below existing surface.

- E. Stability: Replace damaged or displaced subsoil to same requirements as for specified fill.

3.5 FILLING

- A. Install Work in accordance with State of California, Department of Transportation's "Standard Specifications" latest edition, except for the test methods for compaction testing.
- B. Fill areas to contours and elevations shown.
- C. Place fill material in continuous layers and compact in accordance with the schedule at end of this section.
- D. Maintain optimum moisture content, up to 2% over optimum, of fill materials to attain required compaction density.
- E. Slope grade away from building pads a minimum of 0.2 feet in 10ft unless noted otherwise.
- F. Make grade changes gradual. Blend slope into level areas.

3.6 TOLERANCES

- A. Top Surface of Subgrade: Plus or minus 1/10 foot from required elevation.

3.7 FIELD QUALITY CONTROL

- A. Section 01410 - Quality Control: Field inspection and testing. Advise the Architect at least 72 hours before subexcavation will commence. Permit the independent testing laboratory or Project Geotechnical Engineer to review subexcavated limits to confirm that the soil subexcavation has been done to an adequate depth.
- B. Testing: In accordance with ASTM D1557 and ASTM D2922.
- C. If tests indicate Work does not meet specified requirements, remove Work, replace and retest.
- D. Frequency of Tests: Section 01410 - Testing Laboratory Services.

3.8 SCHEDULES

- A. Structural Fill:
 - 1. Granular Fill: Maximum 8 inches compacted depth.
 - 2. Compact to minimum 90 percent of maximum density under building.

3. Compact to minimum 90 percent of maximum density under pavements which support traffic and Portland cement concrete slabs.
4. In fills which support pavements and slabs, described in item 3 above, compact fills to minimum 90 percent compaction except upper 12 inches under traffic bearing surfaces and upper 8 inches under other paved surfaces shall be compacted to 93 percent of maximum density.

END OF SECTION

SECTION 31-3000 - TRENCHING, BACKFILLING AND COMPACTION

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Trenching and other excavation needed for the installation of pipe and appurtenances.
- B. Provide and install gravel or crushed rock sub-bedding as needed.
- C. Provide and install bedding material as specified.
- D. Construct thrust blocking as needed and as specified.
- E. Backfill trenches and excavations with suitable material and as specified.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. 22- 0100 Plumbing
- B. 26-000 Basic Electrical Materials and Methods

1.3 QUALITY ASSURANCE

- A. Testing Agency: The Geotechnical Engineer shall verify the adequacy of sub-bedding conditions and monitor backfilling and compaction.
- B. Unsatisfactory Conditions: The Geotechnical Engineer will advise the Contractor immediately if unsatisfactory conditions or test results are observed. The area where compaction is unsatisfactory shall be reworked until the required density has been attained. The Geotechnical Engineer shall have the authority to reject structural bedding or backfill until corrective measures to measure unsuitable material or rework as needed have taken place. It shall be the sole responsibility of the Contractor to achieve the specified degree of compaction.
- C. Test Methods: Unless otherwise indicated, tests shall be made in accordance with the following standard methods:
 - 1. Relative compaction tests shall be in accordance with ASTM D1557-70(c)

1.4 PROTECTION FROM CAVING

- A. Construction Safety Orders

Nothing in this section shall be deemed to allow the use of a shoring, sloping, or protective system less effective than that required by the Construction Safety Orders.

- B. Liability

Nothing in this section shall be construed to impose tort liability on the District, Architect or Engineers.

PART 2 - PRODUCTS

2.1 SUB-BEDDING MATERIAL

Sub-bedding material shall be clean drain rock conforming to the following:

<u>Sieve Size</u>	<u>Percentage Passing</u>
2"	100
1-1/2"	90 to 100
3/4"	5 to 30
3/8"	5 to 20
No. 200	0 to 4

2.2 BEDDING MATERIAL

- A. Bedding material shall be material free from vegetable matter and refuse.
- B. The minimum sand equivalent value shall be 25.
- C. The grading shall conform to the following:

<u>Sieve Size</u>	<u>Percentage Passing</u>
1"	100
3/4"	90 to 100
No. 4	35 to 55
No. 30	10 to 30
No. 200	2 to 9

- D. Pea gravel shall not be used.

2.3 BACKFILL

- A. Outside of paved areas, backfill material may be native excavated material free of vegetable matter, refuse and other unsatisfactory material.
- B. The backfill material shall be free of stone and lumps exceeding 4-1/2 inches in greatest dimension.
- C. Imported material may be used in lieu of native material at the Contractor's option where permitted. Any imported material shall be approved by the Geotechnical Engineer prior to its use.
- D. Within existing and proposed paved areas, granular backfill material shall be used.

2.4 GRANULAR BACKFILL MATERIAL

- A. Granular backfill material shall be gravel, sand or rock material free from deleterious materials.
- B. Minimum sand equivalent value shall be 20.
- C. Maximum aggregate size shall be 1-1/2 inches.

- D. Granular backfill material shall conform to the following:

<u>Sieve Size</u>	<u>Percentage Passing</u>
3"	100
No. 4	35 to 100
No. 30	20 to 100

2.5 FILTER FABRIC

- A. Filter fabric shall be a non-woven geotextile fabric weighing at least four (4) ounces per square yard, Mirafi 140N, Trevira 1114, or approved equal.

PART 3 - EXECUTION

3.1 PUBLIC CONVENIENCE

- A. Free access shall be provided to all fire hydrants, water, valves, meters and private drives, and means shall be provided whereby storm water can flow in the gutters.
- B. All materials excavated that are not required for backfilling shall be promptly removed and disposed of by the Contractor.
- C. Existing utilities shall be located and protected as described in Section 02200.

3.2 EXCAVATION

- A. The Contractor shall make all necessary excavation to construct the work shown on the Drawings in accordance with the dimensions shown thereon.
- B. Excavation shall include the removal of all materials or surface obstructions of any nature that would interfere with the execution of the work.

3.3 TRENCH WIDTH AND DEPTH

- A. The maximum allowable width of trench measured at the top of the pipe shall be the outside diameter of the pipe exclusive of bells and collars, plus twenty-four (24) inches, and such maximum width shall be inclusive of all trench timbers. Minimum width of trench shall be outside diameter plus eighteen (18) inches. Whenever the maximum allowable trench width is exceeded for any reason, the contractor shall, at his expense, embed or cradle the pipe in concrete in a manner satisfactory to the Engineer.
- B. The trench shall be excavated to the dimensions and depth shown on the Drawings and in a manner which will produce a firm foundation for supporting the entire length of each section of pipe. Bell holes shall be provided so that the load is carried on the pipe barrel.
- C. For limited sections, it may be necessary for the trench to be deeper to avoid obstacles shown on the Drawings and/or found in the field. The line or grade, or both, may be ordered changed by the Engineer to afford clearance. The Contractor shall be entitled to no additional compensation therefore.
- D. Trenches parallel footings and the trench bottom is within two horizontal feet to one vertical plane, projected outward and downward from any structural element,

concrete slurry shall be used to backfill trench below this plane. Where narrow trenches occur perpendicular or near perpendicular to footing slurry backfill is not required.

3.4 CONTROL OF WATER

- A. The Contractor, at his own expense, shall provide sufficient pumping equipment and the operation thereof to remove ground water from the excavation.
- B. Water shall be disposed of in such a manner as to cause no injury to public or private property, nor be a menace to the public health.

3.5 UNSUITABLE SUB-BEDDING

- A. Where soft, wet, spongy, or unsuitable trench foundation is encountered, sub-bedding material shall be placed under the pipe to facilitate construction. The cost of furnishing and placing sub-bedding material shall be included in the price bid for the job.

3.6 BRACING EXCAVATIONS

- A. Excavations shall be so braced and supported that they will be safe, and the ground alongside the excavation will not slide or settle, and all existing improvements of any kind, either on public or private property will be fully protected from damage.
- B. If any damage does result to such improvements, the Contractor shall make the necessary repairs or reconstruction at his own expense.
- C. Sheet piling and other timbers shall be driven in such a manner as to prevent caving the walls of the excavation.
- D. In no case shall shoring or bracing which has been driven below the flow line of the pipe be removed. It may be cut off at or above the flow line grade.

3.7 PIPE BEDDING

- A. Bedding material shall be placed immediately after the pipe joints have been completed and inspected.
- B. Bedding material shall be placed carefully around and under the pipe in horizontal layers 4 inches thick after compaction.
- C. The bedding material shall be brought up uniformly on each side of the pipe.
- D. Bedding material shall have the proper moisture content to assure maximum compaction by using hand or pneumatic tampers.
- E. Bedding shall be accomplished in a manner which will not disturb the pipe but will secure a relative compaction of 90 percent.
- F. Bedding shall be installed up to a minimum of 12 inches over the top of the pipe.

3.8 TRENCH BACKFILL

- A. Backfill material shall be placed after the pipe and bedding have been inspected by the Engineer. All trenches shall be backfilled to pavement structural section subgrade.
- B. Native Backfill.
 - 1. The material shall be placed in horizontal, uniform layers not exceeding eight (8) inches in thickness before compaction.
 - 2. Each layer shall be compacted to 90 percent relative compaction.
 - 3. Compaction must be accomplished by mechanical methods only.
 - 4. Ponding, jetting or the use of excessive amounts of water will not be allowed.
- C. Granular Backfill
 - 1. The Contractor shall compact by tamping and/or rolling, the backfill material in layers not exceeding eight (8) inches in loose depth, each layer being thoroughly compacted by tamping and/or rolling before succeeding layers are placed. "Stomper"-type equipment for compaction shall not be permitted. Vibrating equipment that does not damage the pipe or adjacent facilities may be used for compaction.
 - 2. Granular backfill compacted by tamping and/or railings shall be free from stones or lumps exceeding three {3} inches in greatest dimension, vegetable matter, or other unsatisfactory material, and shall be compacted to a relative compaction of not less than ninety (90%) percent as determined by Test Method NO. California 216, except that within two and one-half (2 1/2) feet of finished permanent surfacing grade the relative compaction shall not be less than ninety-five (95%) percent.

3.9 FILTER FABRIC

- A. Install filter fabric per manufacturer's recommendations.

END OF SECTION 32-3000

SECTION 31-5000 – EXCAVATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Excavating for footings, slabs-on-grade, on-site stormwater detention system, paving, site structures, and utilities within the building.

1.2 RELATED SECTIONS

- A. Geotechnical Report; bore hole locations and findings of subsurface materials.
- B. Section 02211 - Rough grading.
- C. Section 02221 -Trenching Backfilling and Compaction.
- D. Section 02223 - Backfilling
- E. Section 02260 - Finish Grading

1.3 PROJECT CONDITIONS

- A. Verify that survey bench mark and intended elevations for the Work are as indicated.
- B. Protect plants, lawns, rock outcroppings, and other features to remain.
- C. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.1 PREPARATION

- A. Identify required lines, levels, contours, and datum locations.
- B. See Section 02211- Rough Grading for additional requirements.
- C. Locate, identify, and protect utilities that remain and protect from damage.

3.2 EXCAVATING

- A. General Requirements:
 - 1. Excavate to dimensions and elevations shown or noted with bottoms square and true.
 - 2. Shore, brace, underpin, sheet and slope excavations as required to prevent caving, erosion, danger to persons and structures, or interference with construction operations and as required to comply with safety laws ..

- a. Install necessary shoring, lagging, cribbing and bracing of ample strength to support adjoining soils and paving. Construct such items so that they will not interfere with the building of any structural elements, and leave permanently in place if required.
 - b. Support systems shall permit proper application of the specified waterproofing systems.
 - c. Pressure treat for decay and termite prevention all wood materials used in such systems and which are to be left permanently in place.
 - d. Protect edges of excavations to prevent raveling.
 - e. Provide base course for support of slab as indicated.
 - f. Keep excavations free of water at all times until concrete work and backfilling are complete.
 - g. Grade excavated areas to provide drainage to prevent ponding of water.
- B. Stability of Excavations:
1. Slope sides of excavations to comply with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible, either because of space restrictions or stability of material excavated.
 2. Maintain sides and slopes of excavations in a safe condition until completion of backfilling.
- C. Provisions for Formwork Construction:
1. Extend excavations sufficient distance from footing to permit placing and removal of forms, installation of services and inspection.
 2. Trim excavation walls and bottoms to reasonably smooth lines and grades.
- D. Excavation for Pavements: Cut surface under pavements to comply with cross-sections, elevations and grades as shown.
- E. Earth Forms:
1. Contractor may excavate to dimensions of footing required in order to avoid constructing formwork, provided excavations area clean cut and free of spaces or cave-ins.
 2. Continuous trenching for individual footings will not be permitted.

3.3 FIELD QUALITY CONTROL

- A. Testing Agency Services: Allow testing agency to inspect and test each subgrade and each fill or backfill layer. Do not proceed until test results for previously completed work verify compliance with requirements.

- B. Perform field in-place density tests according to ASTM D 1556 (sand cone method) or ASTM D 02937 (Nuclear Gage method), as applicable.
 - 1. Field in-place density tests may also be performed by the nuclear gage method according to ASTM D 2922, provided that calibration curves are periodically checked and adjusted at the gage manufacturers facility. With each density calibration check, check to calibration curves furnished with the moisture gauges according to ASTM D 3017.
 - a. When field in-place density tests are performed using nuclear gage methods, make calibration checks of both density and moisture gauges at beginning of work on each different type of material encountered, and at intervals as directed by the Architect.
 - 2. Footing Subgrade: At footing subgrades, perform at least one test of each soil stratum to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of each subgrade with related tested strata when acceptable to the Architect.
 - 3. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, perform at least one field in-place density test for every 2,000 square feet or less of paved area or building slab, but in no case fewer than three tests.
 - 4. Trench Backfill: In each compacted initial and final backfill layer, perform at least one field in-place density test for each 150 feet or less of trench, but no fewer than two tests.
- C. Number and location of test(s) shall be at option of the Geotechnical Engineer.
- D. When testing agency reports that subgrades, fills, or backfills are below specified density, scarify and moisten or aerate, or remove and replace soil to the depth required, recompact and retest until required density is obtained.
- E. After grading is completed and the testing agency has completed observation of the work, permit no further excavation or filling, except as approved by Owner's Representative.
- F. See Section 01400 - Quality Control, for general requirements for field inspection and testing.
- G. Provide for visual inspection of load-bearing excavated surfaces before placement of foundations.

3.4 PROTECTION

- A. Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
- B. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.
- C. Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, compact to required density and provide other corrective work, including retesting, prior to further construction.

- D. Prevent displacement of banks and keep loose soil from falling into excavation;
maintain soil stability.

END OF SECTION

SECTION 31-5500 – FILL AND BACKFILL

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Filling, backfilling, and compacting for site structures.

1.2 RELATED SECTIONS

- A. Geotechnical Report: Geotechnical report; bore hole locations and findings of subsurface materials.
- B. Section 31-1000 - Rough Grading
- C. Section 31-5000 - Excavation.
- D. Section 31-3000 - Trenching for Site Utilities
- E. Section 03-3000- Cast-in-Place Concrete.

1.3 REFERENCES

- A. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54 kg (10-lb) Rammer and a 457 mm (18 in.) Drop; American Association of State Highway and Transportation Officials.
- B. ASTM D 1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
- C. ASTM D 1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 *ft-lbf/ft³* (2,700 *kN m/m³*)).
- D. ASTM D 2922 - Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
- E. ASTM D 3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

1.4 DEFINITIONS

- A. Finish Grade Elevations: Indicated on drawings.
- B. Subgrade Elevations: Indicated on drawings.

1.5 SUBMITTALS

- A. See Section 01-3300 - Submittals, for submittal procedures.
- B. Samples: 10 lb sample of each type of fill; submit in air-tight containers to testing laboratory.
- C. Materials Sources: Submit name of imported materials source.

COUNTY OF HUMBOLDT
SOCIAL SERVICES BUILDING ADA MODIFICATIONS PHASE II

- D. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used.
- E. Compaction Density Test Reports.

1.6 PROJECT CONDITIONS

- A. Provide sufficient quantities of fill to meet project schedule and requirements. When necessary, store materials on site in advance of need.
- B. Verify that survey bench marks and intended elevations for the Work are as indicated.

1.7 CUT AND FILL INBALANCE

- A. Contractor at time of preparing their bid is to determine to their own satisfaction and responsibility the amount of removal or import of soil to meet the completed design. Cut and fill is not necessarily a balanced site material quantity.

PART 2 - PRODUCTS

2.1 FILL MATERIALS

- A. General Fill: Site soil is not adequate for structural fill and must be imported. Subsoil excavated on-site, to extent of quantities available may be used for landscaping fill, Select Import otherwise.
 - 1. Graded.
 - 2. Free of lumps larger than 3 inches, rocks larger than 2 inches, and debris.
- B. Select Fill (non structural): Select Import fill.
 - 1. Graded according to Geotechnical Report specifications as follows
 - a. 3 inch sieve: 100 percent passing
 - b. 4 inch sieve: 90 to 100 percent passing c. c. No. 200: 10 to 60 percent passing
 - 2. Liquid Limit 40% Maximum
 - 3. Plasticity Index 15% Maximum
- C. Structural Fill
 - 1. Well graded imported granular material, crushed quarry rock or river-runs.
 - 2. 100 percent passing through 3-inch sieve
 - 3. Compact structural fill to at least 90 percent relative compaction under all foundation elements (foundations and slabs), sidewalks and other flatwork areas.

- D. Bedding for Utility Piping under building slabs: Washed, uniformly graded mineral aggregate ASTM D448 with percentage composition of dry weight conforming with following limits:
1. Passing 1-inch Sieve: 100 percent.
 2. Passing 3/4-inch Sieve: 90-100 percent.
 3. Passing NO.4 Sieve: 0-10 percent.
- E. Graded Rock Base:
1. Under Building Slabs: Washed, uniformly graded mineral aggregate ASTM D448 with percentage composition of dry weight conforming with following limits:
 - a. Passing 1-inch Sieve: 100 percent.
 - b. Passing 3/4-inch Sieve: 90-100 percent.
 - c. Passing NO.4 Sieve: 0-10 percent.
 2. Base at Slab-on-Grade: As specified in the geotechnical report for this project.
 3. Absorption of water to saturated-surface dry condition shall not exceed 3 percent of oven-dry weight of a sample.
- F. Granular Fill - Pea Gravel 3/8 inch to 1/2 inch washed, uncrushed gravel. Use at drainage pipe and at other locations indicated.
- G. Sand - Fill: Natural river or bank sand; washed; free of silt, clay, loam, friable or soluble materials, and organic matter.
1. Graded in accordance with ASTM C 136; within the following limits:
 - a. 4.75 mm sieve: 90 to 100 percent passing.
 - b. 75 mm sieve: 0 to 5 percent passing.
 2. Provide at locations indicated.
- H. Topsoil: Satisfactory topsoil is reasonably free of subsoil, clay lumps, stones and other objects over 2 inches in diameter, and without weeds, roots and other objectionable material.
1. Use topsoil for top 2 feet of fill against exterior walls, except at paving and sidewalks.
 2. Topsoil may also be used beyond the area within 5 feet of building, except under paving and sidewalks.

COUNTY OF HUMBOLDT
SOCIAL SERVICES BUILDING ADA MODIFICATIONS PHASE II

3. Confirm suitability of stockpiled materials with project Landscape Architect and Geotechnical Engineer.

2.2 SOURCE QUALITY CONTROL

- A. See Section 01400 (01-4000) - Quality Requirements, for general requirements for testing and analysis of soil material.
- B. Where fill materials are specified by reference to a specific standard, testing of samples for compliance will be provided before delivery to site.
- C. If tests indicate materials do not meet specified requirements, change material and retest.
- D. Provide all materials of each type from same source.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Identify required lines, levels, contours, and datum locations.
- B. See Section 31-2000 rough Grading for additional requirements.

3.2 PREPARATION

- A. Scarify subgrade surface to a depth of 6 inches to identify soft spots.
- B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.
- C. Compact subgrade to density equal to or greater than requirements for subsequent fill material.
- D. Until ready to fill, maintain excavations and prevent loose soil from falling into excavation.
- E. At parking lots: Remove a minimum of 1 foot of soil to reach suitable subgrade.
- F. At concrete slab on grade: Excavate to the design depth of the bottom of the structural fill beneath the slab.
 1. Compact the upper 8 inches to a minimum of 90 percent dry density per ASTM D1557.
 2. Moisture content to be controlled to -1 to +3 percent of optimum.

3.3 FILLING

- A. Fill to contours and elevations indicated using unfrozen materials.
- B. Fill up to subgrade elevations unless otherwise indicated.

- C. Employ a placement method that does not disturb or damage other work.
 - D. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
 - E. Maintain optimum moisture content of fill-materials to attain required compaction density.
 - F. Granular Fill: Place and compact materials in equal continuous layers not exceeding 6 inches compacted depth.
 - G. Soil Fill: Place and compact material in equal continuous layers not exceeding 8 inches compacted depth.
 - H. Slope grade away from building minimum 2 inches in 10ft, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.
 - I. Correct areas that are over-excavated.
 - 1. Load-bearing foundation surfaces: Use Structural Fill, flush to required elevation, compacted to 90 percent of maximum dry density.
 - 2. Other areas: Use Topsoil Fill, flush to required elevation, compacted to minimum 93 percent of maximum dry density.
 - J. Compaction Density Unless Otherwise Specified or Indicated:
 - 1. Under paving, slabs-on-grade, and similar construction: 90 percent of maximum dry density.
 - 2. At traffic bearing paving: 93 percent of maximum dry density.
 - K. Reshape and re-compact fills subjected to vehicular traffic.
- 3.4 FILL AT SPECIFIC LOCATIONS

- A. General Requirements:
 - 1. Do not place engineered fill or backfill until forms, rubbish and deleterious materials have been removed and areas have been approved by the Owner's Representative.
 - 2. Do not backfill against surfaces to be damproofed or waterproofed until damproofing or waterproofing has been completed and accepted.
 - 3. Sequence placement of permeable material with adjacent backfill.
 - 4. Brace and shore footings, walls, etc., against which backfill is to be placed to prevent displacement or damage during placement.
 - 5. Place acceptable soil material in layers to required subgrade elevations, for each area classification listed below.

COUNTY OF HUMBOLDT
SOCIAL SERVICES BUILDING ADA MODIFICATIONS PHASE II

6. In excavations, use satisfactory excavated or borrow material.
 7. Under grassed areas, use satisfactory excavated or borrow material.
 8. Under walks and pavement, use base material, or structural fill, or combination of both.
 9. Under steps, use base material.
 10. Under building slabs, use structural fill or drainage fill material.
 11. Under piping and conduit; use base course material where base course is indicated under piping or conduit; shape to fit bottom 90 degrees of cylinder.
- B. Backfill excavations as promptly as work permits, but not until completion of the following:
1. Acceptance by Architect of construction below finish grade, including, where applicable, damp proofing, waterproofing, and perimeter insulation.
 2. Inspection, testing, approval, and recording of locations of underground utilities.
 3. Removal of concrete formwork.
 4. Removal of shoring and bracing, and backfilling of voids with satisfactory materials. Cut of temporary sheet piling driven below bottom of structures and removal in a manner to prevent settlement of the structures or utilities, unless otherwise noted.
 5. Removal of trash and debris from excavated area.
 6. Permanent or temporary horizontal bracing is in place on horizontally supported walls.
- C. Compact utility trench backfill placed in or adjacent to buildings and exterior slabs to at least 90 percent of the maximum dry density (ASTM D1557). Compact the upper 2 feet of the utility trench backfill placed in or adjacent to buildings and exterior slabs and in pavement areas to at least 95 percent of the maximum dry density (ASTM D1557).
- D. After subgrade compaction has been approved by the Geotechnical Engineer, spread the engineered fill material in 6 to 8 inch loose lifts and uniformly mixed during the spreading operation.
- E. Install engineered fill below footings and extend at least 5 feet beyond building limits.
- F. Repeat compaction procedure until proper grade is attained.
- G. Rocks generated during site earthwork may be used in fill when conforming to material specifications.

3.5 TOLERANCES

- A. Top Surface of General Filling: Plus or minus 1 inch from required elevations.
 - B. Top Surface of Filling Under Paved Areas: Plus or minus 1 inch from required elevations.
- 3.6 FIELD QUALITY CONTROL
- A. See Section 01-4200 - Quality Requirements, for general requirements for field inspection and testing.
 - B. Perform compaction density testing on compacted fill in accordance with ASTM D1556, ASTM D2167, ASTM D2922, or ASTM D3017.
 - C. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D 1557 ("modified Proctor"), or AASHTO T 180.
 - D. If tests indicate work does not meet specified requirements, remove work, replace and retest.
 - E. Frequency of Tests: As specified by the project Geotechnical Engineer.
 - F. Proof roll compacted fill at surfaces that will be under slabs-on-grade.
- 3.7 CLEAN-UP
- A. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.
 - B. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

END OF SECTION

SECTION 31-5600 - ROCK BASE AT SLABS

PART 1 - GENERAL

1.1 DOCUMENTS

- A. The General Conditions, Supplementary Conditions, and applicable portions of Division 1 of the specifications are part of this section.

1.2 SCOPE

- A. The work covered in this Section includes a description of the sub-grade preparation for slab-on-grade areas and of slab base rock and its placement.

PART 2 - PRODUCTS

2.1 SLAB BASE ROCK AT BUILDINGS

- A. Slab base rock shall consist of rounded, free-draining gravel-graded as follows:

<u>Sieve Size</u>	<u>Percent (by Dry Weight)</u>
1-1/2 inch	100
3/4 inch	90 - 100
No. 4	0 - 5

2.2 SLAB BASE SAND

- A. At other concrete flat work and over membrane sand shall be clean, graded sand with 100 percent passing No. 4-Inch screen and not more than five percent passing No.200 sieve.

PART 3 - EXECUTION

3.1 INSPECTION AND TESTS

- A. Section 01400

3.2 SUBGRADE PREPARATION

- A. After all structural and utility trench backfills are compacted satisfactorily and before slab base rock is placed within concrete slab-on-grade areas where foundation and utility operations have disturbed the sub-grade soils, the upper six inches of sub-grade soils shall be uniformly moisture-conditioned to near optimum moisture content and shall be uniformly compacted to achieve at least 90 percent relative compaction. The sub-grade shall be finished true to line and grade and present a smooth, firm, unyielding surface.

3.3 PLACEMENT OF SLAB BASE ROCK

- A. After sub-grade preparation has been completed satisfactorily the slab base rock shall be placed in a manner to prevent segregation, and shall be compacted with vibrating equipment to provide a tight interlock of aggregate. Any free water that has collected in the slab base rock shall be drained or removed by pumping before concrete is placed.

**LAYTONVILLE ELEMENTARY SCHOOL
DEMOLITION AND CONSTRUCTION OF NEW CLASSROOM BUILDING "D"**

3.4 CLEAN UP

- A. Remove all debris resulting from the work of this Section.

END OF SECTION

SECTION 31-5700 – AGGREGATE BASE COURSE

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Aggregate base course.

1.2 RELATED SECTIONS

- A. Section 01-4523 - Testing Services: Soil Testing.
- B. Section 31-2000 - Rough Grading: Preparation of site for base course.
- C. Section 31-5500 - Backfilling: Compacted fill under base course.
- D. Section 31-3000 - Trenching: Compacted fill under base course.
- E. Section 32-1216 - Asphaltic Concrete Paving: Finish asphalt courses.

1.3 REFERENCES

- A. ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb Rammer and an 18 inch Drop.
- B. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
- C. California Test Method (CTM) 216 - Method of Test for Relative Compaction of Untreated and Treated Soils.
- D. CTM 231 - Method of Test for Relative Compaction of Untreated and Treated Soils and Aggregates by the Area Concept Utilizing Nuclear Gages.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Class 2 Aggregate Base: As specified in Section 26 of the Caltrans "Standard Specifications", except the Durability Index may be 25 minimum.
- B. Unclassified Aggregate Base: Reground bituminous surfacing and underlying unclassified aggregate base material, salvaged from existing paved surfacing, may be combined through a grinding/mixing operation resulting in one inch maximum size and not more than 20 percent passing the No.200 sieve. The sand equivalent shall be 20, minimum.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify substrate has been inspected, gradients and elevations are correct, and is dry.

3.2 PREPARATION

- A. Correct irregularities in substrate gradient and elevation by scarifying, reshaping, and re-compacting.
- B. Do not place fill on soft, muddy, or frozen surfaces.

3.3 AGGREGATE PLACEMENT

- A. Spread aggregate over prepared substrate to a total compacted thickness shown on the drawings. Use equipment specified in Section 26 of the Caltrans "Standard Specifications" to assure that the base material does not segregate during spreading.
- B. Compact material to specified density.
- C. Level and contour surfaces to elevations and gradients indicated.
- D. Add water to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.
- E. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

3.4 TOLERANCES

- A. Flatness: Maximum variation of 1/4 inch measured with 10 foot straight edge.
- B. Scheduled Compacted Thickness: Within 1/2 inch of minimum thickness specified.
- C. Variation From Design Elevation: Within 0.04 feet below grade and 0.03 feet above grade.

3.5 FIELD QUALITY CONTROL

- A. Section 01-4523- Testing Services: Soil Testing.
- B. Compaction testing will be performed in accordance with CTM 216, and CTM231, except for base under concrete walks where testing will be done in accordance with ASTM D1557 and ASTM D2922
- C. If tests indicate Work does not meet specified requirements, remove Work, replace and retest.
- D. Frequency of Tests: As specified in Section 01-4523 - Testing Services, "Payment for Testing."

3.6 SCHEDULES

- A. Under Asphalt Concrete Pavement for Vehicular Traffic:
 - 1. Compact placed aggregate base materials to achieve compaction of 95 percent.

- B. Under asphalt concrete pavement and Portland Cement Concrete Walks and play areas:
 - 1. Compact placed aggregate base materials to 92 percent compaction.

END OF SECTION 02231

SECTION 31-6000 - FINISH GRADING

PART 1 - GENERAL

1.1 DOCUMENTS

- A. The General Conditions, Supplementary Conditions and applicable portions of Division 1 of the specifications are part of this section.

1.2 SCOPE

- A. Work Specified
 - 1. Finish grading of all areas not covered by construction, to finish grade lines and contours indicated, and to blend uniformly to areas of undisturbed grades.

1.3 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 31-2000 - Rough Grading
- B. Section 31-5000 - Excavation
- C. Section 31-5500 - Fill and Backfilling
- D. Section 31-5700 - Aggregate Base Course.

PART 2 - PRODUCTS

2.1 TOPSOIL

- A. Topsoil shall be fertile, friable material of a loamy character without sub-soil materials. Topsoil shall be free of stones, refuse, and clods greater than 1_ inches in diameter. Topsoil for use in planter areas shall be as specified elsewhere for landscape construction.

PART 3 - EXECUTION

3.1 FINISH GRADING

- A. Finish grading work shall comply with requirements of Section 31-5000 Excavating, Section 31-5500 Excavating, and Section 31-5700- Aggregate Base Course.
- B. Finish grading shall follow the general grading pattern established by the finished grade (FG) elevations as indicated. Areas to receive pavement shall be graded to provide positive slope to a drop inlet. Isolated low areas, "birdbaths", etc., will not be acceptable.
- C. Finish grade shall be that specified elevation at the base of the first layer of asphalt concrete and Portland cement concrete paved surfaces.
- D. Bring areas to a true and uniform grade without variation of more than one half inch in a 10- foot straight edge. In addition, no points shall be more than 3/8 inch higher

than theoretical grades under asphalt concrete pavement, slabs, or portland cement concrete paved surfaces.

3.2 CLEANUP

- A. Remove debris and stains resulting from the work of this section.

END OF SECTION

SECTION 32-1600 - SITE CONCRETE WORK AND WALKS

PART 1 - GENERAL

1.1 DOCUMENTS

- A. The General Conditions, Supplementary Conditions and applicable portions of Division 1 of the specifications are part of this section.

1.2 WORK SPECIFIED

- A. Prepare subgrade to receive base course materials for walks, slabs, curbs and concrete bases.
- B. Place and compact base course materials.
- C. Concrete walks, slabs, curbs and concrete bases, complete with reinforcement.

1.3 RELATED WORK

- A. Section 31-1000 - Rough Grading
- B. Section 31-5000 - Excavation
- C. Section 31-5500 - Backfilling
- D. Section 31-5700 - Aggregate Base Course
- E. Section 31-2000 - Concrete Reinforcement
- F. Section 31-3000 - Cast in Place Concrete - for retaining walls

1.4 REFERENCE STANDARDS

- A. ASTM A185: Welded Steel Wire Fabric for Concrete Reinforcement.
- B. ASTM A615: Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
- C. ASTM C150: Portland Cement.
- D. ASTM C94: Ready Mixed Concrete.
- E. ASTM C260: Air-Entraining Admixtures for Concrete.
- F. ASTM C33: Concrete Aggregates.
- G. ASTM C309: Liquid Membrane-Forming Compounds for Curing Concrete.
- H. ASTM 01557: Tests for Moisture/Density Relations of Soils.
- I. ASTM 01751: Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction.

- J. Standard Specifications -State of California, Department of Public Works, Division of Highways (CalTrans), Sections 40, 51,52,73, and 90 (CSS).

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Any concrete plant that provides materials meeting requirements of CSS, Section 90.
- B. Substitutions: Items of same function and performance are acceptable in conformance with Section 01-6100.

2.2 FILL MATERIALS

- A. Gravel base: Angular crushed natural stone, free from shale, clay and other friable materials and debris graded within the following limits:

<u>Sieve Size</u>	<u>Percent Passing</u>
2"	100
1"	95
3/4"	95 to 100
5/8"	75 to 100
No. 4	35to 60
No. 16	15 to 35
No. 40	10 to 25
No. 200	5 to 10

- B. Sand cushion: Clean natural river or bank sand, free from silt, clay loam, friable or soluble materials and organic matter, graded within the following limits:

<u>Sieve Size</u>	<u>Percent Passing</u>
No. 4	100
No. 14	10 to 100
No. 50	5 to 90
No. 100	4 to 30
No. 200	0

2.3 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150; normal Type I or Type II.
- B. Fine Coarse Aggregates: ASTM C33.
- C. Water: Clean and free from injurious amounts of oil, alkali, organic matter or other deleterious material.

2.4 REINFORCEMENT

- A. Reinforcing steel: 40 ksi yield strength, deformed billet steel bars, ASTM A615, plain finish.
- B. Welded steel wire fabric (WW F): Plain type, ASTM A 185, plain finish.

- C. Tie wire: Minimum 16-gauge annealed type or patented system acceptable to Architect.

2.5 FORMWORK AND ACCESSORIES

- A. Formwork: Matched, tight-fitting and adequately stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of concrete.
- B. Expansion joint filler: Minimum 0-inch thick asphaltic impregnated fiberboard, ASTM 01751.
- C. Color additive: Consov Permatint Pigment Color as required shall be added to all concrete in concrete walks and curbs to match existing concrete color.
- D. Concrete curing compound: Chlorinated rubber type, clear color, ASTM C308.

2.6 CONCRETE MIX

- A. Mix and proportion to produce minimum 2,500 psi concrete at 28 days with maximum slump of four inches, ASTM C94. No less than five sacks of cement per cubic yard.
- B. Use accelerating admixtures in cold weather only when acceptable to Architect. Use of admixtures shall not relax cold weather placement requirements as described in Section 01-3000. Do not use calcium chloride.
- C. Use set-retarding admixtures during hot weather only when acceptable to Architect.
- D. Add color additive to concrete batch after the aggregate and before the cement and water.

PART 3 - EXECUTION

3.1 PREPARATION OF SUB-GRADE

- A. Ensure rough grading has brought sub-grade to required elevations.
- B. Fill soft spots and hollow spots with additional fill and compact.
- C. Level and compact sub-grade to receive granular base. Compact to 93 percent compaction.

3.2 PLACEMENT OF GRAVEL FILL, SAND CUSHION AND WWF

- A. Place and level gravel fill over prepared sub-grade to a compacted depth indicated on the drawings true to lines and levels to plus or minus 0.1 foot.
- B. Place and cushion over gravel base and lightly consolidate and level to plus or minus 0.05 foot. Prevent displacement.
- C. During concrete placement keep cushion sufficiently moist to prevent excessive absorption of water from freshly-placed concrete.

- D. Install WWF at center of slab, protect to remain at center of slab during pour.

3.3 FORMING

- A. Form vertical surfaces to full depth and securely position to required lines and levels. Ensure form ties are not placed so as to pass through concrete.
- B. Arrange and assemble formwork to permit easy dismantling and stripping and to prevent damage to concrete during formwork removal.

3.4 FORMING EXPANSION AND CONTRACTION JOINTS

- A. When sidewalks abut the building, provide continuous joint filler.
- B. Fit expansion joints with filler of required profiles as shown on the drawings. Recess 1/2-inch below finished concrete surface.

3.5 PLACING CONCRETE

- A. Place concrete, screed and wood float surfaces to a smooth and uniform finish, free of open texturing and exposed aggregate.
- B. Avoid working mortar to surface.
- C. Round all edges, including edges of control joints, with 1/3-inch radius edging tool.
- D. Provide exposed surfaces of concrete with medium broom finish for slopes less than or equal to 6% and a heavy broom finish for areas with greater than a 6% slope. Broomed finish shall have striations across slope, parallel to grading contours.
- E. Ensure that finished surfaces do not vary from true lines: levels or grade by more than one eighth (1/8) inch in ten feet when measured with straight edge.
- F. Apply curing compound on finished surfaces (except exposed aggregate finish) immediately after placement. Apply in accordance with manufacturer's recommendations.

3.6 CLEAN UP

- A. Remove all debris resulting from the work of this section.

END OF SECTION

SECTION 32-1726 – TACTILE WARNING SURFACES

PART 1 - GENERAL

1.1 DOCUMENTS

- A. The General Conditions, Supplementary Conditions and applicable portions of Division 1 of the specifications are part of this section.

1.2 SCOPE

- A. Tactile Warning Surfaces: Truncated dome detectable warnings required for compliance with State and Federal accessibility regulations.

1.3 RELATED WORK

- A. Pertinent sections of other Divisions specifying paving, striping work affecting this Section.
- B. Section 07-9200- Joint Sealants.

1.4 REFERENCE STANDARDS

- A. 36 CFR 1191 - Americans with Disabilities Act Accessibility Guidelines (ADAAG) for Buildings and Facilities; Final Rule; Federal Register, July 26, 1991; current update.
- B. California Building Code (CBC) 2013 ed., Amendments to Uniform Building Code 2009 ed.
- C. Manufacturer's recommendations and specifications.
- D. Uniform Building Code Standards.; current edition.

1.5 WARRANTY

- A. See Section 01-7000 – Contract Closeout, for additional warranty requirements.
- B. Provide five year manufacturer warranty for products. Manufacturer shall warrant that the installation's shape, color-fastness, confirmation, sound-on-cane acoustic quality, resilience and attachment will not degrade significantly (defined as maintaining at least 90 percent of the approved design characteristics as determined by the authority having Jurisdiction) for five years from the date of installation.

1.6 SUBMITTAL

- A. See Section 01-3300 – Submittals and Shop Drawings for submittal procedures.
- B. Product Data: Provide manufacturer's brochures illustrating conformance to specified characteristics. Shop Drawings: Provide standard installation details. Indicate dome spacing, height, width and length of dome fields for required conditions.

- C. Installation Instructions: Include recommended environmental conditions for installation.
- D. Samples: Submit two samples of each exposed finish or product, 8x10 inch in size, illustrating finish, appearance and color.
- E. Test Reports: Indicate that products will meet all performance requirements of this specification.
- F. Previously completed test reports will be acceptable if they are current and indicative of products used on this project.
- G. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.7 QUALITY ASSURANCE

- A. Regulatory Requirements: Meet all requirements of ADAAG 4.29.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
- C. Installer Qualifications: Company specializing in installing products specified in this section, licensed by Manufacturer

1.8 MOCK-UP

- A. Construct mock-up comprised of one horizontal field sample panel, approximately 4 feet long. Mock-up shall be ready for review not less than 4 weeks before placement of work is scheduled to begin.
- B. Locate where directed.
- C. Mock-up may remain as part of the Work if accepted by Architect.

1.9 DELIVERY STORAGE AND PROTECTION

- A. Deliver products and materials to project site in original containers and packaging.
- B. Comply with pertinent provisions of Section 01-6000.
- C. Prevent contact with materials which may cause discoloration or staining. Clean materials which are discolored or stained.
- D. Replacements: In the event of damage, immediately make repairs and replacements necessary to the approval of the Architect and Division of the State Architect, without change in contract amount or time.

PART 2 - PRODUCTS

2.1 MANUFACTURER -SUBSTITUTION

- A. Substitutions: See Section 01630 - Product Substitutions.

- B. Request For Substitution of proposed alternate products must be made in writing as specified in Section 01630 and shall demonstrate that the proposed substitution meets or exceeds each of the specified characteristics.
- C. All performance requirements listed in Articles titled QUALITY ASSURANCE, DESIGN CRITERIA, PERFORMANCE REQUIREMENTS and WARRANTY must be met and provided with the Request For Substitution.
- D. Submit complete product and test data as specified in the Article titled SUBMITTALS for each proposed substitution.
- E. Architect will accept or reject Request for Substitution in writing as specified in Section 01-6100.
- F. Accepted substitutions will be issued via Addendum.
- G. No substitutions will be accepted following the bid, except as otherwise specified in Section 01-6100.

2.2 TACTILE WARNING SURFACES

- A. Tactile Warning Surfaces: Cast in place unit(s) to paving substrates, resilient, reflective, chemically resistant, abrasion resistant, ultra-violet resistant, meeting all current accessibility standards of Authorities Having Jurisdiction. "Truncated Dome" Product by "Amour Tile", Cast in Place system or approved equal.
 - 1. Composition: Comprised of resins, reactive monomers, pigments, glass beads, and fillers. Exact composition is at the manufacturer's discretion. The material is resistant to ultra-violet light.
 - 2. Face Thickness: 0.1875 +/-5% max.
 - 3. Warpage of Edge: 0.5% max.
 - 4. Water Absorption - ASTM D 570-98 less than 0.05%.
 - 5. Slip Resistance - ASTM C 1028-96 greater than 0.80.
 - 6. Compressive Strength - ASTM D 695-02a greater than 28,000 psi.
 - 7. Tensile Strength - ASTM D 638-03 greater than 19,000 psi.
 - 8. Flexural Strength - ASTM D 790-03 greater than 25,000 psi.
 - 9. Chemical Stain Resistance - ASTM D 543-95 no discoloration or staining.
 - 10. Abrasive Wear - ASTM D 2486-00 less than 0.060 after 1000 cycles.
 - 11. Wear Resistance - ASTM C 501-84 greater than 500.
 - 12. Fire Resistance - ASTM E 84-05 flame spread less than 15.
 - 13. Impact Resistance - ASTM D 5420-04 greater than 550 in. lbf/in.

14. Accelerated Weathering - ASTM G 155-05a for 3000 hrs. $\Delta E < 4.5$ tile color 33538, no fading or chalking.
15. Freeze Thaw - ASTM D 1037-99 no cracking, delamination, or other defects.
16. Salt Spray - ASTM B 117-03 for 200 hours no deterioration.
17. AASHTO HB-17 single wheel HS20-44 loading no failure @10,400lbs.
18. Color to be selected by Architect from Manufacturer's nine standard colors.

2.3 ACCESSORIES

- A. Sealant: Compatible material of types specified in Section 07-9200.
- B. Accessory Materials: Other materials not specifically indicated but required to achieve the results specified; commercial quality. Types recommended by manufacturer to suit conditions.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work. Correct conditions detrimental to the proper and timely performance of this work before proceeding with installation. Commencement of work indicates acceptance of substrates.
- B. Verify all opening sizes, dimensions and tolerances in field.
- C. Verify location and sizes of utility rough-in associated with work of this section.

3.2 PREPARATION

- A. Substrate Requirements:
 1. General Surfaces: All surfaces to be clean and dry.
 2. Temperatures: Surface temperatures during installation shall be within range recommended by the manufacturer. Provide manufacturer's written approval of alternate installation materials or methods for temperatures outside this range.
 3. Asphalt: Asphalt surfaces shall be composed of oil based bitumen. Coal tar asphalt is not acceptable, nor warranted. Asphalt must cure for 40 days prior to installation to insure proper bonding of all surfaces. This will allow tensile strength properties of both materials to more closely approximate each other.

4. Seal Coat: Products shall not be placed on asphalt or coal tar sealers. If surface has been sealed, grind to remove sealers completely, or paint surface with properly thinned black chlorinated rubber traffic paint. Hand spray to insure minimal application (light film), just enough to keep the applied products from merging with the oils in the sealers.
5. Concrete: Minimum compressive strength ("shear") 3000 PSI. Concrete must cure for 40 days prior to installation to insure proper bonding. All concrete coloring/additives shall be integral, not surface applied. All surface curing compounds must be removed on concrete that is less than 6 months old. Finish shall be medium broom finish for maximum adhesion.
6. Protect surrounding work from damage, including over-application and spillage.
7. Prevent materials from entering storm drainage systems.

3.3 INSTALLATION

- A. Install components in strict accordance with manufacturer's instructions and approved shop drawings. Use materials and hardware for attachments as recommended by manufacturer and as required to suit field conditions.
- B. Install items true to line and level, measured from established lines and levels, accurately fitted, free from distortion or defects, align with adjacent work.
- C. Install sealant in accordance with Section 07-9200.

3.4 TOLERANCES

- A. Maximum Variation From True Position: one-sixteenth inch.
- B. Maximum Offset From True Alignment: one-sixteenth inch.
- C. Maximum Out-of-Position: 1/8 inch.
- D. Maximum Misalignment of Two Adjoining Surfaces Abutting in Plane: one-sixteenth inch.

3.5 QUALITY CONTROL

- A. Perform field inspection and testing in accordance with Section 01-4200.

3.6 ADJUSTING

- A. Repair damaged and defective work and eliminate functional and visual defects. Where repair is not possible replace work. Adjust joints for uniform appearance. No unfinished surfaces or irregularities in completed work.

3.7 CLEAN UP AND PROTECTION

- A. Clean exposed surfaces.
- B. Strictly follow manufacturer guidelines when removing foreign substances from finished surfaces.
- C. Protect installed work from subsequent construction operations until Owner's acceptance. Utilize durable protective wrappings and panel materials using methods which will not damage surfaces or finishes. Do not remove until Owner acceptance following move-in.
- D. Do not permit traffic near unprotected finish surface(s).

END OF SECTION

SECTION 33-4000 - SITE DRAINAGE

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Furnish all labor, materials, and equipment and perform all operations required to complete the site drainage as indicated on the drawings and specified herein.
- B. Related work specified elsewhere:
 - 1. Section 31-2000 - Rough Grading.
 - 2. Section 31-3000 - Trenching.
 - 3. Section 31-5000 - Excavating.
 - 4. Section 31-5000 - Backfilling.

1.2 REFERENCE STANDARDS

- A. All work shall comply with the applicable section of the State of California Department of Transportation's "Standard Specifications", most recent edition, insofar as the same may apply.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Storm drain piping larger than 12" nominal diameter shall be either reinforced concrete pipe or corrugated Polyethylene Pipe with a smooth wall interior as specified below. Storm drain pipe with a 12" nominal diameter, or smaller, shall be either corrugated Polyethylene Pipe or Polyvinyl Chloride Pipe (PVC) as specified below.

2.2 REINFORCED CONCRETE PIPE

- A. Reinforced concrete pipe shall be Class III, and shall conform to ASTM C76-67.

2.3 CORRUGATED POLYETHYLENE PIPE (LARGER THAN 12" NOMINAL DIAMETER)

- A. Corrugated polyethylene pipe shall have a smooth wall interior and shall conform to AASHTO M294 Type S. Acceptable products are Hancor Hi-Q, Advanced Drainage System N-12 or approved equivalent.

2.4 POLYVINYL CHLORIDE PIPE (PVC) (INCLUDING 12" NOMINAL DIAMETER)

- A. PVC pipe shall conform to the provisions of ANSI/ASTM Specification D3034, SDR35. All pipe lengths shall be 12.5 feet minimum, and shall be fabricated with integral bells. Rubber gaskets shall be the manufacturer's standard for a push-fit system.

2.5 CORRUGATED POLYETHYLENE PIPE (12" NOMINAL DIAMETER AND SMALLER)

- A. Corrugated Polyethylene Pipe shall conform to AASHTO M252 for diameters smaller than 12".

2.6 STRUCTURES

- A. Drop inlets shall be constructed at the locations shown on the plans and in accordance with these Specifications. Drop inlets shall be manufactured by Santa Rosa Cast Products, as indicated on the Drawings, with standard or heavy-duty frames and grates as noted or required, or approved equivalent.
- B. Curb inlets shall be constructed at the locations shown on the plans and in accordance with these Specifications. Curb inlets shall be Santa Rosa Cast Products, as indicated on the Drawings, or approved equivalent.
- C. Area drains shall be with Model VI Drain Box with cast iron grate by Christy Concrete Products, Inc., or approved equivalent. Phone No. 1-800-486-7070 (Fremont).

2.7 BEDDING AND BACKFILL MATERIALS

- A. Backfill material shall conform to the specifications on the Drawings.

PART 3 - EXECUTION

3.1 TRENCHING AND BACKFILL

- A. Trenching and backfill shall be as specified in Section 31-3000 and Section 31-5500 and as specified on the Drawings.

3.2 LAYING PIPE

- A. No pipe shall be laid which is cracked, checked, spalled, or damaged.
- B. All pipe shall be laid true to line and grade with uniform slope as indicated on the Drawings.

END OF SECTION

SECTION 33-4500 SANITARY SEWER SYSTEM

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work included: Provide sanitary sewerage system as shown on the Drawings, specified herein, and needed for a complete and proper installation.
- B. Related Work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.

1.2 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.3 SUBMITTALS

- A. Comply with pertinent provisions of Section 01-3300.
- B. Product data: Within 35 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:
 - 1. Materials list of items proposed to be provided under this Section.
 - 2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
 - 3. Manufacturer's recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.

1.4 PRODUCT HANDLING

- A. Comply with pertinent provisions of Section 01-6000.

PART 2 - PRODUCTS

2.1 PIPE AND FITTINGS

- A. Cast iron soil pipe and fittings (CIP):
 - 1. Comply with ASTM A74, Class SV.
 - 2. Use rubber gaskets complying with ASTM C564 for compression joints.
- B. Polyvinyl chloride pipe and fittings (PVC):

1. Use extra strength, minimum of SDR 35.
 2. Comply with ASTM D 3034.
- C. Acrylonitrile butadiene styrene pipe and fittings (ABS):
1. Comply with ASTM D2680

2.2 MAN-HOLES

- A. Precast:
1. Provide reinforced precast concrete manhole sections complying with ASTM C478, except use portland cement as specified below.
 2. Provide joint of approved mastic or rubber gasket, or an approved combination of those types.
 3. Provide precast units of concrete rings and eccentric cone section. No ladder rungs are permitted.
 4. Approved manufacturer
 - a. Santa Rosa Cost Products.
- B. Portland Cement:
1. For concrete in manholes, comply with ASTM C150, Type II.
 2. For concrete in cradle and encasement: Type optional with the Contractor.
- C. Concrete
1. Provide 2500 psi concrete in accordance with pertinent provisions of Section 03300 of these Specifications.
- D. Mortar
1. Comply with ASTM C270, Type M.

2.3 FRAMES AND COVERS

- A. Use cast iron frames and covers, with the wording "SEWER" cast into the covers in letters 2" and plainly visible, as manufactured by Alhambra Foundry, or approved equivalent.

2.4 CLEANOUTS

- A. Provide cleanouts as required and where shown on the Drawings.
1. Provide traffic weight covers and frames where clean outs are within pavement, with the letters "SSCO" cast into the cover.

2. Acceptable products:

- a. Alhambra Foundry, Model A-21 00, 10" round cover, unless otherwise shown on the Drawings.

B. Where cleanout is within a graded area, construct as shown on the Drawings.

2.5 OTHER MATERIALS

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

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 FIELD MEASUREMENTS

- A. . Make necessary measurements in the field to assure precise fit of items in accordance with the approved design.

3.3 INSTALLATION

- A. Trench, backfill, and compact for the work of this Section in strict accordance with pertinent provisions of Section 02223 and Section 02225 of these Specifications.

B. Locations

1. Where the sewer location is not located clearly by dimensions on the Drawings, locate the sewer:
- a. Not closer than ten feet from a water supply main or service line.
- b. Where the bottom of the water pipe will be at least 12" above the top of the sewer pipe, the horizontal spacing may be a minimum of eight feet.
- c. Where the gravity flow sewers cross above water lines, fully encase the sewer pipe for a distance of ten feet on each side of the crossing; or
- d. Use acceptable pressure pipe with no joint closer horizontally than ten feet from the crossing.

- e. Where concrete encasement is used, provide not less than 4" thickness including that on pipe joints.

C. Pipe Laying

1. Protect pipe during handling against shocks and free fall. Remove extraneous material from the pipe interior.
2. Lay pipe by proceeding upgrade with the spigot ends of bell-and-spigot pipe pointing in direction of flow.
3. Lay each pipe accurately to the indicated line and grade, aligning so the sewer has a uniform invert.
4. Continually clear interior of the pipe free from foreign material.
5. Before making pipe joints, clean and dry all surfaces of the pipe to be joined.
6. Use lubricants, primers, and adhesives recommended for the purpose by the pipe manufacturer.
7. Place, fit, join, and adjust the joints to obtain the degree of water tightness required.

3.4 WYE BRANCHES

- A. Provide wye branches where sewer connections are indicated or required.
 1. Where joining an existing line, join by placing a saddle over the line, and make connection in manner approved by the Ukiah Valley Sanitation District (UVSD).

3.5 MANHOLE OVER EXISTING PIPE

- A. Construct new manhole as specified, breaking upper half of existing pipe after base of manhole is completed so as not to obstruct flow of the existing pipe.

3.6 BUILDING CONNECTIONS

- A. Terminate building connections where shown on the Drawings or five feet from the Building Line.
- B. Provide temporary closures at terminals where the building pipe is not installed.
 1. Place marker post at grade end of plugged line.
 2. Where building piping has been installed, make connection to the building piping system.

3.7 TESTING AND INSPECTING

- A. Do not allow or cause any of the work of this Section to be covered up or enclosed until after it has been inspected and tested, and has been approved by the Architect.
- B. Leakage Tests:
 - 1. Unless otherwise required by UVSD, test all underground sewer pipe with air pressure testing method specified in the UPC. Isolate segments of pipe for testing with plugs or other air tight devices.
 - 2. Provide and use measuring devices approved by the Architect.
 - 3. Provide water, materials, and labor for making required tests.
 - 4. Make tests in the presence of the Architect, giving the Architect at least three days advance notice of being ready for test observation.
- C. Submit test data to the Architect for review and approval.

END OF SECTION

SECTION 33-5000 - SITE WATER LINES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Pipe and fittings for site water line including raw water line, domestic and fire suppression water distribution lines.
- B. Valves

1.2 RELATED SECTIONS

- A. Section 31-2000 - Rough Grading.
- B. Section 31-5000 - Excavating.
- C. Section 31-5500 - Backfilling.
- D. Section 31-3000 - Trenching.
- E. Section 33-6000 - Disinfection of Water Distribution Systems: Disinfection of site utility water piping.
- F. Section 03-3300 - Cast-in-Place Concrete (for thrust restraints).
- G. Section 22-1100 - Plumbing Piping.

1.3 REFERENCES

- A. ASTM 01557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb Rammer and 18 inch Drop.
- B. ASTM 02241 - Poly (VinylChloride) (PVC) Plastic Pipe(SDR-PR).
- C. ASTM 02466 - Poly (VinylChloride) (PVC) Plastic Pipe Fittings, Sch 40.
- D. ASTM 02855 - Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.
- E. ASTM 02922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
- F. ASTM 03139 - Joints for Plastic Pressure Pipes using Flexible Elastomeric Seals.
- G. AWWA C104 - Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
- H. AWWA C111- Rubber-Gasket Joints for Ductile Iron and Grey-Iron Pressure Pipe and Fittings.
- I. AWWA C151 - Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids.

- J. AWWA C500 - Gate Valves, 3 through 48 in NPS, for Water Systems.
- K. AWWA C508 - Swing-Check Valves for Waterworks Service, 2 in through 24 in NPS.
- L. AWWA C509 - Resilient Seated Gate Valves 3 in through 12 in NPS, for Water and Sewage Systems.
- M. AWWA C600 - Installation of Ductile-Iron Water Mains and Appurtenances.
- N. AWWA C606 - Grooved and Shouldered Type Joints.
- O. AWWA C900 - Standard for Polyvinyl Chloride (PVC) Pressure Pipe, 4 inch through 12 inch, for Water.

1.4 SUBMITTALS

- A. See section 01-3300 - Submittals and Substitutions Procedures for submittals.
- B. Product Data: Provide data on pipe materials, pipe fittings, valves and accessories.
- C. Section 01-3100 - Project Record Documents: Procedures for submittals.
- D. Record actual locations of piping mains, valves, connections, thrust restraints, and invert elevations.
- E. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with local Water District standards.
- B. The Work of this Section shall conform to the AWWA Specifications, ASTM Specifications, ANSI Specifications and Title 22 of the California Administrative Code.
- C. The California State Department of Health Services (DHS) and local water district have overview inspection and notification requirements.
- D. Definitions related to these requirements are as follows:
 - 1. "ASTM" shall mean American Society for Testing and Materials, latest edition of the Specifications.
 - 2. "AWWA" shall mean American Water Works Association, latest edition of the Specifications.
 - 3. "ANSI" shall mean American National Standard Institute, latest edition of the Specifications.
- E. Valves: Manufacturer's name and pressure rating marked on valve body.

- F. Piping: Manufacturer's name and type/class of pipe marked on piping.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle products to site under provisions of Section 01-6000 - Product Handling.
- B. Deliver and store valves in shipping containers with labeling in place.

PART 2 - PRODUCTS

2.1 WATER PIPE

- A. Ductile Iron Pipe: AWWA C151
 - 1. Fittings: Ductile iron, standard thickness: AWWA C110.
 - 2. Joints: AWWA C111, rubber gasket.
- B. Water Service Pipe:
 - 1. All polyethylene water service tubing shall conform with the latest AWWA standards as described in AWWA C901 of the latest revision, and with ASTM D 2239 and shall be SDR-7, NSF approved, for 1" in service lines, SDR-9 for 1-1/4" to 2" service lines.
 - 2. Above ground: Schedule 80 polyvinylchloride (PVC) with glued joints for sizes 2" and smaller, except at backflow preventer, utilize Schedule 40 2" galvanized iron pipe.
- C. PVC Pipe: AWWA C900 Class 150: 4 inch to 12 inch
 - 1. Fittings: AWWA C110, cast iron, 250 psi rating.
 - 2. Joints: ASTM D 3139 compression gasket ring.
 - 3. Tracer Wire: Where new water piping is installed in the ground, provide #10 insulated THNN tracer wire continuous throughout the length of the pipe. Lay wire directly on and along the centerline of the top of the pipe. Fix wire in proper location by taping to pipe or other approved means. Work carefully so as not to break, stress or dislocate by backfilling operations. All splices in the tracer wire shall be made watertight with a product such as Aqua-Seal tape.

2.2 BALL VALVES - 3 INCH OR SMALLER

- A. Manufacturers:
 - 1. Watts Industries, Inc, West Products Division.
 - 2. Approved equivalent.
 - 3. Substitutions: Refer to Section 01-6100.

- B. Watts B-6080, bronze body, full port, two piece lever handle, 400 lb. WOG.

2.3 GATE VALVES - 4 INCHES AND OVER

- A. Manufacturers:

- 1. Waterous Series 2500 Resilient Wedge (NRS), 200 psi rating.
- 2. Approved equivalent.
- 3. Substitutions: Refer to Section 01-6100.

- B. AWWA C509, Iron body, bronze trim, non-rising stem with square nut, single wedge, resilient seat.

2.4 CHECK VALVES - FROM 4 INCHES TO 12 INCHES

- A. Check valves shall be "wafer style" unless specifically identified otherwise.

- B. Manufacturers:

- 1. Val-Matic, 1400 Series, wafer style, silent check valves, or
- 2. Approved equivalent.
- 3. Substitutions: Refer to Section 01340

- C. Cast iron body, bronze seat, plug and bushing, stainless steel spring and screws.

2.5 SWING CHECK VALVES - FROM 4 INCHES TO 12 INCHES

- A. Manufacturers:

- 1. Waterous Series 6000, 250 psi rating.
- 2. Approved equivalent.
- 3. Substitutions: Refer to Section 01340

- B. AWWA C508, iron body, bronze trim, 45 degree swing disc, renewable disc and seat, flanged.

2.6 VALVE BOXES

- A. The valve boxes shall be constructed of reinforced concrete with recessed traffic lids designed to take H-20 loadings.

- B. Valve boxes shall be Christy Concrete Products, G-5 series, or equivalent.

2.7 BOLTS, NUTS AND GASKETS

- A. Unless otherwise shown on the Plans, bolts shall be standard, hexagon head, machine bolts with cold pressed nuts and locking washers or cut washers conforming to ASTM Specification A307.

2.8 BEDDING AND COVER MATERIALS

- A. Bedding: Sand Bedding as specified in Section 31-5500 - Backfilling.
- B. Cover: Structure Backfill, as specified in Section 31-5500 - Backfilling.

2.9 ACCESSORIES

- A. Concrete for Thrust Restraints: Concrete type specified in Section 03-3300 - Cast-in-Place Concrete.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions under provisions of Section 02-4119 - Selective Demolition.
- B. Verify that building service connection and municipal utility water main size, location, and invert are as indicated.

3.2 PREPARATION

- A. Cut pipe ends square, ream pipe and tube ends to full pipe diameter, remove burrs.
- B. Remove scale and dirt on inside and outside before assembly.
- C. Prepare pipe connections to equipment with flanges or unions.
- D. Swab all pipe to insure cleanliness.
- E. Place temporary plugs of foam rubber in ends to have positive prevention of dirt entry.

3.3 BEDDING

- A. Excavate pipe trench in accordance with Section 31-3000 - Trenching, for work of this Section. Hand trim excavation for accurate placement of pipe to elevations indicated.
- B. Form and place concrete for pipe thrust restraints at any change of pipe direction. Place concrete to permit full access to pipe and pipe accessories. Provide thrust restraint bearing on subsoil as shown on the detail sheet of the Drawings.
- C. Place bedding material at trench bottom, level fill materials in one continuous layer not exceeding 4 inches compacted depth; compact to 90 percent.

- D. Backfill around sides and to top of pipe with cover fill, tamp in place and compact to 90 percent.
- E. Maintain optimum moisture content of bedding material to attain required compaction density.

3.4 INSTALLATION - PIPE

- A. Group piping with other site piping work whenever practical.
- B. Install pipe to indicated elevation to within tolerance of 5/8 inches.
- C. Install ductile iron piping and fittings to AWWA C600.
- D. Where applicable, install grooved and shouldered pipe joints to AWWA C606.
- E. Route pipe in straight line.
- F. Install pipe to allow for expansion and contraction without stressing pipe or joints.
- G. Install access fittings to permit disinfection of water system performed under Section 33-6000 - Disinfection of Water Distribution System.
- H. Slope water pipe and position drains at low points.
- I. Form and place concrete for thrust restraints at each elbow or change of direction of pipe main.
- J. Establish elevations of buried piping to ensure not less than 1.5 ft of cover.
- K. Install tracer wire continuous over top of pipe.
- L. Remove foam plugs as work progresses.
- M. Backfill trench in accordance with Section 31-5500- Backfilling and Section 31-3000 -Trenching.

3.5 VALVE APPLICATION

- A. Where specific valve types not indicated on drawings the following applies.
 - 1. Shutoff Duty: Use bronze ball for piping NPS 3 and smaller. Use cast-iron butterfly or gate valves with flanged ends for piping NPS 4 and larger.
 - 2. Throttling Duty: Use bronze ball or globe valves for piping NPS 2 and smaller. Use cast-iron butterfly valves with flanged ends for piping NPS 2-1/2 and larger.
 - 3. Hot-Water-Piping, Balancing Duty: Memory-stop balancing valves.
 - 4. Drain Duty: Hose-end drain valves.

5. Install stop-and-waste drain valves where indicated.

3.6 INSTALLATION - VALVES

- A. Set valves on solid bearing.
- B. Center and plumb valve box over valve. Set box cover flush with finished grade.
- C. Install shutoff valve with unions close to water main on each branch and riser serving plumbing fixtures or equipment, on each water supply to equipment, and on each water supply to plumbing fixtures that do not have supply stops. Use ball or gate valves for piping NPS 3 and smaller. Use butterfly or gate valves for piping NPS 4 and larger.
- D. Install drain valves for equipment at base of each water riser, at low points in horizontal piping, and where required to drain water piping.
 1. Install hose-end drain valves at low points in water mains, risers, and branches.

3.7 CONNECTIONS TO EXISTING MAINS

- A. General:
 1. Provide miscellaneous fittings and specials to accomplish the Work.
 2. Provide Shop Plans and a work schedule to Engineer prior to connection of new lines for review and comment.
 3. Make repair and replacement without additional cost to the Owner.
 4. When making connections to existing piping, make extra efforts to prevent inside of pipe from becoming contaminated. This includes, but is not limited to, capping each segment until it is ready to be assembled.

3.8 FLEXIBLE COUPLINGS AND ADAPTORS

- A. Provide flexible couplings at locations shown on the Plans or as required in the field for transition joints between types of pipe or sizes of pipe that are not compatible otherwise.

3.9 TESTING AND INSPECTION

- A. Closing uninspected Work: Do not allow or cause any of the Work of this Section to be covered up or enclosed until after it has been completely inspected by the Engineer.
 1. Hydrostatic Tests:
 - a. Where any section of a water line is provided with concrete thrust blocking for fittings, do not make hydrostatic tests until at least seven days after installation of the concrete thrust blocking, unless otherwise directed by the Engineer.

- b. Devise a method for disposal of waste water from hydrostatic test, and for disinfection, as approved in advance by the Engineer.

2. Pressure Tests:

- a. After the pipe is laid, the joints completed, and the trench backfilled, subject the newly laid piping and valved sections of water distribution main piping to a hydrostatic pressure of 150 psi. Duration of test will be 2 hours. The hydrostatic test pressure shall be maintained for the duration of the test period by pumping additional water into the pipe at intervals when the test pressure drops more than 5 psi. The hydrostatic test is basically a constant pressure test, irrespective of the amount of water necessary to maintain the test pressure.
- b. Open and close any valves between the closure valves several times during the test.
- c. Carefully examine exposed pipe, joints, fittings and valves.
- d. Replace or remake joints showing visible leakage.
 - 1) Remove cracked pipe, defective pipe and cracked or defective joints, fittings and valves. Replace with sound material and repeat the test until results are satisfactory.
 - 2) Make repair and placement without additional cost to the Owner.

3. Leakage Test:

- a. Conduct leakage test concurrently with the pressure test.
- b. Duration of each leakage test: At least two hours.
- c. During the test, subject water lines to a pressure of 150 psi.
- d. Leakage is defined as the quantity of water to be supplied into the newly laid pipe, or any valved or approved section thereof, necessary to maintain the specified leakage test pressure after the pipe has been filled with water and the air expelled.
 - 1) No piping installation will be accepted until the leakage is less than the number of gallons per hour as determined by the formula: $L = ND \sqrt{P/7,400}$

Where:

L = allowable leakage in gallons per hour;
N = number of joints in length of pipe tested;
D = nominal diameter of pipe in inches; and
P = average test pressure in lb. Per sq. inch.

- e. The allowable leakage in gallons per hour, per joint, at the specified average test pressure shall be in accordance with the formula noted above.

- f. Should any test of pipe disclose leakage greater than that specified, locate and repair the defective joint or joints until the leakage is within the specified allowance and at no additional cost to the Owner.
 - 4. Time for Making Test:
 - a. Except for joint material setting, or where concrete reaction backing necessitates a seven day delay, pipelines jointed with rubber gaskets, mechanical, push on joints or couplings may be subjected to hydrostatic pressure, inspected and tested for leakage at any time after completion of backfill.
 - b. Pipe shall be filled with water for 24 hours or as recommended by the manufacturer before being subject to
- 3.10 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM
- A. Flush and disinfect system in accordance with Section 33-6000.
- 3.11 SERVICE CONNECTIONS
- A. Provide water service to utility company requirements as shown on the detail sheet of the Drawings.
- 3.12 FIELD QUALITY CONTROL
- A. Section 01410 - Testing Services: Field inspection and testing.
 - B. Compaction testing will be performed in accordance with ASTM 01557 and ASTM D2922.
 - C. If tests indicate Work does not meet specified requirements, remove Work, replace, and retest.
 - a. Frequency of Tests: Upon completion of all piping, 4 inches or larger in diameter, except for tie-ins to municipal water.

END OF SECTION

SECTION 33-6000 DISINFECTION OF WATER DISTRIBUTION LINES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Disinfection of potable water piping and equipment.
- B. Testing and reporting results.

1.2 RELATED SECTIONS

- A. Section 33-5000 - Site Water Lines.

1.3 REFERENCES

- A. AWWA B300 - Standard for Hypochlorites.
- B. AWWA B301 - Standard for Liquid Chlorine.
- C. AWWA C651 - Standards for Disinfecting Water Mains.

1.4 COORDINATION

- A. Testing laboratory personnel will collect bacteriological and chlorine residual samples for testing.
- B. Coordinate disinfection and pressure testing with Architect.

1.5 PROJECT RECORD DOCUMENTS

- A. Provide the following information for testing laboratory personnel if requested:
- B. Disinfection test information:
 - 1. Type and form of disinfectant used.
 - 2. Date and time of disinfectant injection start and time of completion.
 - 3. Test locations.
 - 4. Date and time of flushing start and completion.
- C. Architect will provide Contractor with copies of certification that water conforms, or fails to conform, to bacterial standards of State Health Department, Office of Drinking Water requirements.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with AWWA C651.
- B. Testing Firm: Architect will procure the services of a company specializing in testing potable water systems, certified by the State of California.

1.7 REGULATORY REQUIREMENTS

- A. Conform to State Health Department regulations for performing the work of this Section.

PART 2 - PRODUCTS

2.1 DISINFECTION CHEMICALS

- A. Chemicals: AWWA 8300, Hypochlorite; AWWA 8301, Liquid Chlorine.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that piping system has been cleaned, inspected , and pressure tested.
- B. Perform scheduling and disinfecting activity with start-up, testing, adjusting and balancing, demonstration procedures, including coordination with related systems.

3.2 EXECUTION

- A. Provide and attach required equipment to perform the work of this
- B. Section.
- C. Inject treatment disinfectant into piping system.
- D. Maintain disinfectant in system for 24 hours.
- E. Flush, circulate, and clean until required cleanliness is achieved; use municipal water.
- F. Replace permanent system devices removed for disinfection.

3.3 FIELD QUALITY CONTROL

- A. Section 01400 - Quality Assurance: Field inspection and testing.
- B. Architect will test samples in accordance with AWWA C651.

END OF SECTION