COMPLETE BIDDING & CONTRACTING MANUAL

NEW RESIDENCE
OTTO HODGE
1080 PATRICK J. MURPHY MEMORIAL DRIVE

KLAMATH, DEL NORTE COUNTY, CALIFORNIA

MARCH 2020
YUROK INDIAN HOUSING AUTHORITY
OTTO HODGE RESIDENCE
1080 PATRICK J. MURPHY MEMORIAL DRIVE
BIDDING AND CONTRACTING MANUAL

RECOMMENDED BY:

Nicole Sager, YIHA Executive Director
Date

Joshua T. McKnight, P.E.
Date
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The Yurok Indian Housing Authority (YIHA) will be accepting bids from responsive, responsible, qualified, and licensed Contractors for the 1080 Patrick J. Murphy Memorial Drive Single Family Home Project in Klamath California.

**BIDDING AND CONTRACTING MANUALS**
Complete Bidding & Contracting Manuals as well as plan-sets are available in electronic (PDF) format. Bid packets can be viewed at the Humboldt and California Builders’ Exchanges. Prints of the manual and plans can be viewed at the YIHA office in Klamath and can be obtained from TVCE at the cost of production.

**PREBID CONFERENCE**
A Non-Mandatory Pre-bid Conference and site visit will be held starting at the YIHA Office located at 15540 US HWY 101 N, Klamath, CA 95548 on Tuesday, April 7, 2020 at 10:00 AM PST.

**BID DEADLINE**
Bids will be accepted until Friday, April 24, 2020 at 4:00 PM PST at which time they will be publicly opened and read aloud. Bids received after this time will NOT be accepted or considered.

**CONSTRUCTION TIMEFRAME**
The allocated timeframe for completion of work is one-hundred eighty (180) calendar days starting on the date to be designated under the official Notice to Proceed.

**PREVAILING WAGE**
Application of current Davis Bacon Wage Scales, Federal Executive Order 11246 (Equal Employment Opportunity), Indian Preference-Section 7(b) of the Indian Self-Determination and Education Assistance Act (25 USC 450e (b), and the Yurok TERO Ordinance will be enforced.

**CONTRACTOR LICENSING REQUIREMENT**
All Contractors bidding this Project must have a Class B License.

**RESERVE**
YIHA reserves the right to reject any and all bids and to waive any informalities or irregularities in the bid proposal process. Further, that right is reserved to select Project Bids separately.

For more information regarding this request for bids please contact:

Yurok Indian Housing Authority
Attn: Will Bommelyn
15540 US Highway 101 North
Klamath, CA 95548
P: (707) 482-1506
wbommelyn@yurokhousing.com

Trinity Valley Consulting Engineers
Attn: Frank Masten
67 Walnut Way
Willow Creek, CA 95573
P: (530) 629-3000
frank@tvce.biz
Instructions to Bidders for Contracts
Public and Indian Housing Programs
1. Bid Preparation and Submission

(a) Bidders are expected to examine the specifications, drawings, all instructions, and, if applicable, the construction site (see also the contract clause entitled Site Investigation and Conditions Affecting the Work of the General Conditions of the Contract for Construction). Failure to do so will be at the bidders’ risk.

(b) All bids must be submitted on the forms provided by the Public Housing Agency/Indian Housing Authority (PHA/IHA). Bidders shall furnish all the information required by the solicitation. Bids must be signed and the bidder’s name typed or printed on the bid sheet and each continuation sheet which requires the entry of information by the bidder. Erasures or other changes must be initialed by the person signing the bid. Bids signed by an agent shall be accompanied by evidence of that agent’s authority. (Bidders should retain a copy of their bid for their records.)

(c) Bidders must submit as part of their bid a completed form HUD-5369-A, “Representations, Certifications, and Other Statements of Bidders.”

(d) All bid documents shall be sealed in an envelope which shall be clearly marked with the words “Bid Documents,” the Invitation for Bids (IFB) number, any project or other identifying number, the bidder’s name, and the date and time for receipt of bids.

(e) If this solicitation requires bidding on all items, failure to do so will disqualify the bid. If bidding on all items is not required, bidders should insert the words “No Bid” in the space provided for any item on which no price is submitted.

(f) Unless expressly authorized elsewhere in this solicitation, alternate bids will not be considered.

(g) Unless expressly authorized elsewhere in this solicitation, bids submitted by telegraph or facsimile (fax) machines will not be considered.

(h) If the proposed contract is for a Mutual Help project (as described in 24 CFR Part 905, Subpart E) that involves Mutual Help contributions of work, material, or equipment, supplemental information regarding the bid advertisement is provided as an attachment to this solicitation.

2. Explanations and Interpretations to Prospective Bidders

(a) Any prospective bidder desiring an explanation or interpretation of the solicitation, specifications, drawings, etc., must request it at least 7 days before the scheduled time for bid opening. Requests may be oral or written. Oral requests must be confirmed in writing. The only oral clarifications that will be provided will be those clearly related to solicitation procedures, i.e., not substantive technical information. No other oral explanation or interpretation will be provided. Any information given a prospective bidder concerning this solicitation will be furnished promptly to all other prospective bidders as a written amendment to the solicitation, if that information is necessary in submitting bids, or if the lack of it would be prejudicial to other prospective bidders.

(b) Any information obtained by, or provided to, a bidder other than by formal amendment to the solicitation shall not constitute a change to the solicitation.

3. Amendments to Invitations for Bids

(a) If this solicitation is amended, then all terms and conditions which are not modified remain unchanged.

(b) Bidders shall acknowledge receipt of any amendment to this solicitation (1) by signing and returning the amendment, (2) by identifying the amendment number and date on the bid form, or (3) by letter, telegram, or facsimile, if those methods are authorized in the solicitation. The PHA/IHA must receive acknowledgement by the time and at the place specified for receipt of bids. Bids which fail to acknowledge the bidder’s receipt of any amendment will result in the rejection of the bid if the amendment(s) contained information which substantively changed the PHA’s/IHA’s requirements.

(c) Amendments will be on file in the offices of the PHA/IHA and the Architect at least 7 days before bid opening.

4. Responsibility of Prospective Contractor

(a) The PHA/IHA will award contracts only to responsible prospective contractors who have the ability to perform successfully under the terms and conditions of the proposed contract. In determining the responsibility of a bidder, the PHA/IHA will consider such matters as the bidder’s:

   (1) Integrity;
   (2) Compliance with public policy;
   (3) Record of past performance; and
   (4) Financial and technical resources (including construction and technical equipment).

(b) Before a bid is considered for award, the bidder may be requested by the PHA/IHA to submit a statement or other documentation regarding any of the items in paragraph (a) above. Failure by the bidder to provide such additional information shall render the bidder nonresponsible and ineligible for award.
5. Late Submissions, Modifications, and Withdrawal of Bids

(a) Any bid received at the place designated in the solicitation after the exact time specified for receipt will not be considered unless it is received before award is made and it:

(1) Was sent by registered or certified mail not later than the fifth calendar day before the date specified for receipt of offers (e.g., an offer submitted in response to a solicitation requiring receipt of offers by the 20th of the month must have been mailed by the 15th);

(2) Was sent by mail, or if authorized by the solicitation, was sent by telegram or via facsimile, and it is determined by the PHA/IHA that the late receipt was due solely to mishandling by the PHA/IHA after receipt at the PHA/IHA; or

(3) Was sent by U.S. Postal Service Express Mail Next Day Service - Post Office to Addressee, not later than 5:00 p.m. at the place of mailing two working days prior to the date specified for receipt of proposals. The term “working days” excludes weekends and observed holidays.

(b) Any modification or withdrawal of a bid is subject to the same conditions as in paragraph (a) of this provision.

(c) The only acceptable evidence to establish the date of mailing of a late bid, modification, or withdrawal sent either by registered or certified mail is the U.S. or Canadian Postal Service postmark both on the envelope or wrapper and on the original receipt from the U.S. or Canadian Postal Service. Both postmarks must show a legible date or the bid, modification, or withdrawal shall be processed as if mailed late. “Postmark” means a printed, stamped, or otherwise placed impression (exclusive of a postage meter machine impression) that is readily identifiable without further action as having been supplied and affixed by employees of the U.S. or Canadian Postal Service on the date of mailing. Therefore, bidders should request the postal clerk to place a hand cancellation bull’s-eye postmark on both the receipt and the envelope or wrapper.

(d) The only acceptable evidence to establish the time of receipt at the PHA/IHA is the time/date stamp of PHA/IHA on the proposal wrapper or other documentary evidence of receipt maintained by the PHA/IHA.

(e) The only acceptable evidence to establish the date of mailing of a late bid, modification, or withdrawal sent by Express Mail Next Day Service-Post Office to Addressee is the date entered by the post office receiving clerk on the “Express Mail Next Day Service-Post Office to Addressee” label and the postmark on both the envelope or wrapper and on the original receipt from the U.S. Postal Service. “Postmark” has the same meaning as defined in paragraph (c) of this provision, excluding postmarks of the Canadian Postal Service. Therefore, bidders should request the postal clerk to place a legible hand cancellation bull’s eye postmark on both the receipt and Failure by a bidder to acknowledge receipt of the envelope or wrapper.

(f) Notwithstanding paragraph (a) of this provision, a late modification of an otherwise successful bid that makes its terms more favorable to the PHA/IHA will be considered at any time it is received and may be accepted.

(g) Bids may be withdrawn by written notice, or if authorized by this solicitation, by telegram (including mailgram) or facsimile machine transmission received at any time before the exact time set for opening of bids; provided that written confirmation of telegraphic or facsimile withdrawals over the signature of the bidder is mailed and postmarked prior to the specified bid opening time. A bid may be withdrawn in person by a bidder or its authorized representative if, before the exact time set for opening of bids, the identity of the person requesting withdrawal is established and the person signs a receipt for the bid.

6. Bid Opening

All bids received by the date and time of receipt specified in the solicitation will be publicly opened and read. The time and place of opening will be as specified in the solicitation. Bidders and other interested persons may be present.

7. Service of Protest

(a) Definitions. As used in this provision:

“Interested party” means an actual or prospective bidder whose direct economic interest would be affected by the award of the contract.

“Protest” means a written objection by an interested party to this solicitation or to a proposed or actual award of a contract pursuant to this solicitation.

(b) Protests shall be served on the Contracting Officer by obtaining written and dated acknowledgement from —

YUROK INDIAN HOUSING AUTHORITY
ATTN: WILL BOMMELYN
15540 US HIGHWAY 101 NORTH
KLAMATH, CA 95548

[Contracting Officer designate the official or location where a protest may be served on the Contracting Officer]

(c) All protests shall be resolved in accordance with the PHA’s/IHA’s protest policy and procedures, copies of which are maintained at the PHA/IHA.

8. Contract Award

(a) The PHA/IHA will evaluate bids in response to this solicitation without discussions and will award a contract to the responsible bidder whose bid, conforming to the solicitation, will be most advantageous to the PHA/IHA considering only price and any price-related factors specified in the solicitation.

(b) If the apparent low bid received in response to this solicitation exceeds the PHA’s/IHA’s available funding for the proposed contract work, the PHA/IHA may either accept separately priced items (see 8(e) below) or use the following procedure to determine contract award. The PHA/IHA shall apply in turn to each bid (proceeding in order from the apparent low bid to the high bid) each of the separately priced bid deductible items, if any, in their priority order set forth in this solicitation. If upon the application of the first deductible item to all initial bids, a new low bid is within the PHA’s/IHA’s available funding, then award shall be made to that bidder. If no bid is within the available funding amount, then the PHA/IHA shall apply the second deductible item. The PHA/IHA shall continue this process until an evaluated low bid, if any, is within the PHA’s/IHA’s available funding. If upon the application of all deductible items, no bid is within the PHA’s/IHA’s available funding, or if the solicitation does not request separately priced deductibles, the PHA/IHA shall follow its written policy and procedures in making any award under this solicitation.

(c) In the case of tie low bids, award shall be made in accordance with the PHA’s/IHA’s written policy and procedures.

(d) The PHA/IHA may reject any and all bids, accept other than the lowest bid (e.g., the apparent low bid is unreasonably low), and waive informalities or minor irregularities in bids received, in accordance with the PHA’s/IHA’s written policy and procedures.
(e) Unless precluded elsewhere in the solicitation, the PHA/IHA may accept any item or combination of items bid.

(f) The PHA/IHA may reject any bid as nonresponsive if it is materially unbalanced as to the prices for the various items of work to be performed. A bid is materially unbalanced when it is based on prices significantly less than cost for some work and prices which are significantly overstated for other work.

(g) A written award shall be furnished to the successful bidder within the period for acceptance specified in the bid and shall result in a binding contract without further action by either party.

9. Bid Guarantee (applicable to construction and equipment contracts exceeding $25,000)

All bids must be accompanied by a negotiable bid guarantee which shall not be less than five percent (5%) of the amount of the bid. The bid guarantee may be a certified check, bank draft, U.S. Government Bonds at par value, or a bid bond secured by a surety company acceptable to the U.S. Government and authorized to do business in the state where the work is to be performed. In the case where the work under the contract will be performed on an Indian reservation area, the bid guarantee may also be an irrevocable Letter of Credit (see provision 10, Assurance of Completion, below). Certified checks and bank drafts must be made payable to the order of the PHA/IHA. The bid guarantee shall insure the execution of the contract and the furnishing of a method of assurance of completion by the successful bidder as required by the solicitation. Failure to submit a bid guarantee with the bid shall result in the rejection of the bid. Bid guarantees submitted by unsuccessful bidders will be returned as soon as practicable after bid opening.

10. Assurance of Completion

(a) Unless otherwise provided in State law, the successful bidder shall furnish an assurance of completion prior to the execution of any contract under this solicitation. This assurance may be [Contracting Officer check applicable items] —

[X] (1) a performance and payment bond in a penal sum of 100 percent of the contract price; or, as may be required or permitted by State law;

[ ] (2) separate performance and payment bonds, each for 50 percent or more of the contract price;

[X] (3) a 20 percent cash escrow;

[ ] (4) a 25 percent irrevocable letter of credit; or,

[X] (5) an irrevocable letter of credit for 10 percent of the total contract price with a monitoring and disbursements agreement with the IHA (applicable only to contracts awarded by an IHA under the Indian Housing Program).

(b) Bonds must be obtained from guarantee or surety companies acceptable to the U.S. Government and authorized to do business in the state where the work is to be performed. Individual sureties will not be considered. U.S. Treasury Circular Number 570, published annually in the Federal Register, lists companies approved to act as sureties on bonds securing Government contracts, the maximum underwriting limits on each contract bonded, and the States in which the company is licensed to do business. Use of companies listed in this circular is mandatory. Copies of the circular may be downloaded on the U.S. Department of Treasury website http://www.fms.treas.gov/c570/index.html, or ordered for a minimum fee by contacting the Government Printing Office at (202) 512-2168.

(c) Each bond shall clearly state the rate of premium and the total amount of premium charged. The current power of attorney for the person who signs for the surety company must be attached to the bond. The effective date of the power of attorney shall not precede the date of the bond. The effective date of the bond shall be on or after the execution date of the contract.

(d) Failure by the successful bidder to obtain the required assurance of completion within the time specified, or within such extended period as the PHA/IHA may grant based upon reasons determined adequate by the PHA/IHA, shall render the bidder ineligible for award. The PHA/IHA may then either award the contract to the next lowest responsible bidder or solicit new bids. The PHA/IHA may retain the ineligible bidder’s bid guarantee.

11. Preconstruction Conference (applicable to construction contracts)

After award of a contract under this solicitation and prior to the start of work, the successful bidder will be required to attend a preconstruction conference with representatives of the PHA/IHA and its architect/engineer, and other interested parties convened by the PHA/IHA. The conference will serve to acquaint the participants with the general plan of the construction operation and all other requirements of the contract (e.g., Equal Employment Opportunity, Labor Standards). The PHA/IHA will provide the successful bidder with the date, time, and place of the conference.

12. Indian Preference Requirements (applicable only if this solicitation is for a contract to be performed on a project for an Indian Housing Authority)

(a) HUD has determined that the contract awarded under this solicitation is subject to the requirements of section 7(b) of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450e(b)). Section 7(b) requires that any contract or subcontract entered into for the benefit of Indians shall require that, to the greatest extent feasible...

(1) Preferences and opportunities for training and employment (other than core crew positions; see paragraph (h) below) in connection with the administration of such contracts or subcontracts be given to qualified “Indians.” The Act defines “Indians” to mean persons who are members of an Indian tribe and defines “Indian tribe” to mean any Indian tribe, band, nation, or other organized group or community, including any Alaska Native village or regional or village corporation as defined in or established pursuant to the Alaska Native Claims Settlement Act, which is recognized as eligible for the special programs and services provided by the United States to Indians because of their status as Indians; and,

(2) Preference in the award of contracts or subcontracts in connection with the administration of contracts be given to Indian organizations and to Indian-owned economic enterprises, as defined in section 3 of the Indian Financing Act of 1974 (25 U.S.C. 1452). That Act defines “economic enterprise” to mean any Indian-owned commercial, industrial, or business activity established or organized for the purpose of profit, except that the Indian ownership must constitute not less than 51 percent of the enterprise; “Indian organization” to mean the governing body of any Indian tribe or entity established or recognized by such governing body; “Indian” to mean any person who is a member of any tribe, band, group, pueblo, or community which is recognized by the Federal Government as eligible for services from the Bureau of Indian Affairs and any “Native” as defined in the Alaska Native Claims Settlement Act; and Indian “tribe” to mean any Indian tribe, band, group, pueblo, or community including Native villages and Native groups (including...
corporations organized by Kenai, Juneau, Sitka, and Kodiak) as defined in the Alaska Native Claims Settlement Act, which is recognized by the Federal Government as eligible for services from the Bureau of Indian Affairs.

(b) (1) The successful Contractor under this solicitation shall comply with the requirements of this provision in awarding all subcontracts under the contract and in providing training and employment opportunities.

(2) A finding by the IHA that the contractor, either (i) awarded a subcontract without using the procedure required by the IHA, (ii) falsely represented that subcontracts would be awarded to Indian enterprises or organizations; or, (iii) failed to comply with the contractor’s employment and training preference bid statement shall be grounds for termination of the contract or for the assessment of penalties or other remedies.

(c) If specified elsewhere in this solicitation, the IHA may restrict the solicitation to qualified Indian-owned enterprises and Indian organizations. If two or more (or a greater number as specified elsewhere in the solicitation) qualified Indian-owned enterprises or organizations submit responsive bids, award shall be made to the qualified enterprise or organization with the lowest responsive bid. If fewer than the minimum required number of qualified Indian-owned enterprises or organizations submit responsive bids, the IHA shall reject all bids and readvertise the solicitation in accordance with paragraph (d) below.

(d) If the IHA prefers not to restrict the solicitation as described in paragraph (c) above, or if after having restricted a solicitation an insufficient number of qualified Indian enterprises or organizations submit bids, the IHA may advertise for bids from non-Indian as well as Indian-owned enterprises and Indian organizations. Award shall be made to the qualified Indian enterprise or organization with the lowest responsive bid if that bid is -

(1) Within the maximum HUD-approved budget amount established for the specific project or activity for which bids are being solicited; and

(2) No more than the percentage specified in 24 CFR 905.175(c) higher than the total bid price of the lowest responsive bid from any qualified bidder. If no responsive bid by a qualified Indian-owned economic enterprise or organization is within the stated range of the total bid price of the lowest responsive bid from any qualified enterprise, award shall be made to the bidder with the lowest bid.

(e) Bidders seeking to qualify for preference in contracting or subcontracting shall submit proof of Indian ownership with their bids. Proof of Indian ownership shall include but not be limited to:

(1) Certification by a tribe or other evidence that the bidder is an Indian. The IHA shall accept the certification of a tribe that an individual is a member.

(2) Evidence such as stock ownership, structure, management, control, financing and salary or profit sharing arrangements of the enterprise.

(f) (1) All bidders must submit with their bids a statement describing how they will provide Indian preference in the award of subcontracts. The specific requirements of that statement and the factors to be considered by the IHA in determining the statement’s adequacy are included as an attachment to this solicitation. Any bid that fails to include the required statement shall be rejected as nonresponsive. The IHA may require that comparable statements be provided by subcontractors to the successful Contractor, and may require the Contractor to reject any bid or proposal by a subcontractor that fails to include the statement.

(2) Bidders and prospective subcontractors shall submit a certification (supported by credible evidence) to the IHA in any instance where the bidder or subcontractor believes it is feasible to provide Indian preference in subcontracting. The acceptance or rejection by the IHA of the certification shall be final. Rejection shall disqualify the bid from further consideration.

(g) All bidders must submit with their bids a statement detailing their employment and training opportunities and their plans to provide preference to Indians in implementing the contract; and the number or percentage of Indians anticipated to be employed and trained. Comparable statements from all proposed subcontractors must be submitted. The criteria to be used by the IHA in determining the statement(s)’s adequacy are included as an attachment to this solicitation. Any bid that fails to include the required statement(s), or that includes a statement that does not meet minimum standards required by the IHA shall be rejected as nonresponsive.

(h) Core crew employees. A core crew employee is an individual who is a bona fide employee of the contractor at the time the bid is submitted; or an individual who was not employed by the bidder at the time the bid was submitted, but who is regularly employed by the bidder in a supervisory or other key skilled position when work is available. Bidders shall submit with their bids a list of all core crew employees.

(i) Preference in contracting, subcontracting, employment, and training shall apply not only on-site, on the reservation, or within the IHA’s jurisdiction, but also to contracts with firms that operate outside these areas (e.g., employment in modular or manufactured housing construction facilities).

(j) Bidders should contact the IHA to determine if any additional local preference requirements are applicable to this solicitation.

(k) The IHA [X] does [ ] not [Contracting Officer check applicable box] maintain lists of Indian-owned economic enterprises and Indian organizations by specialty (e.g., plumbing, electrical, foundations), which are available to bidders to assist them in meeting their responsibility to provide preference in connection with the administration of contracts and subcontracts.
SECTION 004000
BID FORM

PROPOSAL OF

(hereinafter called "Bidder"), organized and existing under the laws of the State of California, doing business as

(a corporation, a partnership, an individual, etc.)

to the Yurok Indian Housing Authority (hereinafter called "Owner").

In compliance with the Advertisement for Bids, Bidder hereby proposes to perform all work for the completion of the project as described under Section 011000 and all other appurtenant items in strict accordance with the Contract Documents, within the time set forth therein, and at the prices stated in the Bid Schedule, also included herein.

By submission of this Bid, the Bidder certifies, and in the case of a joint Bid each party thereto certifies as to Bidder’s organization, that this BID has been arrived at independently, without consultation, communication, or agreement as to any matter relating to this Bid with any other Bidder or with any competitor.

Bidder hereby agrees to commence work under this contract on or before a date, to be specified in the Notice to Proceed, and to fully complete the project within the allocated timeframe. Bidder further agrees to pay as liquidated damages, the sum of $500.00 per calendar day for every day beyond the agreed upon date of completion as provided in the General Provisions (Time for Completion and Liquidated Damages section).

Bid Grand Total Amount: ____________________________________________________________

(Numeric Amount)

(Written Amount)

Bidder agrees to perform all the work described in the Contract Documents for the unit prices or lump sum stated in the Bid Schedule.
Bid Respectfully Submitted:


Date

Bidder

Address

License No.  Expiration Date

Print Name  Title

Signature

SEAL – (if BID is by a corporation)
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</tr>
<tr>
<td>072100-01</td>
<td>Insulation</td>
<td>LS</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>073113-01</td>
<td>Roof System</td>
<td>LS</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>074646-01</td>
<td>Siding, Soffit, &amp; Exterior Trim</td>
<td>LS</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>077123-01</td>
<td>Seamless Gutters &amp; Downspouts</td>
<td>LS</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>081100-01</td>
<td>Windows &amp; Doors</td>
<td>LS</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>092000-01</td>
<td>Sheetrock</td>
<td>LS</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>096000-01</td>
<td>Flooring</td>
<td>LS</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>099100-01</td>
<td>Paint, Stain, &amp; Seal</td>
<td>LS</td>
<td>1</td>
<td></td>
<td></td>
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<tr>
<td>103000-01</td>
<td>Wood Stove System</td>
<td>LS</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>123530-01</td>
<td>Casework</td>
<td>LS</td>
<td>1</td>
<td></td>
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</tr>
<tr>
<td>123600-01</td>
<td>Countertops</td>
<td>LS</td>
<td>1</td>
<td></td>
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<tr>
<td>200000-01</td>
<td>Propane Rough In</td>
<td>LS</td>
<td>1</td>
<td></td>
<td></td>
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<tr>
<td>200000-02</td>
<td>Propane Finish</td>
<td>LS</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>311000-01</td>
<td>Fire Suppression Rough In</td>
<td>LS</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>311000-02</td>
<td>Fire Suppression Finish</td>
<td>LS</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>220500-01</td>
<td>Plumbing Rough In</td>
<td>LS</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>220500-02</td>
<td>Plumbing Finish</td>
<td>LS</td>
<td>1</td>
<td></td>
<td></td>
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<tr>
<td>232000-01</td>
<td>HVAC Rough In</td>
<td>LS</td>
<td>1</td>
<td></td>
<td></td>
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<tr>
<td>232000-02</td>
<td>HVAC Finish</td>
<td>LS</td>
<td>1</td>
<td></td>
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<tr>
<td>260500-01</td>
<td>Electrical Rough In</td>
<td>LS</td>
<td>1</td>
<td></td>
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</tr>
<tr>
<td>Code</td>
<td>Description</td>
<td>Unit</td>
<td>Quantity</td>
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<tr>
<td>260500-02</td>
<td>Electrical Finish</td>
<td>LS</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>311100-01</td>
<td>Clearing &amp; Grubbing</td>
<td>LS</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>312200-01</td>
<td>Grading</td>
<td>LS</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>312300-01</td>
<td>Building Pad</td>
<td>LS</td>
<td>1</td>
<td></td>
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<tr>
<td>321600-01</td>
<td>PCC 5'x4&quot; (WxD) Sidewalk</td>
<td>LS</td>
<td>1</td>
<td></td>
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<tr>
<td>331100-01</td>
<td>Water Service</td>
<td>LS</td>
<td>1</td>
<td></td>
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<tr>
<td>333000-01</td>
<td>Sewer Service</td>
<td>LS</td>
<td>1</td>
<td></td>
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<tr>
<td>335200-01</td>
<td>Propane Service</td>
<td>LS</td>
<td>1</td>
<td></td>
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<tr>
<td>337000-01</td>
<td>Electric Service</td>
<td>LS</td>
<td>1</td>
<td></td>
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<tr>
<td>338000-01</td>
<td>Telecom Service</td>
<td>LS</td>
<td>1</td>
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</tbody>
</table>

**Bid Subtotal:**

**TERO Tax (5%):**

**Bid Grand Total:**

### BID ADD ALTERNATE

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Unit</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>113000-01</td>
<td>Appliances</td>
<td>LS</td>
<td>1</td>
</tr>
</tbody>
</table>

1. Please provide a price for procuring and installing appliances including: refrigerator, propane range, dish washer, clothes washer, and propane clothes dryer.
SECTION 004336
SUBCONTRACTOR SCHEDULE
(Submit with Bid)

Provided in strict accordance with the Miller Act, Prompt Payment Act, Small Business Act, and California Subletting and Subcontracting Fair Practices Act Public Code Sections 4100-4113.

The undersigned bidder certifies that he has used the bids of the subcontractors named in making up his bid and that the subcontractors listed will be used for the work on which they bid.

Please provide a list of all subcontractors used to create your bid. At a minimum, provide the following information for each subcontractor:

1. Bid item number(s) that the subcontractor will perform work for,
2. Subcontractors name (Company name or name for which the license is issued),
3. License designation and number,
4. Physical and mailing addresses,
5. Point of contact,
6. Phone number (fax and email optional),
7. Identification of if the subcontractor is "union",
8. Identification of if the subcontractor is "Indian Owned".

The foregoing is submitted by the bidder in accordance with the acts listed above, and the bidder, if awarded the contract, agrees to fully and promptly comply with such Acts including payment to subcontractors for "satisfactory" performance within seven calendar days of government payment receipt. Bidder certifies and warrants that all subcontractors listed above are, and when performing their subcontracts will be, dully licensed by the State of California to perform the work or services to be provided by the subcontractor.

Name of Bidder: __________________________________________________________

Name of Signer: __________________________________________________________

Title of Signer: __________________________________________________________

Authorized Signature: __________________________________________________

TVCE Subcontractor Schedule 004336-1
SECTION 004500
BIDDER QUALIFICATIONS

Name: ____________________________________________________________

D.B.A.: __________________________________________________________

SSN or EIN: ________________________ Telephone: ______________________

Street Address: __________________________________________________

Mailing Address: __________________________________________________

State License Number: ________________________ Type: _________________

DUNS: _____________________________________________________________

How long in business? ________________ How many employees? ___________

Are you an equal opportunity employer? Yes / No (Circle One)

Are you eligible to perform state or federal government work? Yes / No (Circle One)

Bank Reference: ___________________________________________________

___________________________________________________________________

___________________________________________________________________

Insurance Carrier: _________________________________________________

___________________________________________________________________

___________________________________________________________________

List three similar construction jobs by name and address completed within the last five (5) years. Provide Point of Contact Name and Number for each job:

___________________________________________________________________

___________________________________________________________________

___________________________________________________________________

TVCE  Contractor Questionnaire  004500-1
List Major Construction projects your organization has under contract on this date:

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Owner</th>
<th>Contract Amount</th>
<th>% Complete</th>
<th>Scheduled Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

List the construction experience of the principal individuals of your organization (include designated foreman for this job):

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Experience (years)</th>
</tr>
</thead>
<tbody>
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</table>

Conflict of Interest: Are you or any member of your family related to any employee of the Owner or member of the governing board of the Owner?

Yes / No (Circle One) If yes, please explain relationship:

________________________________________________________________________

Have you ever failed to complete any work awarded to you? Yes / No (Circle One) if yes, attached description of each occurrence.

Has any officer or partner of your organization ever been an officer or partner of another organization that failed to complete a construction contract? Yes / No (Circle One) if yes, attach a description of each occurrence.
Have you received any citation or been assessed penalties for safety violations from any governmental agency? Yes / No (Circle One) if yes, attach a description of each citation.

Have you been fined, penalized, or otherwise found to have violated any prevailing wage or labor code provision within the past five (5) years? Yes / No (Circle One) if yes, attach a description of each occurrence.

Have you had any claims, litigation, or disputes ending in mediation or arbitration, or termination of contract for cause associated with any project in the past five (5) years? Yes / No (Circle One) if yes, attach a description of each instance including details of the total claim amount, settlement amount, and the owner's point of contact name and phone number.

In the last five (5) years has your firm, or any firm with which any of your company's owners, officers, or partners were or are associated with, been debarred, disqualified, removed, or otherwise prevented from bidding on, or completing, any government agency or public works projects for any reason? Yes / No (Circle One) if yes, attach a description of each instance including details and owners' point of contact name and phone number.

In the last five (5) years has your firm been denied an award of a government agency or public works contract based on a finding that your company was not a responsible bidder? Yes / No (Circle One) if yes, attach a description of each instance including details and the owner's point of contact name and phone number.

At any time in the past five (5) years has your firm been assessed and paid liquidated damages after completion of a project, under a construction contract with either a public or private owner? Yes / No (Circle One) if yes, attach a description of each instance including details and the owner's name and phone number.

_________________________________________________________________________

Signature of License Holder

Date: ____________________________

_________________________________________________________________________

Signature of Company Representative (if different)

Date: ____________________________
The undersigned certifies under oath the truth and correctness of all answers to questions made hereinafter:

- Applicant wishes to qualify as an "Economic Enterprise" as defined in Section 3(e) of the Indian Financing Act of 1974 (P.L. 93-262); that is: "an Indian-Owned... commercial, industrial or business activity established or organized for the purpose of profit: Provided, that such Indian ownership shall constitute not less than fifty-one percent (51%) of the enterprise",

or

- A "Tribal Organization" as defined in Section 4(c) of the Indian Self-Determination and Education Assistance Act (P.L. 93-638); that is: "the recognized governing body of any Indian Tribe; any legally established organization of Indians which is controlled, sanctioned or chartered by such governing body or which is democratically elected by the adult members of the Indian community to be served by such organization and which includes the maximum participation of Indians in all phases of its activities: Provided, that in any case where a contract is let or grant made to an organization to perform services benefiting more than one Indian Tribe, the approval of each such Indian Tribe shall be a prerequisite to the letting or making of such contract or grant..."

1. Name of Enterprise or Organization: ________________________________
   Address: _______________________________________________________
   _______________________________________________________________
   _______________________________________________________________
   Telephone No.: _____________________

2. Check One:
   _____ Corporation
   _____ Joint Venture
   _____ Partnership
   _____ Sole Proprietorship
   _____ Other (Specify) ___________________________________________
3. If a Corporation, answer the following:

3.1 Date of incorporation: 

3.2 State of Incorporation: 

3.3 Give the names and addresses of the officers of this corporation and establish whether they are Indian (I) or Non-Indian (NI).

<table>
<thead>
<tr>
<th>Name and SS#</th>
<th>I or NI</th>
<th>Title</th>
<th>Address</th>
<th>% of Stock Ownership</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>President</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>Vice-President</td>
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<td></td>
<td>Secretary/Clerk</td>
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<td></td>
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<td>Treasurer</td>
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</tbody>
</table>

3.4 Complete the following information on any stockholder who is not listed in C above, owning 51% or more of the stock. Establish whether they are Indian (I) or Non-Indian (NI).

<table>
<thead>
<tr>
<th>Name</th>
<th>Social Security #</th>
<th>I or NI</th>
<th>Address</th>
<th>% of Stock Ownership</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>
4. If a Sole Proprietorship or Partnership, answer the following:

4.1 Date of Organization: 

4.2 Give the following information on the individual or partners and establish whether they are Indian (I) or Non-Indian (NI).

<table>
<thead>
<tr>
<th>Sole Proprietorship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
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<table>
<thead>
<tr>
<th>Partnership</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
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</table>

5. If a joint Venture, provide the following:

Date of Joint Venture Agreement: 

Attach the information for each member of the joint venture prepared in the appropriate format given above.

Provide the following information for the principal spokesperson of your organization:

Name: 

Address: 

Telephone Number: 
5.1 Will any officer or partner listed in Section 4 be engaged in outside employment?

        Yes     No

If Yes, complete the following:

<table>
<thead>
<tr>
<th>Name/Title</th>
<th>Hours Per Week Outside the Enterprise</th>
</tr>
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<tbody>
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<td></td>
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</table>

6. Does this enterprise have any subsidiaries or affiliates or is it a subsidiary or affiliate of another concern?

        Yes     No

If yes, complete the following:

<table>
<thead>
<tr>
<th>Name and Address of subsidiary, affiliate or other concerns</th>
<th>Description of Relationship</th>
</tr>
</thead>
<tbody>
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</table>

7. Does this enterprise or any person listed in Q4 above have or intend to enter into any type of agreement with any other concern or person which relates to or affects the on-going administration, management or operations of this enterprise? These include but are not limited to management, and joint venture agreements and any arrangement or contract involving the provision of such compensated services as administrative assistance, data processing, management consulting of all types, marketing, purchasing, production and other type of compensated assistance.

        Yes     No

If yes, attach a copy of any written agreement or an explanation of any oral or intended agreement.
8. Indicate the core crew employees in your work force, their job titles, and whether they are Indian or Non-Indian. Core crew is defined as an individual who is a current bona-fide individual who is regularly employed by the contractor in a supervisory or other key position when work is available.

Core Crew

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>I or NI</th>
</tr>
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<tbody>
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</table>

b. Over the past three years, what has been the average number of employees?


9. Attach evidence showing membership in a tribe or other evidence of enrollment in a federally recognized tribe or qualification as a California Indian according to federal law.

10. Attach a certified copy of the charter, articles of incorporation, by-laws, partnership agreement, joint venture agreement and/or other pertinent organizational documentation.

NOTE: Omission of any information may be cause for this statement not receiving timely and complete consideration.
The persons signing below certify that all information in the statement, including exhibits and attachments, is true and correct.

Print or type name below all signatures.

If applicant is Sole Proprietor, sign below:

_________________________  __________________
Name  Date

If applicant is in a Partnership or Joint Venture, all Partners must sign below:

_________________________  __________________
Name  Date

_________________________  __________________
Name  Date

If applicant is a corporation, affix corporate seal:

_________________________  __________________
Name  Date

By:  ____________________________
    President's Signature

Attested by:  ____________________________
    Corporate Secretary's Signature
Non-Collusive Affidavit

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of ________________________________

County of ________________________________

being first duly sworn, deposes and states:

That I, ________________________________, am the party making the foregoing proposal for bid, that such proposal or bid is genuine and not collusive or sham; that said bidder has not colluded, conspired, connived or agreed, directly or indirectly, with any bidder or person, to put in a sham bid or to refrain from bidding, and has not, in any manner, directly or indirectly, sought by agreement or collusion, or communication or conference, with any person, to fix the bid price of affiant or of any other bidder, or to fix any overhead, profit or cost element of said bid price, or of that of any other bidder, or to secure any advantage against the Owner or any person interested in the proposed contract, and that all statements in said proposal for bid are true.

Project Name: ____________________________________________

Location: ________________________________

(Signature must be notarized)

(Name and title)

(Date)

Subscribed and Sworn (or affirmed) to before me on this ________ day of ____________, 20____ by __________________________ proved to me on the basis of satisfactory evidence to be the person who appeared before me.

__________________________
Signature of Notary

Seal
Representations, Certifications, and Other Statements of Bidders
Public and Indian Housing Programs
1. Certificate of Independent Price Determination

(a) The bidder certifies that--

(1) The prices in this bid have been arrived at independently, without, for the purpose of restricting competition, any consultation, communication, or agreement with any other bidder or competitor relating to (i) those prices, (ii) the intention to submit a bid, or (iii) the methods or factors used to calculate the prices offered;

(2) The prices in this bid have not been and will not be knowingly disclosed by the bidder, directly or indirectly, to any other bidder or competitor before bid opening (in the case of a sealed bid solicitation) or contract award (in the case of a competitive proposal solicitation) unless otherwise required by law; and

(3) No attempt has been made or will be made by the bidder to induce any other concern to submit or not to submit a bid for the purpose of restricting competition.

(b) Each signature on the bid is considered to be a certification by the signatory that the signatory--

(1) Is the person in the bidder's organization responsible for determining the prices offered in this bid or proposal, and that the signatory has not participated and will not participate in any action contrary to subparagraphs (a)(1) through (a)(3) above; or

(ii) As an authorized agent, does certify that the principals named in subdivision (b)(2)(i) above have not participated, and will not participate, in any action contrary to subparagraphs (a)(1) through (a)(3) above; and

(ii) As an agent, has not personally participated, and will not participate in any action contrary to subparagraphs (a)(1) through (a)(3) above.

(c) If the bidder deletes or modifies subparagraph (a)(2) above, the bidder must furnish with its bid a signed statement setting forth in detail the circumstances of the disclosure.

[X] [Contracting Officer check if following paragraph is applicable]

(d) Non-collusive affidavit. (applicable to contracts for construction and equipment exceeding $50,000)

(1) Each bidder shall execute, in the form provided by the PHA/IHA, an affidavit to the effect that he/she has not colluded with any other person, firm or corporation in regard to any bid submitted in response to this solicitation. If the successful bidder did not submit the affidavit with his/her bid, he/she must submit it within three (3) working days of bid opening. Failure to submit the affidavit by that date may render the bid nonresponsive. No contract award will be made without a properly executed affidavit.

(2) A fully executed "Non-collusive Affidavit" [ ] is, [ ] is not included with the bid.

2. Contingent Fee Representation and Agreement

(a) Definitions. As used in this provision:

"Bona fide employee" means a person, employed by a bidder and subject to the bidder's supervision and control as to time, place, and manner of performance, who neither exerts, nor proposes to exert improper influence to solicit or obtain contracts nor holds out as being able to obtain any contract(s) through improper influence.

"Improper influence" means any influence that induces or tends to induce a PHA/IHA employee or officer to give consideration or to act regarding a PHA/IHA contract on any basis other than the merits of the matter.

(b) The bidder represents and certifies as part of its bid that, except for full-time bona fide employees working solely for the bidder, the bidder:

(1) [ ] has, [ ] has not employed or retained any person or company to solicit or obtain this contract; and

(2) [ ] has, [ ] has not paid or agreed to pay to any person or company employed or retained to solicit or obtain this contract any commission, percentage, brokerage, or other fee contingent upon or resulting from the award of this contract.

(c) If the answer to either (a)(1) or (a)(2) above is affirmative, the bidder shall make an immediate and full written disclosure to the PHA/IHA Contracting Officer.

(d) Any misrepresentation by the bidder shall give the PHA/IHA the right to (1) terminate the contract; (2) at its discretion, deduct from contract payments the amount of any commission, percentage, brokerage, or other contingent fee; or (3) take other remedy pursuant to the contract.

3. Certification and Disclosure Regarding Payments to Influence Certain Federal Transactions (applicable to contracts exceeding $100,000)

(a) The definitions and prohibitions contained in Section 1352 of title 31, United States Code, are hereby incorporated by reference in paragraph (b) of this certification.
The bidder, by signing its bid, hereby certifies to the best of his or her knowledge and belief as of December 23, 1989 that:

(1) No Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress on his or her behalf in connection with the awarding of a contract resulting from this solicitation;

(2) If any funds other than Federal appropriated funds (including profit or fee received under a covered Federal transaction) have been paid, or will be paid, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress on his or her behalf in connection with this solicitation, the bidder shall complete and submit, with its bid, OMB standard form LLL, "Disclosure of Lobbying Activities;" and

(3) He or she will include the language of this certification in all subcontracts at any tier and require that all recipients of subcontract awards in excess of $100,000 shall certify and disclose accordingly.

Submission of this certification and disclosure is a prerequisite for making or entering into this contract imposed by section 1352, title 31, United States Code. Any person who makes an expenditure prohibited under this provision or who fails to file or amend the disclosure form to be filed or amended by this provision, shall be subject to a civil penalty of not less than $10,000, and not more than $100,000, for each such failure.

Indian tribes (except those chartered by States) and Indian organizations as defined in section 4 of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450B) are exempt from the requirements of this provision.

4. Organizational Conflicts of Interest Certification
The bidder certifies that to the best of its knowledge and belief and except as otherwise disclosed, he or she does not have any organizational conflict of interest which is defined as a situation in which the nature of work to be performed under this proposed contract and the bidder's organizational, financial, contractual, or other interests may, without some restriction on future activities:

(a) Result in an unfair competitive advantage to the bidder; or,

(b) Impair the bidder's objectivity in performing the contract work.

[ ] In the absence of any actual or apparent conflict, I hereby certify that to the best of my knowledge and belief, no actual or apparent conflict of interest exists with regard to my possible performance of this procurement.

5. Bidder's Certification of Eligibility
(a) By the submission of this bid, the bidder certifies that to the best of its knowledge and belief, neither it, nor any person or firm which has an interest in the bidder's firm, nor any of the bidder's subcontractors, is ineligible to:

(1) Be awarded contracts by any agency of the United States Government, HUD, or the State in which this contract is to be performed; or,

(2) Participate in HUD programs pursuant to 24 CFR Part 24.

(b) The certification in paragraph (a) above is a material representation of fact upon which reliance was placed when making award. If it is later determined that the bidder knowingly rendered an erroneous certification, the contract may be terminated for default, and the bidder may be debarred or suspended from participation in HUD programs and other Federal contract programs.

6. Minimum Bid Acceptance Period
(a) "Acceptance period," as used in this provision, means the number of calendar days available to the PHA/IHA for awarding a contract from the date specified in this solicitation for receipt of bids.

(b) This provision supersedes any language pertaining to the acceptance period that may appear elsewhere in this solicitation.

(c) The PHA/IHA requires a minimum acceptance period of [Contracting Officer insert time period] calendar days.

(d) In the space provided immediately below, bidders may specify a longer acceptance period than the PHA's/IHA's minimum requirement. The bidder allows the following acceptance period:

(e) A bid allowing less than the PHA's/IHA's minimum acceptance period will be rejected.

(f) The bidder agrees to execute all that it has undertaken to do, in compliance with its bid, if that bid is accepted in writing within (1) the acceptance period stated in paragraph (c) above or (2) any longer acceptance period stated in paragraph (d) above.

7. Small, Minority, Women-Owned Business Concern Representation
The bidder represents and certifies as part of its bid/ offer that it --

(a) [ ] is, [ ] is not a small business concern. "Small business concern," as used in this provision, means a concern, including its affiliates, that is independently owned and operated, not dominant in the field of operation in which it is bidding, and qualified as a small business under the criteria and size standards in 13 CFR 121.

(b) [ ] is, [ ] is not a women-owned business enterprise. "Women-owned business enterprise," as used in this provision, means a business that is at least 51 percent owned by a woman or women who are U.S. citizens and who also control and operate the business.

(c) [ ] is, [ ] is not a minority business enterprise. "Minority business enterprise," as used in this provision, means a business which is at least 51 percent owned or controlled by one or more minority group members or, in the case of a publicly owned business, at least 51 percent of its voting stock is owned by one or more minority group members, and whose management and daily operations are controlled by one or more such individuals. For the purpose of this definition, minority group members are:

(1) Black Americans
(2) Hispanic Americans
(3) Native Americans

8. Indian-Owned Economic Enterprise and Indian Organization Representation (applicable only if this solicitation is for a contract to be performed on a project for an Indian Housing Authority)

The bidder represents and certifies that it:

(a) [ ] is, [ ] is not an Indian-owned economic enterprise.
"Economic enterprise," as used in this provision, means any commercial, industrial, or business activity established or organized for the purpose of profit, which is at least 51 percent Indian owned. "Indian," as used in this provision, means any person who is a member of any tribe, band, group, pueblo, or community which is recognized by the Federal Government as eligible for services from the Bureau of Indian Affairs and any "Native" as defined in the Alaska Native Claims Settlement Act.

(b) [ ] is, [ ] is not an Indian organization. "Indian organization," as used in this provision, means the governing body of any Indian tribe or entity established or recognized by such governing body. Indian "tribe" means any Indian tribe, band, group, pueblo, or
community including Native villages and Native groups (including corporations organized by Kenai, Juneau, Sitka, and Kodiak) as defined in the Alaska Native Claims Settlement Act, which is recognized by the Federal Government as eligible for services from the Bureau of Indian Affairs.

9. Certification of Eligibility Under the Davis-Bacon Act (applicable to construction contracts exceeding $2,000)
(a) By the submission of this bid, the bidder certifies that neither it nor any person or firm who has an interest in the bidder's firm is a person or firm ineligible to be awarded contracts by the United States Government by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(b) No part of the contract resulting from this solicitation shall be subcontracted to any person or firm ineligible to be awarded contracts by the United States Government by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(c) The bidder will include a certification substantially the same as this certification, including this paragraph (c), in every nonexempt subcontract.

10. Certification of Nonsegregated Facilities (applicable to contracts exceeding $10,000)
(a) The bidder's attention is called to the clause entitled Equal Employment Opportunity of the General Conditions of the Contract for Construction.

(b) "Segregated facilities," as used in this provision, means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees, that are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, or national origin because of habit, local custom, or otherwise.

(c) By the submission of this bid, the bidder certifies that it does not and will not maintain or provide for its employees any segregated facilities at any of its establishments, and that it does not and will not permit its employees to perform their services at any location under its control where segregated facilities are maintained. The bidder agrees that a breach of this certification is a violation of the Equal Employment Opportunity clause in the contract.

(d) The bidder further agrees that (except where it has obtained identical certifications from proposed subcontractors for specific time periods) prior to entering into subcontracts which exceed $10,000 and are not exempt from the requirements of the Equal Employment Opportunity clause, it will:

1. Obtain identical certifications from the proposed subcontractors;
2. Retain the certifications in its files; and
3. Forward the following notice to the proposed subcontractors (except if the proposed subcontractors have submitted identical certifications for specific time periods):

Notice to Prospective Subcontractors of Requirement for Certifications of Nonsegregated Facilities
A Certification of Nonsegregated Facilities must be submitted before the award of a subcontract exceeding $10,000 which is not exempt from the provisions of the Equal Employment Opportunity clause of the prime contract. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semiannually, or annually).

Note: The penalty for making false statements in bids is prescribed in 18 U.S.C. 1001.

11. Clean Air and Water Certification (applicable to contracts exceeding $100,000)
The bidder certifies that:
(a) Any facility to be used in the performance of this contract [   ] is, [   ] is not listed on the Environmental Protection Agency List of Violating Facilities;
(b) The bidder will immediately notify the PHA/IHA Contracting Officer, before award, of the receipt of any communication from the Administrator, or a designee, of the Environmental Protection Agency, indicating that any facility that the bidder proposes to use for the performance of the contract is under consideration to be listed on the EPA List of Violating Facilities; and,
(c) The bidder will include a certification substantially the same as this certification, including this paragraph (c), in every nonexempt subcontract.

12. Previous Participation Certificate (applicable to construction and equipment contracts exceeding $50,000)
(a) The bidder shall complete and submit with his/her bid the Form HUD-2530, "Previous Participation Certificate." If the successful bidder does not submit the certificate with his/her bid, he/she must submit it within three (3) working days of bid opening. Failure to submit the certificate by that date may render the bid nonresponsive. No contract award will be made without a properly executed certificate.
(b) A fully executed "Previous Participation Certificate" [   ] is, [   ] is not included with the bid.

13. Bidder's Signature
The bidder hereby certifies that the information contained in these certifications and representations is accurate, complete, and current.

(Signature and Date)

(Typed or Printed Name)

(Title)

(Company Name)

(Company Address)
**Part I to be completed by Principals of Multifamily Projects (See instructions)**

**Reason for submission:**

1. **Agency name and City where the application is filed**
2. **Project Name, Project Number, City and Zip Code**
3. **Loan or Contract amount $**
4. **Number of Units or Beds**
5. **Section of Act**
6. **Type of Project (check one)**
   - Existing
   - Rehabilitation
   - Proposed (New)

**7. List all proposed Principals and attach organization chart for all organizations**

<table>
<thead>
<tr>
<th>Name and address of Principals and Affiliates (Name: Last, First, Middle Initial) proposing to participate</th>
<th>8 Role of Each Principal in Project</th>
<th>9. SSN or IRS Employer Number</th>
</tr>
</thead>
</table>

Certifications: The principal(s) listed above hereby apply to HUD or USDA FmHA, as the case maybe, for approval to participate as principal(s) in the role(s) and project listed above. The principal(s) each certify that all the statements made on this form are true, complete and correct to the best of their knowledge and belief and are made in good faith, including any Exhibits attached to this form. **Warning:** HUD will prosecute false claims and statements. Conviction may result in criminal and/or civil penalties. The principal(s) further certify that to the best of their knowledge and belief:

1. Schedule A contains a listing, for the last ten years, of every project assisted or insured by HUD, USDA FmHA and/or State and local government housing finance agencies in which the principal(s) have participated or are now participating.
2. For the period beginning 10 years prior to the date of this certification, and except as shown on the certification:
   a. No mortgage on a project listed has ever been in default assigned to the Government or foreclosed, nor has it received mortgage relief from the mortgagee;
   b. The principals have no defaults or noncompliance under any Conventional Contract or Turnkey Contract of Sale in connection with a public housing project;
   c. There are no known unresolved findings as a result of HUD audits, management reviews or other Governmental investigations concerning the principals or their projects;
   d. There has not been a suspension or termination of payments under any HUD assistance contract due to the principal’s fault or negligence;
   e. The principals have not been convicted of a felony and are not presently the subject of a complaint or indictment charging a felony. (A felony is defined as any offense punishable by imprisonment for a term exceeding one year, but does not include any offense classified as a misdemeanor under the laws of a State and punishable by imprisonment of two years or less);
   f. The principals have not been suspended, debarred or otherwise restricted by any Department or Agency of the Federal Government or of a State Government from doing business with such Department or Agency;
   g. The principals have not defaulted on an obligation covered by a surety or performance bond and have not been the subject of a claim under an employee fidelity bond;
3. None of the principals is a HUD/FmHA employee or a member of a HUD/FmHA employee's immediate household as defined in Standards of Ethical Conduct for Employees of the Executive Branch in 5 C.F.R. Part 2635 (57 FR 35006) and HUD's Standard of Conduct in 24 C.F.R. Part 0 and USDA's Standard of Conduct in 7 C.F.R. Part 0 Subpart B.
4. None of the principals is a participant in an assisted or insured project as of this date on which construction has stopped for a period in excess of 20 days or which has been substantially completed for more than 90 days and documents for closing, including final cost certification, have not been filed with HUD or FmHA.
5. None of the principals have been found by HUD or FmHA to be in noncompliance with any applicable fair housing and civil rights requirements in 24 CFR 5.105(a). (If any principals or affiliates have been found to be in noncompliance with any requirements, attach a signed statement explaining the relevant facts, circumstances, and resolution, if any).
6. None of the principals is a Member of Congress or a Resident Commissioner nor otherwise prohibited or limited by law from contracting with the Government of the United States of America.
7. Statements above (if any) to which the principal(s) cannot certify have been deleted by striking through the words with a pen, and the relevant principal(s) have initial each deletion (if any) and have attached a true and accurate signed statement (if applicable) to explain the facts and circumstances.

<table>
<thead>
<tr>
<th>Name of Principal</th>
<th>Signature of Principal</th>
<th>Certification Date(mm/dd/yyyy)</th>
<th>Area Code and Tel. No.</th>
</tr>
</thead>
</table>

This form prepared by (print name) | Area Code and Tel. No.
## Schedule A: List of Previous Projects and Section 8 Contracts

Below is a complete list of the principals' previous participation projects and participation history in multifamily Housing programs of HUD/FmHA, State and local Housing Finance Agencies. **Note:** Read and follow the instruction sheet carefully. Make full disclosure. Add extra sheets if you need more space. Double check for accuracy. If no previous projects, write by your name, **"No previous participation, First Experience"**.

<table>
<thead>
<tr>
<th>1. Principals Name (Last, First)</th>
<th>2. List of previous projects (Project name, project ID and, Govt. agency involved)</th>
<th>3. List Principals' Role(s) (indicate dates participated, and if fee or identity of interest participant)</th>
<th>4. Status of loan (current, defaulted, assigned, foreclosed)</th>
<th>5. Was the Project ever in default during your participation</th>
<th>Yes</th>
<th>No</th>
<th>If yes, explain</th>
<th>6. Last MOR rating and Physical Insp. Score and date</th>
</tr>
</thead>
</table>

### Part II- For HUD Internal Processing Only

Received and checked by me for accuracy and completeness; recommend approval or refer to Headquarters after checking appropriate box.

<table>
<thead>
<tr>
<th>Date (mm/dd/yyyy)</th>
<th>Tel No. and area code</th>
<th>Staff</th>
<th>Supervisor</th>
<th>Approved</th>
<th>Date (mm/dd/yyyy)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Director of Housing/Director, Multifamily Division</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

Previous editions are obsolete

ref Handbook 4065.1 Form HUD-2530 (2/2013)
Instructions for Completing the Previous Participation Certificate, form HUD-2530

Carefully read these instructions and the applicable regulations. A copy of those regulations published at 24 C.F.R. 200.210 to 200.245 can be obtained from the Multifamily Housing Representative at any HUD Office. Type or print neatly in ink when filling out this form. Mark answers in all blocks of the form. If the form is not filled completely, it will delay approval of your application.

Attach extra sheets as you need them. Be sure to indicate "Continued on Attachments" wherever appropriate. Sign each additional page that you attach if it refers to you or your record.

Carefully read the certification before you sign it. Any questions regarding the form or how to complete it can be answered by your HUD Office Multifamily Housing Representative.

Purpose: This form provides HUD with a certified report of all previous participation in HUD multifamily housing projects by those parties making application. The information requested in this form is used by HUD to determine if you meet the standards established to ensure that all principal participants in HUD projects will honor their legal, financial and contractual obligations and are acceptable risks from the underwriting standpoint of an insurer, lender or governmental agency. HUD requires that you certify your record of previous participation in HUD/USDA-FmHA, State and Local Housing Finance Agency projects by completing and signing this form, before your project application or participation can be approved.

HUD approval of your certification is a necessary precondition for your participation in the project and in the capacity that you propose. If you do not file this certification, do not furnish the information requested accurately, or do not meet established standards, HUD will not approve your certification.

Note that approval of your certification does not obligate HUD to approve your project application, and it does not satisfy all other HUD program requirements relative to your qualifications.

Who Must Sign and File Form HUD-2530: Form HUD-2530 must be completed and signed by all principals applying to participate in HUD multifamily housing projects, including those who have no previous participation. The form must be signed and filed by all principals and their affiliates who propose participating in the HUD project. Use a separate form for each role in the project unless there is an identity of interest.

Affiliates are defined as any person or business concern that directly or indirectly controls the policy of a principal or has the power to do so. A holding or parent corporation would be an example of an affiliate if one of its subsidiaries is a principal.

Exception for Corporations – All principals and affiliates must personally sign the certificate except in the following situation. When a corporation is a principal, all of its officers, directors, trustees and stockholders with 10 percent or more of the common (voting) stock need not sign personally if they all have the same record to report. The officer who is authorized to sign for the corporation or agency will list the names and title of those who elect not to sign. However, any person who has a record of participation in HUD projects that is separate from that of his or her organization must report that activity on this form and sign his or her name. The objective is full disclosure.

Exemptions – The names of the following parties do not need to be listed on form HUD-2530: Public Housing Agencies, tenants, owners of less than five condominium or cooperative units, and all others whose interests were acquired by inheritance or court order.

Where and When Form HUD-2530 Must Be Filed: The original of this form must be submitted to the HUD Office where your project application will be processed at the same time you file your initial project application. This form must be filled with applications for projects, or when otherwise required in the situations listed below:

- Projects in which 20 percent or more of the units are to receive a subsidy as described in 24 C.F.R. 200.213.
- Purchase of a project subject to a mortgage insured by the Secretary of HUD.
- Purchase of a Secretary-owned project.
- Proposed substitution or addition of a principal or principal participation in a different capacity from that previously approved for the same project.
- Proposed acquisition by an existing limited partner of an additional interest in a project resulting in a total interest of 25 percent or more or proposed acquisition by a corporate stockholder of an additional interest in a project resulting in a total interest of 10 percent or more.
- Projects with U.S.D.A., Farmers Home Administration, or other federally-related housing finance agencies that include rental assistance under Section 8 of the Housing Act of 1937. For projects of this type, form HUD-2530 must be filed with the appropriate applications directly to those agencies.

Review of Adverse Determination: If approval of your participation in a HUD project is denied, withheld, or conditionally granted, you may request reconsideration by the HUD Office. You may request reconsideration by the HUD Review Committee. Alternatively, you may request a hearing before a Hearing Officer. Either request must be made in writing within 30 days from your receipt of the notice of determination.

If you do request reconsideration by the Review Committee and the reconsideration results in an adverse determination, you may then request a hearing before a Hearing Officer. The Hearing Officer will issue a report to the Review Committee. You will be notified of the final ruling by certified mail.

Specific Line Instructions:

Reason for submitting this Certification: e.g., refinance, change in ownership, change in management agent, transfer of physical assets, etc.

Block 1: Fill in the name of the agency to which you are applying. For example: HUD Office, Farmers Home Administration District Office, or the name of a State or local housing finance agency. Below that, fill in the name of the city where the office is located.

Block 2: Fill in the name of the project, such as "Greenwood Apts." If the name has not yet been selected, write "Name unknown." Below that, enter the HUD contract or project identification number, the Farmers Home Administration project number, or the State or local housing finance agency project or contract number. Include all project or contract identification numbers that are relevant to the project. Also enter the name of the city in which the project is located, and the ZIP Code.

Block 3: Fill in the dollar amount requested in the proposed mortgage, or the annual amount of rental assistance requested.

Block 4: Fill in the number of apartment units proposed, such as "40 units." For hospital projects or nursing homes, fill in the number of beds proposed, such as "100 beds."

Block 5: Fill in the section of the Housing Act under which the application is filed.

Block 7: Definitions of all those who are considered principals and affiliates are given above in the section titled "Who Must Sign and File..."
**Column 4.** Indicate the current status of the loan. Except for current loan, the date associated with the status is required. Loans under a workout arrangement are considered assigned. For all noncurrent loans, an explanation of the status is required.

**Column 5.** Explain any project defaults during your participation.

**Column 6.** Provide the latest Management Review (MOR) rating and Physical Inspection score.

**Certification:** After you have completed all other parts of form HUD-2530, including schedule A, read the Certification carefully. In the box below the statement of the Certification, fill in the names of all principals and affiliates as listed in block 7. Each principal should sign the Certification with the exception in some cases of individuals associated with a corporation (see “Exception for Corporations” in the section of the instructions titled “Who Must Sign and File Form HUD-2530”). Principal who is signing on behalf of the entity should attach the signature authority document. Each principal who signs the form should fill in the date of the signature and a telephone number. By providing a telephone number, HUD can reach you in the event of any questions.

If you cannot certify and sign the Certification as it is printed because some statements do not correctly describe your record, use a pen to strike through those parts that differ with your record, and then sign and certify. Attach a signed statement of explanation of the items you have struck out on the Certification. Item 2e. relates to felony convictions within the past 10 years. If you are convicted of a felony within the past 10 years, strike out 2e. and attach a signed statement of explanation. A felony conviction will not necessarily cause your participation to be disapproved unless there is a criminal record or other evidence that your previous conduct or method of doing business has been such that your participation in the project would make it an unacceptable risk from the underwriting standpoint of an insurer, lender or governmental agency.

The Department of Housing and Urban Development (HUD) is authorized to collect this information by law (42 U.S.C. 3535(d) and 24 C.F.R. 200.217) and by regulation at 24 CFR 200.210. This information is needed so that principals applying to participate in multifamily programs can become HUD-approved participants. The information you provide will enable HUD to evaluate your record with respect to established standards of performance, responsibility and eligibility. Without prior approval, a principal may not participate in a proposed or existing multifamily project. HUD uses this information to evaluate whether or not principals pose an unsatisfactory underwriting risk. The information is used to evaluate the potential principals and approve only individuals and organizations that will honor their legal, financial and contractual obligations.

**Privacy Act Statement:** The Housing and Community Development Act of 1987, 42 U.S.C. 3543 requires persons applying for a Federally-insured or guaranteed loan to furnish his/her Social Security Number (SSN). HUD must have your SSN for identification of your records. HUD may use your SSN for automated processing of your records and to make requests for information about you and your previous records with other public agencies and private sector sources. HUD may disclose certain information to Federal, State and local agencies when relevant to civil, criminal, or regulatory investigations and prosecutions. It will not be otherwise disclosed or released outside of HUD, except as required and permitted by law. You must provide all of the information requested in this application, including your SSN.

**Public reporting burden** for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. This agency may not collect this information, and you are not required to complete this form, unless it displays a currently valid OMB control number.

A response is mandatory. Failure to provide any of the information will result in your disapproval of participation in this HUD program.
YUROK TRIBE
TRIBAL EMPLOYMENT RIGHTS OFFICE
PRE-AWARD LABOR FORCE PROJECTION FORM

Employer/Supplier Name: ________________________________________________

Mailing Address: ______________________________________________________

City, State, and Zip Code: ______________________________________________

Phone Number ___________________ Cell # ________________________________

Contact: _______________________ RFP/RFB Number: ______ Amount of Contract $ ______

Contracting with: Entity/Department __________________________ Date _____________

THIS IS AN AGREEMENT BETWEEN THE YUROK TRIBE AND EMPLOYER FOR
CONDUCTING COMMERCE AND EMPLOYMENT ACTIVITY WITHIN THE
EXTERIOR BOUNDARIES OF THE YUROK INDIAN RESERVATION AND YUROK
TRIBAL “TERRITORY”.

EMPLOYER hereby agrees to comply with the requirements and procedures for the
selection of contractors, sub-contractors and recruitment of viable Indian applicants
through TERO.

TERO shall receive notice, in the form of copies of bid forms by awarded prime
Employer seeking bids of all sub-contract work to be conducted on the Yurok Indian
Reservation. Notice shall be made reasonably in advance of any award, but not later than
five (5) days in advance of an award.

The above named employer understands that they are required to comply with the Yurok

COMPLIANCE INSPECTIONS: The TERO Officer or other designated
Staff shall make periodic or site visitations for assurance to all involved parties that
employment rules are adhered to.

MAINTAINING EMPLOYMENT RECORDS: Employer shall maintain accurate
employment records on all employees and all applicants for employment; regardless of
length and category or employment, hired, fired, or laid-off. The files shall reflect: name,
address and employment category for which applicant performed or applied to perform.
If applicant was contacted but not hired, hired and fired, all data should reflect action
taken by that firm. Such informational records shall be made available to the TERO
Officer, upon reasonable notice.
YUROK TRIBE
TRIBAL EMPLOYMENT RIGHTS OFFICE
PRE-AWARD LABOR FORCE PROJECTION FORM

ASSISTANCE: If an Employer deems that an Indian employee’s performance is such that he or she is jeopardizing and endangering job loss, suspension, or termination, Employer may contact TERO to provide assistance toward resolving of that issue.

EMPLOYMENT POLICIES AND PROCEDURES: It is further understood that Employer recognizes that its operations are taking place within a unique cultural setting on the Yurok Indian Reservation. Accordingly, all firms in conjunction with the TERO Officer should consider seriously Tribal Holidays and ceremonial customs; and to accommodate those Indian employees requesting certain leave of absences for religious purposes.

*This form must be completed and filed with the TERO. Attach additional sheets if necessary.

Briefly describe the basic tasks and types of work to be performed: ____________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Please list types of skills and categories which will be required towards performing said contract:

1. __________________________  7. __________________________  12. __________________________
2. __________________________  8. __________________________
3. __________________________  9. __________________________
4. __________________________ 10. __________________________
5. __________________________ 11. __________________________
6. __________________________
Indian Preference shall be accorded at every Tier Level. Please list the names and positions of your Core Crew. (Key staff). (Core Crew members are the vitally needed Supervisors that you depend on every day). All other persons needed on this job will go through the TERO Skills Bank.

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<tr>
<th>NAME</th>
<th>JOB TITLE</th>
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Note:
(Please utilize as many sheets as necessary for explaining your on-site employment related projection)
Section 005200
Construction Contract (Example)
CONTRACT AGREEMENT

THIS CONTRACT AGREEMENT IS BETWEEN

Yurok Indian Housing Authority
15540 US HWY 101 North AND
Klamath, California 95548
(707) 482-1506

****************************************************************
*
FOR THE YUROK TRIBE

Department: Yurok Indian Housing Authority

Contact Person: Will Bommelyn

Phone Number: 707-482-1506

****************************************************************
*

Brief Description of Contract:

Refer to Section 011000 of the Bidding and Contracting Manual.

Reviewed By These Departments:

TERO: _____ LEGAL: _____ FISCAL: _____ EXECUTIVE DIRECTOR: _____
INDEPENDENT CONTRACTOR AGREEMENT

This Agreement, dated as of ________, is between YUROK TRIBE and ___ ("Contractor") (collectively, "the Parties").

The Parties agree as follows:

1. Project Covered.
Yurok Tribe hereby engages Contractor to provide all work for the Otto Hodge Home Project as identified and listed under Section 011000 of the Bidding and Contracting Manual.

2. Taxpayer Identification Number.
Prior to commencing the Project, Contractor shall provide Yurok Tribe with a duly executed IRS Form W-9 and obtain an Employer Identification Number (EIN) from the IRS and an EDD registration number.

3. No Training or Instructions.
Yurok Tribe enters into this Agreement based on Contractor's demonstrated ability to perform the type of services that it believes, and that Contractor has represented, are needed to accomplish the Project. Consequently, Yurok Tribe does not contemplate providing Contractor with any training or instructions with respect to the Project.

4. Intent of Independent Contractor Relationship.
(a) The Parties intend that the relationship created by this Agreement shall be that of service recipient and independent contractor.
(b) For all purposes, including but not limited to the Federal Insurance Contributions Act ("FICA"), the Social Security Act, the Federal Unemployment Tax Act ("FUTA"), income tax withholding requirements, California Personal Income Tax Withholding ("PIT"), California Unemployment taxes ("UI"), California Disability Insurance ("SDI"), and all other federal, state and local laws, rules and regulations, Contractor (and all Contractor’s respective employees, if any) shall be treated as an independent contractor and not as an employee with respect to Yurok Tribe.

5. No Benefits.
None of the benefits that are provided by the Yurok Tribe to its employees shall be available to Contractor (or Contractor’s employees, if any, which for purposes of this paragraph shall be included in the term "Contractor"). Contractor's exclusion from
benefit programs maintained by Yurok Tribe is a material term of the terms of compensation negotiated by the Parties, and is not premised on Contractor's status as a non-employee with respect to Yurok Tribe. To the extent that Contractor may become eligible for any benefit programs maintained by Yurok Tribe (regardless of the timing of or reason for eligibility), Contractor hereby waives all rights to participate in these programs. Contractor's waiver is not conditioned on any representation or assumption concerning Contractor's status under the common law test. Contractor agrees that, consistent with his independent contractor status, Contractor will not apply for any government-sponsored benefits that are intended to apply to employees, including, but not limited to, unemployment benefits.

6. Tax Reporting and Filing.
Contractor acknowledges and agrees that Contractor shall be responsible (as a self-employed individual) for filing all tax returns, tax declarations, and tax schedules, and for the payment of all taxes required, when due, with respect to all compensation earned by Contractor under this Agreement. Yurok Tribe will not withhold any employment taxes from compensation it pays Contractor. Rather, Yurok Tribe will report the amount it pays Contractor on IRS Forms 1099, to the extent required to do so under applicable Internal Revenue Code provisions and state or local law.

7. Compensation.
Contractor's compensation for the Project shall be _____ dollars ($__), payable upon completion of the Project. Contractor shall be solely responsible for all costs incurred in connection with the accomplishment of the Project. Upon receiving each invoice for this contract, the Yurok Tribe Fiscal Department shall have thirty (30) working days to process payment.

8. Liability Insurance.
Liability insurance, in the amount of 1,000,000 is required to be obtained by the Contractor no less than five (5) working days prior to commencement of this project. A certificate of insurance naming the Yurok Tribe as additionally insured shall be filed with the Yurok Tribe at the same time. The Tribe will assume no liability based upon negligence or intentional acts of the Contractor and should such negligence or intentional acts occur, Contractor agrees to assume full liability and indemnify and hold Yurok Tribe harmless for all such actions.
9. **Equipment and Tools.**
Contractor shall provide and be responsible for maintaining any equipment and tools that Contractor uses, or determines is necessary, to accomplish the Project.

10. **Manner, Time, and Location.**
All work to be performed within the time set under the official Notice to Proceed at the location identified under the Bidding and Contracting Manual in strict conformance with the regulations and requirements, as identified in the Bidding and Contracting Manual and per industry standard.

11. **Right to Engage Assistants.**
Contractor shall have the right to engage others to assist in the accomplishment of the Project. Contractor shall be solely responsible for paying all compensation owed to any assistants engaged and for paying, and/or withholding and remitting to the appropriate government agency, any applicable employment taxes that might be owed with respect to this compensation. Contractor also shall indemnify and hold Yurok Tribe harmless against any and all liabilities attributable to the obligations imposed on Contractor under this Paragraph 11. The Parties acknowledge that Contractor shall retain the exclusive right to determine which workers Contractor shall engage for these purposes. Contractor agrees to provide proof of Workers’ Compensation insurance coverage for all assistants he engages.

12. **Tribal Employment Rights Ordinance (TERO).**
Contractor acknowledges that Contractor has had the opportunity to read the Yurok Tribe TERO Ordinance, is fully aware of the legal effects of the TERO Ordinance on this agreement, and agrees to comply with the TERO Ordinance, including payment of all applicable TERO taxes. *(The TERO Ordinance calls for a one-time fee of 5% of the total contract for construction contracts or ½ of 1% for all other contracts. The TERO tax is deducted from each payment.)*

13. **Performing Services for Others.**
Yurok Tribe agrees that Contractor may perform services for others, so long as the performance of these services does not interfere with the completion of the Project.
14. **Status Reports.**
Contractor to maintain an active Construction Progress Schedule for the duration of the project and provide weekly updates to YIHA.

15. **Completion Date.**
Contractor agrees to complete the Project by no later than ________, 20__. Failure to complete the Project by ________, 20__ shall subject Contractor to a financial obligation of $_________.

16. **Termination.**
In the case of a material breach of this Agreement by one Party, the other Party shall have the right to terminate this Agreement with no advance notice if after providing the breaching Party with notice of the breach, the breaching Party fails to cure the breach within ten (10) days after receipt of the notice of breach.

17. **Sovereign Immunity.**
Nothing in this agreement shall be deemed or construed to be a waiver of the sovereign immunity of the Yurok Tribe, its officials or employees acting within their official or individual capacities.

18. **Performance Bond.**
The Tribe reserves the right to require that a bond satisfactory to the Approving officer in an amount equal to the value of this contract be delivered before a notice to proceed is issued.

19. **Drug and Alcohol Policy.**
Contractor and all employees or subcontractors of Contractor working on Tribal property are subject to the Yurok Tribe's Drug and Alcohol Free Workplace Policy.

20. **Indemnification.**
Contractor indemnifies and holds harmless Yurok Tribe from and against any and all liabilities, losses, damages, claims or causes of action, and any connected expenses (including reasonable attorneys' fees) that are caused, directly or indirectly, by or as a result of the performance by Contractor or its employees or agents of the Project.

21. **Notices.**
Any notice under this Agreement must be in writing and shall be effective upon delivery by hand or three (3) business days after
deposit in the United States mail, postage prepaid, certified or registered, and addressed to Yurok Tribe or to Contractor at the corresponding address below. Contractor shall be obligated to notify Yurok Tribe in writing of any change in his address. Notice of change of address shall be effective only when done in accordance with this Paragraph.

Yurok Tribe's Notice Address:

Yurok Indian Housing Authority
15540 US HWY 101 North
Klamath, California  95548
(707) 482-1506

Contractor's Notice Address:

(contractor name)
(contractor business name)
(contractor address)
(XXX) ____

22. Integration.
This Agreement is intended to be the final, complete, and exclusive statement of the terms of Contractor's engagement by Yurok Tribe. This Agreement supersedes all other prior and contemporaneous agreements and statements, whether written or oral, express or implied, pertaining in any manner to the engagement of Contractor, and it may not be contradicted by evidence of any prior or contemporaneous statements or agreements. To the extent that the practices, policies, or procedures of Yurok Tribe, now or in the future, apply to Contractor and are inconsistent with the terms of this Agreement, the provisions of this Agreement shall control.

23. Amendments; Waivers.
This Agreement may not be amended except by an instrument in writing, signed by each of the Parties. Failure to exercise any right under this Agreement shall not constitute a waiver of such right.

24. Assignment; Successors and Assigns.
Neither Yurok Tribe nor Contractor shall assign any rights or obligations under this Agreement.
25. **Severability.**
If a court or arbitrator holds any provision of this Agreement to be invalid, unenforceable, or void, the remainder of this Agreement shall remain in full force and effect, however, nothing in this section shall be construed to waive the Yurok Tribe’s sovereign immunity.

26. **Account Number.**
Payment for services rendered by Contractor shall be made from account number _____.

27. **Governing Law.**
This Agreement shall be governed by and construed in accordance with the law of the Yurok Tribe. Parties agree that any and all actions which may arise from or out of this agreement shall be adjudicated in the Yurok Tribal Court.

28. **Interpretation.**
This Agreement shall be construed as a whole, according to its fair meaning, and not in favor of or against any Party. By way of example and not in limitation, this Agreement shall not be construed in favor of the Party receiving a benefit nor against the Party responsible for any particular language in this Agreement. Captions are used for reference purposes only and should be ignored in the interpretation of the Agreement.
29. Contractor Acknowledgment.
Contractor acknowledges that Contractor has read and understands this agreement and has had the opportunity to consult legal counsel in regard to this Agreement. Contractor further acknowledges that Contractor has entered into it freely and voluntarily and based on Contractor’s own judgment and not on any representations or promises other than those contained in this Agreement and further agrees to submit to the jurisdiction of the Yurok Tribal Court for all actions arising out of this Agreement.

The Parties have duly executed this Agreement as of the date first written above.

______________________________
(contractor name)
(contractor business name)

______________________________
(Federal ID/Social Security number)

Nicole Sager, Executive Director
Yurok Indian Housing Authority
SECTION 006100
CONTRACT SECURITY

SECTION 1  GENERAL

1.1  Definition
   A. The Construction Contract Security provided by the Contractor is a financial guarantee that
      the project will be satisfactorily completed at the cost of the bid amount to the Owner.

1.2  Submittals
   A. A Contract Security will be required to be submitted to the Owner in concert with
      ratification of the Contract Agreement.

1.3  Measurement and Payment
   A. Payment for the Construction Contract Security shall be paid as a lump sum amount, to be
      billed as an item under the first partial payment request for the project. The amount paid
      shall reflect the price provided in the Bid Schedule.

SECTION 2  PRODUCTS

2.1  Construction Contract Security Types

   A. Contract Security must be provided at a minimum of 100% of the total amount of the
      contract including all costs itemized per section 004100 and the cost of the security, if not
      also itemized per section 004100. The following four (4) types of contract security may be
      used to meet the construction guarantee for this project:

       a. Performance Bond
       b. Payment Bond
       c. Irrevocable Letter of Credit
       d. Cash Escrow

SECTION 3  EXECUTION

3.1  Sample forms have been provided under this section for convenience.
PERFORMANCE BOND FORM

KNOW ALL MEN BY THESE PRESENTS: that

(Name and Address of Contractor)

a ________________________, hereinafter called Principal, and ________________________, (Name and Address of Surety)

hereinafter called Surety, are held and firmly bound unto the Yurok Indian Housing Authority, hereinafter called Owner, in the penal sum of

$_________________________$, being one-hundred percent (100%) of the contract amount in lawful money of the United States, for the payment of which sum will and truly to be made, we bind 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 contract with the Owner, dated the ______ day of ____________________, 20__, a copy of which is hereto attached and made a part hereof for the completion of the

including the work as described under Section 011000 of the Contract Manual, and all other appurtenant items in strict accordance with the contract documents, within the time set forth therein, and at the prices stated in the Bid Schedule.

NOW THEREFORE, if the Principal shall, truly and faithfully perform its duties, all 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 he 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.

PROVIDED FURTHER, that 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 there under or the TECHNICAL SPECIFICATIONS accompanying the same shall in any way affect its obligation 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 TECHNICAL SPECIFICATIONS.

PROVIDED FURTHER, that no final settlement between the OWNER and the Principal shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.
IN WITNESS WHEREOF, this instrument is executed in ______ counterparts one of which shall be deemed an original, this the ________ day of ______________, 20__.

(Name of Principal) ____________________________ (SEAL)

BY: ____________________________
    (Signature for Principal)

________________________
    (Address)

ATTEST: ____________________________
    (Principal Secretary)

WITNESS: ____________________________
    (Witness as to Principal)

________________________
    (Address)

________________________
    (Signature for Principal) (SEAL)

BY: ____________________________
    (Attorney-in-Fact)

________________________
    (Address)

ATTEST: ____________________________
    (Surety Secretary)

WITNESS: ____________________________
    (Witness as to Principal)

________________________
    (Address)

NOTE: Date of BOND must not be prior to date of Contract. If Principal is Partnership, all partners should execute BOND.

IMPORTANT: Surety companies executing BONDS must be authorized to transact business in the State where the PROJECT is located.
PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: that

(Name and Address of Contractor)

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

hereinafter called Surety, are held and firmly bound unto the Yurok Indian Housing Authority, hereinafter called Owner, in the penal sum of $__________ representing one-hundred percent (100%) of the contract amount, in lawful money of the United States, for the payment of which sum will and truly to be made, we bind 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 completion of the _____ including the work as described under Section 011000 of the Contract Documents, and all other appurtenant items in strict accordance with the contract documents, within the time set forth therein, and at the prices stated in the Bid Schedule.

NOW THEREFORE, if the Principal shall promptly make payment to all persons, firms, SUBCONTRACTORS, and corporations furnishing materials for or performing labor in the prosecution of the WORK provided for in such contract, and any authorized extension or modification thereof, including all amounts due for materials, lubricants, oil, gasoline, coal and coke, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such WORK, and all insurance premiums on said WORK, and for all labor, performed in such WORK whether by SUBCONTRACTOR or otherwise, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED FURTHER, that 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 there under or the TECHNICAL SPECIFICATIONS accompanying the same shall in any way affect its obligation 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 TECHNICAL SPECIFICATIONS.

PROVIDED FURTHER, that no final settlement between the OWNER and the Principal shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.
IN WITNESS WHEREOF, this instrument is executed in _______ counterpart one of which shall be deemed an original, this the ______ day of ____________, 20__.

__________________________________________
(Name of Principle) (SEAL)

BY:________________________________________
(Signature for Principal)

________________________
(Address)

ATTEST:
(Principal Secretary)

WITNESS:
(Witness as to Principal)

________________________
(Address)

BY:________________________________________
(Attorney-in-Fact) (SEAL)

________________________
(Address)

ATTEST:
(Surety Secretary)

WITNESS:
(Witness as to Principal)

________________________
(Address)

NOTE: Date of BOND must not be prior to date of Contract. If Principal is a Partnership, all partners should execute the BOND.

IMPORTANT: Surety companies executing BONDS must be authorized to transact business in the State where the PROJECT is located.
IRREVOCABLE LETTER OF CREDIT FORM  
(Please provide on Bank Letterhead)  

CONTRACT SECURITY  

Dear Yurok Indian Housing Authority  

We hereby authorize you to draw on us to the aggregate amount of $ ______________ one-hundred percent (100%) of the total Contract Amount in the event ______________ defaults, or fails to complete construction and payments under that certain Construction Contract with you dated ______________.  

Such drafts must be accompanied by:  

1. Completion Assurance Agreement dated ______________ for the project known as ______________.  

2. Written certification by you that the proceeds of any draft drawn on this Letter of Credit will be used solely for the purposes and interests described in the Completion Assurance for the Project.  

We warrant to you that all drafts drawn in compliance with the terms of this Letter of Credit will be unconditionally and duly honored upon delivery of documentation specified and presented to this office until ______________ or fifteen months after the date of substantial completion of the Construction Contract as such completion date is defined in such Construction Contract, whichever first occurs.  

This letter is irrevocable and shall be in full force and effect unless notification in writing is received by you canceling same.  

This credit shall not be modified or amended except upon the written agreement of this Bank and the Yurok Indian Housing Authority.  

Sincerely,  

President
General Conditions for Construction Contracts - Public Housing Programs

Applicability. This form is applicable to any construction/development contract greater than $150,000.

This form includes those clauses required by OMB’s common rule on grantee procurement, implemented at HUD in 2 CFR 200, and those requirements set forth in Section 3 of the Housing and Urban Development Act of 1968 and its amendment by the Housing and Community Development Act of 1992, implemented by HUD at 24 CFR Part 135. The form is required for construction contracts awarded by Public Housing Agencies (PHAs).

The form is used by Housing Authorities in solicitations to provide necessary contract clauses. If the form were not used, HAs would be unable to enforce their contracts.

Public reporting burden for this collection of information is estimated to average 1.0 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Responses to the collection of information are required to obtain a benefit or to retain a benefit. The information requested does not lend itself to confidentiality.

HUD may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB number.

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These Special Provisions have been provided to include clarification, modification, adjustment, and addition to the standard General Provisions HUD-5370 document. Supplemental information is as follows:

1. Definitions part (a) "Architect" is to be replaced with "Engineer", and part (h) shall be modified to read: “PHA” means the Public Housing Agency organized under applicable state and/or Tribal laws which is a party to this contract.

9. Specifications and Drawings for Construction: include part "(j) Reproductions of contract drawings and specifications will be furnished to the Contractor at the cost of production. All drawings and specifications will be provided electronically in PDF format at no charge to the Contractor.

15. Availability and use of utility Services shall include: (c) The Contractor shall coordinate with applicable utility purveyors and municipalities to adequately provide required temporary utility facilities to satisfactorily complete the requirements of the contracted project.

25. Contract Period shall read: The Contractor shall complete all work required under this contract within one hundred and eighty calendar days (180). Construction work will not be permitted on Saturdays, nor on New Year's Day, Veterans Day, Thanksgiving Day, and Christmas Day, nor any other holiday declared by the federal government. However, the Owner, when in his opinion it is justified, may grant the Contractor permission to work on any of the previously mentioned days upon written request by the Contractor received no less than seventy-two (72) hours prior to the day in question. Regular work shifts shall be eight hours per day, Monday through Friday, except holidays indicated. Time of beginning and ending of day's work shall be approved by the Owner's Representative.

27. Payments part (d) shall read: The Contractor shall submit, on forms provided by the PHA, periodic estimates showing the value of the work performed during each period based upon the approved breakdown of the contract price. Such estimates shall be submitted no later than fourteen (14) calendar days in advance of the date set for payment. Submittals are subject to correction and revision as required. The estimates must be approved by the Contracting Officer with the concurrence of the Engineer prior to payment. If the contract covers more than one project, the Contractor shall furnish a separate progress payment estimate for each project.

29. Changes part (f) shall include: (4) in strict compliance with 24 CFR 85.36 (f)(4) the cost plus percentage of cost method of contracting shall not be used, however the combination of overhead and profit for any given change considered for integration into the contract shall not constitute a cost in excess of fifteen percent (15%) of the proposed hard cost.

33. Liquidated Damages part (a) shall read: If the Contractor fails to complete the work within the time specified in the contract, or any extension, as specified in the clause entitled Default of this
contract, the Contractor shall pay to the PHA as liquidated damages, the sum of **five-hundred dollars ($500.00)** US Currency, per unit per calendar day for each day of delay. Liquidated Damages shall accrue for each calendar day including weekends, federal holidays, and any and all other days not expressly designated as work days. If different completion dates are specified in the contract for separate parts or stages of the work, the amount of liquidated damages shall be assessed on those parts or stages which are delayed. To the extent that the Contractor’s delay or nonperformance is excused under another clause in this contract, liquidated damages shall not be due the PHA. The Contractor remains liable for damages caused other than by delay.

36. Insurance part (a) subpart (2) shall read: Commercial General Liability with a combined single limit for bodily injury and property damage of not less than one-million ($1,000,000) per occurrence to protect the Contractor and each subcontractor against claims for bodily injury or death and damage to the property of others…

36. Insurance part (a) subpart (3) Automobile Liability on owned and non-owned motor vehicles used on the site(s) or in connection therewith for a combined single limit for bodily injury and property damage of not less than one-million dollars ($1,000,000) per occurrence.

40. Employment, Training, and Contracting Opportunities for Low-Income Persons, Section 3 of the Housing and Urban Development Act of 1968 shall include: (h) Contractor shall comply with the TERO policy of the Housing Authority as a course of compliance with the requirements of 24 CFR Part 135.

49. Laws and Permits Affecting Work: The Contractor must at all times observe and comply with all Federal, State, City, County, and Tribal Laws, Ordinances, and Regulations (including requisition of the Tribal Historical Preservation Officer (THPO) clearance and Tribal Employment Rights Ordinance (TERO) Permit) which in any manner affect the conduct of the work, and all such orders and decrees as exist at the present and which may be enacted later by legislative bodies or tribunals having legal jurisdiction or authority over the work of all other required permits, certificates, and licenses shall be obtained by and at the expense of the Contractor. No pleas of misunderstanding or ignorance thereof will be considered. The Contractor must be wholly responsible for any claim or liability arising from or based on the violation of any such law, ordinance, regulation, order, or decree.

**End Section 007210**
In accordance with 25 U.S.C. 452 et seq. and 25 U.S.C. 455 et seq., award shall be made under unrestricted solicitations to the lowest responsive bid from a qualified Indian-Owned Economic Enterprise or Organization within the maximum total contract price established for the specific project or activity being solicited, if the bid is no more than "X" higher than the total bid price of the lowest responsible bid from any qualified bidder. The factor "X" is determined as follows:

\[ X = \text{lesser of:} \]

When the lowest responsive bid Is:

less than $100,000.00

At least $100,000.00,
But less than $200,000.00
At least $200,000.00,
But less than $300,000.00
At least $300,000.00,
But less than $400,000.00
At least $400,000.00,
But less than $500,000.00
At least $500,000.00,
But less than $1 million
At least $1 million,
But less than $2 million
At least $2 million,
But less than $4 million
At least $4 million,
But less than $7 million
$7 million or more

10% of that bid, or $9,000.00
9% of that bid, or $16,000.00
8% of that bid, or $21,000.00
7% of that bid, or $24,000.00
6% of that bid, or $25,000.00
5% of that bid, or $40,000.00
4% of that bid, or $60,000.00
3% of that bid, or $80,000.00
2% of that bid, or $105,000.00
1% of that bid, with no dollar limit.
SECTION 007343
WAGE RATE REQUIREMENTS

SECTION 1 GENERAL

1.1 Federal prevailing wages are applicable for this project as detailed in HUD-5370.46(a). Current Davis-Bacon rates must be followed.

1.2 The wage determination of the Secretary of Labor will need to be administered for this project. The Contractor will be required to provide a HUD-4720 just prior to the signing of the contract for work.

1.3 You can obtain the current Prevailing Wage Rates at https://beta.sam.gov/. Applicable rates are for:

1.3.1 State of California
1.3.2 County of Del Norte
1.3.3 Construction Type = Residential
1.3.4 WD # = CA20200031

SECTION 2 PRODUCTS

2.1 Not used.

SECTION 3 EXECUTION

3.1 Not used.

End of Section 007343
SECTION 009100
ADDENDA

PART 1: GENERAL

1.1 Description

A. Addenda shall be defined as a document that provides supplement, appendix, clarification, or addition to the bidding and contracting documents.

B. Addenda will be the only official modification means to be implemented during the pre-bid timeframe of the project.

C. All potential bidder submitted requests for clarification and interpretation during the pre-bid time of the project, including submissions provided during the pre-bid conference will be addressed via addenda.

D. The final addenda will be released no less than three (3) business days prior to the date of bid. All requests submitted following the official date of release of the final addenda will be collected by the Owner with the intention of address following bidding and prior to issuance of a contract.

E. If a request is received following release of the final addenda that warrants clarification prior to bidding then the due date for bids can be postponed at the Owner’s discretion. All other requests received following release of the final addenda will be addressed with the successful bidder prior to ratification of the contract.

PART 2: PRODUCTS (not used)

PART 3: EXECUTION

3.1 The following is an example Addendum form similar to the one that will be provided for this contract.
This addendum provides changes and/or clarifications, to the Contract Documents. These modifications pertain to the sections referenced below and to all other referenced or applicable sections in the Contract Documents.

Please sign the addendum receipt acknowledgment form and return to the Owner with your cost proposal and other required forms and documents.

Changes and/or clarifications to the bidding and contracting documents are as follows:

1. 
Addendum Receipt Acknowledgement Form

Receipt of Acknowledgement:
My firm received Addendum No. ________, consisting of _____ pages, for the ____________________________

Project on ______________________, 20___.

Name of Firm ____________________________
Name (Print) ____________________________
Name (Signature) _________________________
Date: __________________________

END OF SECTION 009100
PART 1 GENERAL

1.1 CONTRACTOR RESPONSIBILITY
   A. Contractor responsibility for each item of work for the project includes provision of all labor, equipment, materials, supervision, administration, and all other pertinent items required to competently and satisfactorily complete each task.

1.2 MEASUREMENT AND PAYMENT
   A. Measurement and payment for all work to be in accordance with the schedule of amounts and actual work completed, as field measured and verified by the Engineer. All payments to be made following field verification by the Engineer of completed work, and submittal of (at a minimum):
      a. Periodic Estimate of work complete,
      b. Updated Construction Schedule,
      c. Certified Payroll,
      d. Un/conditional Lien Waivers from all subcontractors and major suppliers.

1.3 Work Items Brief Description
   A. 000000-01 General Conditions
      a. Measurement and payment for this item will be determined based on the percentage of all other completed tasks. Payment for this item will be in the same percentage as the invoiced percentage of the total original contract amount as determined per invoice. Final invoice and payment to include no less than ten percent (10%) of the total amount of this bid item.
      b. This item is to cover the cost of all administration, overhead, bonding, insurance, incidentals, and other soft costs not covered within the other items of the bid schedule.
   B. 015000-01 Temporary Facilities
      a. Access to the project site is limited to a single driveway. Temporary Traffic Control may be required for short durations to move materials and equipment to and from the site.
      b. Restroom facilities will need to be provided and maintained for the duration of the project in conformance with OSHA requirements.
      c. Temporary fencing may need to be implemented for the site to help provide security against material and equipment theft as well as to promote safety workers and general public.
      d. Securable containers for tools remaining on site are highly recommended.
      e. Electricity will need to be provided by the Contractor via portable generators or, temporary construction service from the local electrical provider. It is the Contractor’s responsibility to coordinate with PPL for temporary electricity service and to pay for all costs associated with the temporary service.
f. Water will need to be provided by the Contractor. Watering of soils for compaction and dust control will need to be provided by the Contractor. Trucks or temporary use of municipal water are acceptable provisions of water. The Contractor will have the responsibility of provided all needed water for construction.

g. Additional temporary facilities, as determined to be necessary by the Contractor must also be provided and paid for under this bid item. No allowance will be made for additional temporary facilities’ cost following bidding unless such facilities are directly caused by a change in the contract scope of work and identified as such under an official change order.

C. 017100-01 Mobilization/Demobilization
   a. Measurement and payment for mobilization/demobilization will be determined based on the percentage of all other completed tasks. Payment for this item will be in the same percentage as the invoiced percentage of the total original contract amount as determined per invoice.
   b. Final invoice and payment to include no less than ten percent (10%) of the total amount of this bid item.
   c. Item to cover cost of mobilizing and demobilizing of all equipment, personnel, and materials to/from the site for the duration of the project and as needed in order to complete the project.
   d. Mobilization/Demobilization cost is to be for primary activities. Subsequent mobilizations to the site not expressly caused by alterations or modifications to the contract Scope of Work, or otherwise justified by unforeseen causes will not be considered for additional compensation or extension of contract time.

D. 033000-01 Foundation
   a. Foundation work to include all work necessary to build the primary home foundation, the garage foundation, and foundation systems for the porches. All other concrete work required for this project to be included under other items of the bid schedule that include concrete work such as sidewalks, hvac pads, and propane tank pads, to name a few.
   b. Contractor to coordinate with Owner’s inspector for evaluation and approval of all false work, reinforcement, seismic restraint, and utilities that will be covered by or encapsulated in concrete prior to concrete placement.
   c. All concrete work to follow in strict conformance with American Concrete Institute requirements for forming, placement, curing, expansion joints, and reinforcement.

E. 061000-01 Framing
   a. Item to cover all rough framing, trusses, and sheathing for the total home system including the garage and porches. All framing to be per plan and industry standard.
   b. Exterior walls and plumbing walls to be six inch framing. Interior walls to be four inch framing. Roof system for main house and garage to be shop manufactures trusses. Covered porch roof system can be manufactured truss or rafters.

F. 064619-01 Interior Baseboard, Trim, & Closets
   a. No MDF is to be used on this project.
   b. Pine baseboard is to be provided throughout. Pine baseboard is to be O.G. profile or similar style (as approved by Owner) and be the same throughout all rooms.
   c. All baseboard will need to be primed and painted following installation. All cuts and areas removed of manufacturer applied primer to be replaced prior to painting.
All board to receive no less than two coats of paint. Note: priming and painting board cost may be included in Interior Paint bid item or here, whichever is preferred. All baseboard and trim will need to be caulked and sealed around all edges prior to painting.

d. Interior trim to be finger-jointed pine, pre-primed Colonial or similar style (as approved by the Owner).

G. 072100-01 Insulation
   a. Measurement and payment to be per lump sum.
   b. All insulation to be per plan, or approved equal alternate. Insulation R factors to be (minimum typical R19 in all exterior walls, R30 in ceiling, & R13 in all interior walls) unless otherwise noted on the plans.
   c. Baffles are to be installed in all locations that insulation runs in conflict with vents. Baffles to be 2x12” and provide a minimum of 12” clear space in front of all vents. Baffles should be installed at approximately 45 degrees to the vent.

H. 073113-01 Roof System
   a. A complete roof system is to be provided for the building. Typical roof system components include 5/8” CDX plywood (price under 061000-01 framing), 15# underlayment, and 30 year architectural composition shingle.
   b. Miscellaneous components such as h-clips, nails, screws, flashing, drip edge, ridge cap, and ventilation can be found under Section 073113 of the Technical Specifications.
   c. All sheathing nailing will require inspection. Failure to secure Owner inspection and acceptance prior to felt or roofing installation will result in the Contractor removing roofing and felt for inspection. All removed and replaced roofing will be at the sole expense of the Contractor. No allowances will be made for such replacement for the cost of the demolition and replacement nor for the additional time for such activities.
   d. All roof valleys are to be “woven”. No exposed metal valleys are to be used.
   e. Ridge cap is to be installed such that the final cap piece is over an eave. Ridge caps are to be installed to reduce the potential for wind damage by placing caps sequentially from south to north and from east to west. Exposed nails in final ridge cap over eave to be caulked and sealed in place.

I. 074646-01 Siding, Soffit, and Exterior Trim
   a. Contractor to procure new, provide, and install cement fiber siding and soffit for the entire building (garage and porches included). Soffit to be vented under all eaves and solid under porch covers. Siding to be simulated cedar with 7.25” reveal/pattern or equal alternate as approved by the Owner.
   b. Lap siding butt ends to be equipped with 15# felt underlayment strip 6” wide that spans 3” minimum above the butt joint on the wall and overlaps onto the top of the board below the butt joint (while still concealed by the fiber board finish install) to promote any water penetration through butt joints to be transported to the board face surface below.
   c. Exterior trim to be cement fiber board. Exterior trim to be a minimum of 3.5” wide. For multiple windows side by side a 5.5” or 7.5” wide trim will be needed such that the trim between windows is a single board.
d. Fascia boards are to be included under this item. Fascia boards are to be cement fiber board over 2x6 pine. Pine is to be primed prior to cement fiber board install. Cement fiber board to be primed and painted prior to gutter install.

J. 077123-01 Seamless Gutters & Downspouts
   a. Contractor to provide and install seamless gutters and downspouts for the home. Gutters to capture 100% of rainwater shed from the roof system. Gutters are to be fitted with leaf/debris guards. Downspouts to be provided in a sufficient quantity to transfer rainwater shed from the roof system to the ground in a typical storm event (minimum two downspouts per primary exterior wall).
   b. Contractor to provide concrete splash blocks at terminus of each downspout.

K. 081100-01 Windows & Doors
   a. Windows and doors to be per plan schedules. All windows and doors to meet Wildland Urban Interface (WUI) requirements and energy efficiency requirements.
   b. Windows to be tempered, double pane, argon filled, and vinyl framed.
   c. All doors to be solid core, unless otherwise specified.
   d. Exterior doors to be keyed alike (single key to open all exterior doors). All exterior doors are to be equipped with deadbolts.

L. 092000-01 Sheetrock
   a. Gypsum board to be installed per plans. All board to be installed using screws (no nails).
   b. All board within wet zones of the building to be moisture, mold, and mildew resistant. Green/purple board to be installed on full wall (eight foot height) and ceiling.
   c. All ceiling board to be standard 5/8”. All walls to be ½”.
   d. All corners and edges to be equipped with bull-nose metal edging.
   e. Screws to be installed at 8” on-center for perimeter and 12” on-center through the field.

M. 096000-01 Flooring
   a. Luxury Vinyl Plank flooring system to be provided and installed by the contractor throughout the home. Flooring system to include underlayment, moisture barrier, cushion (as single plank system), base board (price in item above), transition molding, and all other pertinent components.
   b. Contractor to provide attic stock of flooring, minimum five percent of total square footage installed.
   c. All flooring systems to be installed per manufacturers’ recommendations.

N. 099000-01 Paint, Stain, & Seal
   a. Exterior painting to include one coat of primer and two coats of paint (minimum). All exposed exterior components of the home to receive paint including but not limited to siding, trim, soffit, fascia, doors, and all other pertinent components typically painted.
   b. Interior paint to include two coats primer and two coats paint (minimum). Interior paint to include alternate sheens and colors for wall, ceiling, and trim.
   c. All exposed wood for the home will need to be stained and sealed to protect against the elements.
   d. Contractor will need to provide submittals for paint and stain and receive color selection and approval from the Owner prior to ordering.
e. Contractor to procure paint and stain new from a single source.
f. Contractor to provide attic stock of all paint and stain used. Attic stock to include a minimum of one gallon of each color used.

O. 103000-01 Wood Stove System
a. Wood stove system to include (at a minimum): hearth, stove, piping w/ ceiling support, insulation shield, drip collar and spark arrester/rain cap, ceiling blocking, and electrical for blower.
b. Stove to be cast iron construction with glass face and be EPA emission certified (4.1 gph catalytic, 7.5 gph non-catalytic). Stove to be able to accommodate 20” minimum log length. Hearth to be sized to accommodate stove manufacturer recommended setbacks from wall, generally 60” on edge.

P. 123530-01 Casework
a. All casework to be constructed of solid wood. No particle, OSB, melamine, or alternate composite or compressed systems are to be used. Cabinets to be “cabinet grade” CC plywood. Cabinet doors to be solid wood panel and frame.
b. All drawer and door hinges to be moderate to severe use rated. All hardware to be safety close systems.
c. Contractor to coordinate for all blocking install in wall for cabinets. All blocking to be inspected prior to sheetrock/wall cladding install.
d. Casework to meet the requirements of HUD Certified Severe Use Construction. All casework to be secured new from a single source for this project. Contractor to provide submittal for style and color selection and secure approval prior to cabinet order.

Q. 123600-01 Countertops
a. Countertop to be solid surface with backsplash (4” minimum height) and bull nose or O.G. edge.
b. Countertop pattern and color to be selected by Owner under submittal process.

R. 200000-01 Propane Rough In
a. Propane facilities to be installed per propane provider recommended practices and industry standards. Propane supply lines to be installed for the kitchen range, water heater, and clothes dryer. Please note that the kitchen range and clothes dryer are to be equipped with both propane and electric options.

S. 200000-02 Propane Finish
a. Finish work to include all propane supply work not included under rough in. Finish, at a minimum to include connection of all appliances and equipment.
b. Contractor to coordinate with propane purveyor for all connections. Contractor price to include all costs of propane purveyor for appliance and equipment connections.

T. 311000-01 Fire Suppression Rough In
a. Item to include all work necessary to install fire suppression system rough in per plans. Rough in to include all work that will be concealed behind sheetrock as well as stubout for connection to site water, flush drain, valves, and sprinkler heads with temporary covers to protect heads during sheetrock and paint work.
b. System pressure, leak, and flow testing to occur prior to insulation installation. Pressurized system testing to occur at 150% operating pressure for a minimum of two hours.
U. 311000-02 Fire Suppression Finish
   a. Item to include all finish work including install of sprinkler head covers, trim around valve box and box cover.
   b. Provide system certification, warranty documentation, operation and maintenance manuals, and all other support documentation for the system in two complete sets. One set to stay onsite for the home owner and the other set to be provided to YIHA.

V. 220500-01 Plumbing Rough In
   a. Procure, provide, and install all domestic and wastewater rough plumbing under this item.
   b. All plumbing materials to be procured new for this project.
   c. All plumbing install to be per California Plumbing Code, current edition unless otherwise noted.
   d. Contractor to coordinate plumbing inspection and testing with Owner’s Inspector prior to installation of insulation and sheetrock. Domestic supply pressure test to be minimum two hour at one-hundred fifty percent of operating pressure (60 psi typical). Wastewater test to be minimum two hour at full pipe to elevation of lowest breather pipe stubbed above roof. Retesting, if required, of failed system to be at the Contractor’s expense and at no additional cost to the Owner. No additional time will be considered for the contract to accommodate failed system repairs or repeat testing.

W. 220500-02 Plumbing Finish
   a. Contractor to procure, provide, and install all finish plumbing under this item. Finish plumbing to include, but not be limited to all sinks, toilets, tubs/showers, faucets and any and all other plumbing components not included under rough plumbing and not expressly itemized hereunder but typically included as finish plumbing work, such as connection of supply and waste water plumbing to finish fixtures.

X. 232000-01 HVAC Rough In
   a. HVAC rough in work to include all work needed to install heat pump concrete pad, heat pump condenser unit, air handler, ductwork, electrical disconnects, line sets, condensation drain system, thermostat wiring, register boxes, and all other work necessary to install all HVAC system components in areas of the home that will be inaccessible following install of sheetrock.
   b. Line sets and electrical to be installed inside walls, under floor, or above ceiling. No surface mounting to be performed.
   c. Install of all components to be per manufacturer recommendations and industry standard.

Y. 232000-01 HVAC Finish
   a. HVAC finish work to include all work necessary following completion of interior paint. Work at a minimum to include install of registers, thermostat, return air filter and grill.
   b. System balancing to follow all interior work that will cause dust or particulates that would potentially enter or compromise the HVAC system or shorten the projected useful life of the filter.
   c. Contractor to provide one filter in place and one attic stock filter following final cleaning of interior of home.
d. Operation, Maintenance, and warranty documentation for the system to be provided in two packets. One packet to remain onsite for the home owner and the other packet is to be provided to YIHA for their records.

Z. 260500-01 Electrical Rough In
   a. Item to include PPL approved, surface mounted meter/load panel, surface mounted manual transfer switch, 200 amp subpanel, and all other electrical wiring, boxes, and circuitry for the home.
   b. Site trench work and connection to PPL existing facilities to be included in item 337000 below.

AA. 260500-02 Electrical Finish
   a. Electrical finish to include all electrical work not included and installed under electrical rough-in. Finish, at a minimum to include light fixtures, fans, switches, outlets, plates, and all other electrical work typically installed following cladding install and painting.

BB. 311100 Clearing & Grubbing
   a. Contractor to strip all volunteer vegetation on the site in all locations scheduled to receive improvements. Topsoil layer in building footprint to be stripped and spread throughout site landscape zones. Generated green waste to be hauled off site and disposed of in strict conformance with applicable regulations.

CC. 312200-01 Grading
   a. In General the site is to be graded to promote storm runoff away from the new home. Finish grading will need to provide a minimum of twenty feet of two percent minimum slope away from the new home in every direction and help direct runoff towards existing storm drains or drainage ways.

DD. 312300-01 Building Pad
   a. Building pad will need to be cleared of all conflicts, shaped and compacted to accommodate proposed foundation system. All over-excavated areas of the building pad scheduled to receive concrete will need to be backfilled with Class 2 aggregate base that is three quarters inch minus. All aggregate base to be compacted to a minimum of ninety-five percent as field verified per Cal 216. Building pad to span no less than five feet beyond exterior wall of foundation system for conformity and compaction.

EE. 321600-01 PCC 5'x4" (WxD) Sidewalk
   a. Sidewalk to be installed per plans. All sidewalk subgrade to be prepared with a minimum of four inches of class two aggregate base. All base to be installed and compacted in place prior to sidewalk formboard placement. Subgrade fine tune work can occur following formboard placement but will need to be compacted mechanically with vibe plate or other means prior to concrete placement.
   b. All sidewalks to be broom finished perpendicular to the flow of traffic. All exposed corner edges of sidewalks to be chamfered ½” radius typical.
   c. Sidewalks to be built with deep expansion joints at five foot on center typical or at intervals that present a uniform finish appearance but that are no greater than eight foot on center.

FF. 331100-01 Water Service
   a. Contractor to field verify location of and provide connection for home to existing onsite well. Contractor to procure new, provide and install all required components
for the water connection including but not limited to: one inch domestic water line, one and one-half inch fire suppression line, pump house system with pump, tank, cover, concrete pad, electrical connection, pump control, and required valves and miscellaneous plumbing components.

b. Domestic water and fire suppression water to be connected to single source water system and supply water independently to the home.

GG. 333000-01 Sewer Connection

a. Contractor will need to field verify location of existing onsite wastewater system and provide connection of the home to the existing sanitary sewer system. House wastewater line to be three inch. All site plumbing between the house and septic tank to be four inch diameter.

b. Contractor to verify flow line elevation at existing septic tank and provide for waste plumbing gravity flow from the house to the existing tank at a minimum of one percent slope.

HH. 335200-01 Propane Service

a. Contractor to coordinate service with propane purveyor. Contractor to include in price all fees by propane purveyor, including but not limited to, tank install, propane line install in trench, and connection of tank to building.

b. Contractor to provide all necessary trench work for propane service from tank to building under this item. Trench excavation and backfill to be per propane purveyor recommendations.

c. Contractor to install concrete tank pad to meet the minimum dimensions for a one hundred and fifty gallon tank and in strict conformance with propane purveyor recommendations. Concrete pad to be four inches thick. Nominal dimensions, to be verified with propane purveyor prior to install, are 30” wide by 60” long.

d. All propane work within the building footprint to be provided under item 200000 above.

II. 337000-01 Electric Service

a. Contractor to provide underground service connection between existing electrical main facilities at property frontage to new service panel at home. Contractor to coordinate all activities with PPL.

b. Conduits and trench work to be per PPL requirements. Contractor to coordinate trench inspection with PPL and cover all costs of PPL inspection.

c. Owner will provide electric service application and cover cost of application fees.

JJ. 338000-01 Telecom Service

a. Contractor to provide underground telecom connection from the existing facilities at property frontage to the new home. Contractor to provide conduit equipped with pull-tape. Frontier to pull wires and install d-mark on outside of home. Contractor to install single line within building from d-mark to a single jack outlet in the kitchen near the back door.

b. Contractor to coordinate with Frontier for telecom facility install. All trench excavation and backfill to be per Frontier requirements.

2 PRODUCTS (NOT USED)
3 EXECUTION (NOT USED)

END OF SECTION 011000
SECTION 011400
WORK RESTRICTIONS

PART 1  GENERAL

1.1 Related Documents
   A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions.

1.2 Use of Premises
   A. Use of Property: Limit use of premises to work in areas indicated and for the purpose of this specific project. Do not disturb portions of the property beyond the areas in which the Work is indicated. If disturbed, repair and restore to a condition equal to or greater than existed prior to impact.
   B. Owner Occupancy: Allow for Owner and public occupancy of the site(s) and surrounding areas.
   C. Driveways and Entrances: Keep driveways and entrances serving premises clear and available to Owner, Owner’s employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
      a. Schedule deliveries to minimize use of driveways and entrances.
      b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

1.3 Occupancy Requirements
   A. Occupancy: neighbors and the Owner will occupy existing adjacent properties during the entire construction period. Cooperate with neighbors during construction operations to minimize conflicts and facilitate use and access to their homes and businesses. Perform the Work, so as not to interfere with neighbor’s operations.

1.4 Special Work Restrictions
   A. The following will not be tolerated or permitted on site.
      a. Loud or objectionable music or language.
      b. Visually explicit or profane clothing, language, and/or gestures.
      c. Smoking.
   B. All products, adhesives, sealers, and chemicals associated with installation of materials and construction activities shall be low VOC content.

1.5 Utilities
   A. Work requiring shutdown of utilities serving occupied areas must be scheduled in writing a minimum of seventy-two (72) hours in advance of shutdown or the minimum amount of time as required by the utility purveyor, whichever is greater.

PART 2:PRODUCTS (Not Used)
PART 3:EXECUTION (Not Used)

END OF SECTION 011400
PART 1 - GENERAL

1.1 Description

A. The Contractor may submit to the Owner value-engineering (VE) proposals that change the Contract Documents resulting in Construction Cost Savings and Time Savings. The Owner will share with the Contractor any cost savings that result from an approved VE proposal.

1.2 Requirements

A. The VE proposal must maintain the essential functions and characteristics of the facility including but not limited to safety, service life, ease of maintenance, and appearance.

B. The Contractor's Conceptual VE proposal will be reviewed by the Owner, and if approved, the Contractor shall submit a formal VE proposal including revised drawings prepared and stamped by a California licensed Professional Engineer, specifications, distribution of quantities and cost savings, which reflect the work required to complete the VE proposal.

1.3 Conditions

A. The Owner will be the sole judge of the VE proposal in determining the following:

   a. Approval or Disapproval
   b. Construction Cost Savings
   c. Time Savings
   d. Advantages and/or Disadvantages

B. The Owner reserves the right to disregard the contract unit bid prices if, in the judgment of the Engineer, such prices do not represent fair value for the work to be performed or deleted. The Engineer will adjust the contract unit bid prices in evaluating the Construction Cost Savings of the VE proposal. If the Owner approves the VE proposal, the Owner will order changes to the Contract Documents that reflect the VE proposal in accordance with the contract documents.

1.4 Measurement and Payment

A. If the Owner approves the VE proposal, the Owner will provide measurements and payments in accordance with the contract documents.

B. The Owner and the Contractor shall equally share the Construction Cost Savings amount resulting from the VE proposal. The Contractor shall receive twenty-five percent (25%) of the Contractor's share when the VE proposal is approved. The Contractor shall receive
seventy five percent (75%) of the Contractor's share when the Engineer has accepted the work related to the VE Scope.

1.5 Reimbursement

A. The Owner will not reimburse the Contractor for any engineering or preparation expenditures of the VE proposal.

PART 2: PRODUCTS (not used)

PART 3: EXECUTION

END OF SECTION 012400
SECTION 012500
PRODUCT SUBSTITUTIONS

PART 1 – GENERAL

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

1.2 SUMMARY
A. Section includes administrative and procedural requirements for substitutions.
B. Related Requirements:
   a. Division 01 Section "Product Requirements" for requirements for submitting
      comparable product submittals for products by listed manufacturers.
   b. Divisions 02 through 48 for specific requirements and limitations for
      substitutions.

1.3 DEFINITIONS
A. Substitutions: Changes in products, materials, equipment, and methods of construction
   from those required by the Contract Documents and proposed by the Contractor.
   a. Substitutions for Cause: Changes proposed by Contractor that are required due to
      changed Project conditions, such as unavailability of product, regulatory changes,
      or unavailability of required warranty terms.
   b. Substitutions for Convenience: Changes proposed by Contractor or Owner that
      are not required in order to meet other Project requirements but may offer
      advantages to the Contractor and/or the Owner.

1.4 ACTION SUBMITTALS
A. Substitution Requests: Submit two (2) copies of each request for consideration. Identify
   product or fabrication or installation method to be replaced. Include Specification Section
   number and title and Drawing numbers and titles.
   a. Substitution Request Form: Use CSI Form 13.1A or approved alternate.
   b. Documentation: Show compliance with requirements for substitutions and the
      following, as applicable:
      i. Statement indicating why specified product or fabrication or installation
         cannot be provided, if applicable.
      ii. Coordination information, including a list of changes or revisions needed
          to other parts of the Work and to construction performed by Owner and
          separate contractors that will be necessary to accommodate proposed
          substitution.
      iii. Detailed comparison of significant qualities of proposed substitution with
          those of the Work specified. Include annotated copy of applicable
          Specification Section. Significant qualities may include attributes such as
          performance, weight, size, durability, visual effect, sustainable design
          characteristics, warranties, and specific features and requirements
          indicated. Indicate deviations, if any, from the Work specified.
iv. Product Data, including drawings and descriptions of products and fabrication and installation procedures.

v. Samples, where applicable or requested.

vi. Certificates and qualification data, where applicable or requested.

vii. List of similar installations for completed projects with project names and addresses and names of Engineers and Owners.

viii. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.

ix. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.

x. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.

xi. Cost information, including a proposal of change, if any, in the Contract Sum.

xii. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.

xiii. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

c. Engineer's Action: If necessary, Engineer will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Engineer will notify Contractor through Construction Manager of acceptance or rejection of proposed substitution within fourteen (14) calendar days of receipt of request, or seven (7) calendar days of receipt of additional information or documentation, whichever is later.

i. Forms of Acceptance: Change Order, Construction Change Directive, or Engineer's Supplemental Instructions for minor changes in the Work.

ii. Use product specified if Engineer does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.6 PROCEDURES

A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.
PART 2 – PRODUCTS

2.1 SUBSTITUTIONS
   A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than fourteen (14) calendar days prior to time required for preparation and review of related submittals.
      a. Conditions: Engineer will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Engineer will return requests without action, except to record noncompliance with these requirements:
         i. Requested substitution is consistent with the Contract Documents and will produce indicated results.
         ii. Requested substitution provides sustainable design characteristics that specified product provided.
         iii. Substitution request is fully documented and properly submitted.
         iv. Requested substitution will not adversely affect Contractor's construction schedule.
         v. Requested substitution has received necessary approvals of authorities having jurisdiction.
         vi. Requested substitution is compatible with other portions of the Work.
         vii. Requested substitution has been coordinated with other portions of the Work.
         viii. Requested substitution provides specified warranty.
         ix. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
   B. Substitutions for Convenience: Engineer will consider requests for substitution if received within thirty (30) calendar days of issuance of the Notice to Proceed. Requests received after that time may be considered or rejected at the discretion of the Engineer.
      a. Conditions: Engineer will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Engineer will return requests without action, except to record noncompliance with these requirements:
         i. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Engineer for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
         ii. Requested substitution does not require extensive revisions to the Contract Documents.
         iii. Requested substitution is consistent with the Contract Documents and will produce indicated results.
         iv. Requested substitution provides sustainable design characteristics that specified product provided.
v. Substitution request is fully documented and properly submitted.
vi. Requested substitution will not adversely affect Contractor's construction schedule.
vii. Requested substitution has received necessary approvals of authorities having jurisdiction.
viii. Requested substitution is compatible with other portions of the Work.
ix. Requested substitution has been coordinated with other portions of the Work.
x. Requested substitution provides specified warranty.
xi. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500
SECTION 012613
REQUESTS FOR INTERPRETATION (RFI)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Administrative and procedural requirements for handling and processing RFI.

1.2 SECTION INCLUDES

A. Administrative and procedural requirements for handling and processing RFI.

1.3 DEFINITIONS

A. Definitions used in this article are not intended to change or modify the meaning of other terms in the Contract Documents.
B. Request for Interpretation (RFI): A request for information by the Contractor to the Owner/Engineer for clarification of intent of any portion of the Contract Documents after the Award of Contract and during the construction of the Project.
C. The following are NOT Requests for Interpretation.
   a. Change Orders.
   b. Construction Change Directives.
   c. Substitution Request.
   e. Field Order.
   f. Shop Drawings.
   g. Normal questions contained in a typical shop drawing submittal.
   h. Clarifications during Bidding.

1.4 REQUESTS FOR INTERPRETATION (RFI's) DURING CONSTRUCTION

A. RFI’s are logged-in at the Engineer's Office, not necessarily with same date as indicated by the Contractor on RFI form. The response time will commence upon the date of receipt by the Engineer.
   a. E-mail copies of RFI’s sent by the Contractor and received on or after a Friday after 2:00 PM are to be dated the following Monday, holidays excepted.
B. RFI: If clarification of any portion of Construction Documents is required, submit a RFI to the Engineer and the Owner’s Representative in accordance with the following procedures:
   a. RFI Format:
      i. Submit on a standard form developed by the Contractor.
      ii. RFI's shall be sequentially numbered; and include the following:
          1. Date
          2. Project name and number
          3. Contractor’s name, address, telephone number and fax number.

Request for Interpretation

TVCE
(RFI)
4. Description of subject and discipline (trade) in question.
5. Adequate space for Engineer to respond, sign, and date.

iii. Contractor shall submit a copy of the format to the Engineer and Owner’s Representative at start of Project for review, comment, and acceptance.

C. RFI Inquiry:
   a. Clearly state and completely define the issue requiring interpretation. Provide drawing and detail numbers, specification section numbers and paragraphs, sketches and other reference information.
   b. Provide potential solutions to issues when possible.
   c. Provide cost and schedule implications, if any.
   d. Ambiguous RFI’s will be returned to Contractor without formal action.

D. RFI Submission Process:
   a. The Contractor shall submit an RFI, in writing, to Engineer immediately with a copy to the Owner’s Representative when any issue requiring clarification arises.
      i. Unless specifically stated on RFI, the Engineer and the Owner will assume adjustment to the Contract Amount and the Project Schedule is not required.
      ii. The Engineer will review and respond only to RFI’s received in writing from the Contractor. When possible, email RFI's can be accepted given the Owner, Engineer, and Contractor agree and Contractor is able to verify delivery of RFI either email receipt, follow up phone call or alternate method.
      iii. For paper RFI; submit one (1) copy of each RFI and Engineer response, including any supplemental drawings and additional instructions, to the Owner’s Representative for recording purposes.
      iv. Review and response of RFI by Owner/Engineer will be accomplished within seven (7) calendar days from the date of receipt.
      v. RFI’s submitted to the Engineer without following these submission procedures will result in rejection of the submission without review and comment.

E. RFI Log:
   a. Contractor must maintain an RFI log indicating the RFI number, subject, date, response date and impact, if any on schedule, and cost.
   b. Contractor is to provide the updated log, at least once a month, to the Engineer and Owner’s Representative and at the request of the Engineer and/or Owner’s Representative.

PART 2 - PRODUCTS (Not Used)
PART 3 - EXECUTION (Not Used)

END OF SECTION 012613
PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Administrative and procedural requirements for proposing, processing, and securing Change Orders.

1.2 COST COMPUTATION

A. The cost of change orders to the contract will be computed as follows:
   a. In all cases, regardless of the method used to determine values of changes, estimated or actual cost shall be submitted in detailed breakdown form, giving quantity and unit costs of each item, labor costs, allowable overhead and profit.
   b. Where unit prices have not been established for the contract, the work shall be based on a lump sum adjustment determined by criteria outlined under Section 007200. The allowances including all overhead, commission, profit, and bond to be allowed for increase shall in no case exceed the percentages of net extra costs as itemized in Sections 007200 and 007210.
      i. For change orders these percentages shall include, but not be limited to:
         1. Insurance (other than mentioned herein),
         2. Bonds,
         3. Field and office supervisors and assistants,
         4. Use of small, portable tools and equipment, whether manual or automatic generally designed for individual use by a tradesman.
         5. Use of any manual tools and equipment, regardless of size, portability or end use,
         6. Average job engineering, stakeout, and layout.
         7. Incidental job burdens.
         8. General administrative costs required by reasonable extension of contract time if necessary as directly caused by the change.
      ii. Cost shall be computed to include actual cost of:
         1. Labor, including pro-rated charges for foremen.
         2. Materials entering permanently into the work.
         3. Ownership or rental cost of construction equipment during time of use for the extra work.
         4. Power and consumable supplies for the operation of power equipment.
         5. Insurance related to labor benefits required under union agreements.
         7. Applicable taxes.
B. Estimates for materials shall be based on reasonable, current prices at which materials are available to the Contractor and subcontractor(s). Satisfactory evidence of such costs shall be submitted with proposed change order.

C. When additions and credits are involved in any one change order, the allowance for overhead and profit shall be figured on the basis of net increase, if any. Full credit, not including allowances for Contractor’s overhead, profit, or commission shall be given the Owner for deductions. Values of taxes shall be included in deductions.

D. No work on proposed changes shall be started until the proposed changes have been approved by the Engineer and Owner.
   a. Exception: Where an emergency or a situation requires that changes in contract work be done prior to formal approval of the Change Order, the Authority shall issue a proceed order to the Contractor who must maintain an accurate account of all labor and material involved in the change. All proceed orders shall be followed by change order(s) in the approved manner prior to contract settlement, final payment, and release of retention.
      i. All Proceed Order time and material costs are subject to verification. Contractor must notify the Engineer, Owner, and/or Owner Representative when work on such changes is to start and when complete. All appropriate documentation itemizing time and materials must be provided to the Engineer/Owner.
      ii. To receive full recognition, labor assigned to contract changes via Proceed Order must, insofar as possible, work continuously on the change rather than interchanging between contract work and the change work.

E. In order that proposed changes in work, if they should occur, can be processed without undue delay, the Contractor shall indicate in each separate proposal requesting a change in the contract supporting information in detailed breakdown form including, at a minimum, the following:
   a. The exact location of the change requested.
   b. The square feet, square yards, cubic yards, linear measure, or any other unit of measure applicable to the work involved, together with the unit cost of labor and material by trades. Labor unit cost shall include associated insurance. Other types of protection are assumed to be covered by overall job insurance with no additional changes assigned to unit costs.
   c. Justification/clarification of the need for the change.
   d. Viable options for completing the proposed change with support documentation and associated costs.
   e. Valued engineering, when possible.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012657
PART 1 – GENERAL

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

1.02 SUMMARY
   A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.
   B. Related Sections include the following:
      a. Division 01 Section "Construction Progress Documentation" for administrative requirements governing preparation and submittal of Contractor's Construction Schedule and Submittals Schedule.

1.03 DEFINITIONS
   A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.04 SCHEDULE OF VALUES
   A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.
      a. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:
         i. Application for Payment forms with Continuation Sheets.
         ii. Submittals Schedule.
         iii. Contractor's Construction Schedule.
      b. Submit the Schedule of Values to Contracting Officer at earliest possible date but no later than seven calendar days before the date scheduled for submittal of initial Applications for Payment.
   B. Format and Content: Use the bid schedule as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section.
      a. Identification: Include the following Project identification on the Schedule of Values:
         i. Project name and location.
         ii. Name of Engineer.
         iii. Name of Construction Manager
         iv. Project Number.
         v. Contractor's name and address.
         vi. Date of submittal.
      b. Submit draft of HUD-51000 for HUD projects or AIA Document G703 Continuation Sheets for all other projects.
      c. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
i. Related Specification Section or Division.
ii. Description of the Work.
iii. Name of subcontractor.
iv. Name of manufacturer or fabricator.
v. Name of supplier.
vi. Change Orders (numbers) that affect value.
vii. Dollar value.

1. Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.

d. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate.
e. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
f. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
   i. Differentiate between items stored on-site and items stored off-site. If specified, include evidence of insurance or bonded warehousing.
g. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
h. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
   i. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.
   j. Schedule Updating: Update and resubmit the Schedule of Values before the next Application for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.05 APPLICATIONS FOR PAYMENT
A. Each Application for Payment shall be consistent with previous applications and payments as certified by Contracting Officer and paid for by Owner.
   a. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Contracting Officer and Contractor. The period of construction Work covered by each Application for Payment is the period indicated in the Agreement.
C. Payment Application Forms: Use forms provided by Contracting Officer for Applications for Payment.
D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Contracting Officer will return incomplete applications without action.
a. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
b. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

E. Transmittal: Submit two (2) signed and notarized original copies of each Application for Payment to Contracting Officer by a method ensuring receipt within twenty-four (24) hours. One copy shall include waivers of lien and similar attachments if required.
   a. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

F. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from every entity who is lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.
   a. Submit partial waivers on each item for amount requested in previous application, after deduction for retention, on each item.
   b. When an application shows completion of an item, submit final or full waivers.
   c. The Contracting Officer reserves the right to designate which entities involved in the Work must submit waivers.
   d. Waiver Forms: Submit waivers of lien on forms, executed in a manner acceptable to the Contracting Officer.

G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's liens from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.
   a. Submit partial waivers on each item for amount requested in previous application, after deduction for retention, on each item.
   b. When an application shows completion of an item, submit final or full waivers.
   c. The Contracting Officer reserves the right to designate which entities involved in the Work must submit waivers.
   d. Submit final Application for Payment with or proceeded by final waivers from every entity involved with performance of the Work covered by the application whom is lawfully entitled to a lien.
   e. Waiver Forms: Submit waivers of lien on forms, executed in a manner acceptable to Contracting Officer.

H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
   a. List of subcontractors.
   b. Schedule of Values.
   c. Contractor's Construction Schedule (preliminary if not final).
   d. Products list.
   e. Schedule of unit prices.
   f. Submittals Schedule (preliminary if not final).
   g. List of Contractor's staff assignments.
   h. List of Contractor's principal consultants.
   i. Copies of building permits (if applicable).
   j. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
   k. Initial progress report.
2. Certificates of insurance and insurance policies.
4. Data needed to acquire Owner's insurance.
5. Initial settlement survey and damage report, if required.

I. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
   a. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
   b. This application shall reflect Certificates of Partial Substantial Completion issued previously for Government occupancy of designated portions of the Work.

J. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
   a. Evidence of completion of Project closeout requirements.
   b. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
   c. Updated final statement, accounting for final changes to the Contract Sum.
   d. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
   e. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
   f. AIA Document G707, "Consent of Surety to Final Payment."
   g. Evidence that claims have been settled.
   h. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
   i. Final, liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)
PART 3 - EXECUTION (Not Used)

END OF SECTION 012900
SECTION 013100
PROJECT MANAGEMENT AND COORDINATION

PART 1: GENERAL

1.1 DESCRIPTION

A. This section details the Contractor and the Owners’ responsibilities in coordinating efforts for this project

PART 2: PRODUCTS (not used)

PART 3: EXECUTION

3.1 CONTRACT DOCUMENTS

A. The Contractor and all subcontractors shall become completely familiar with the requirements of the contract documents.
B. In the event discrepancies or conflicts are encountered, notify the Engineer immediately. Where there is a discrepancy, including referenced Codes, the documents requiring the strictest interpretation, higher quality, the greater quantity, or the more difficult work shall govern, unless otherwise determined by the Engineer.

3.2 REQUEST FOR INFORMATION/INTERPRETATION

A. Refer to Section 012613.
B. The Contractor will need to coordinate the sequencing of work so that Requests for Interpretation (RFI’s) be submitted to the Engineer in a timely manner so as not to delay work.

3.3 SCHEDULE

A. The contractor must submit a Schedule of Work prior to commencing work.
B. The Schedule of Work shall be updated monthly at a minimum, and MUST BE submitted with all Requests for Payment.

3.4 UTILITIES

A. The Contractor will need to coordinate with all utility companies that must be relocated or have connection to in the project area. Coordination should include scheduling with utility companies when various stages of work may be performed and when potential shutdowns may occur.
3.5 PERMITS

A. The Contractor will need to coordinate with all permitting agencies with jurisdiction over this project. The Contractor shall coordinate any inspections necessary and schedule work around requirements of the permits. The Contractor shall be required to adhere to all of the requirements including all mitigation which may be required in these permits.

3.6 OWNER

A. The Contractor shall coordinate with the Owner for all work to be performed.

3.7 INSTALLATION

A. Coordination methods at the Project Site are the responsibility of the Contractor. The Engineer may disapprove Work completed by the Contractor or data submitted by the Contractor, when in the Engineer’s judgment coordination has been inadequate to ensure the highest quality.

END OF SECTION 013100
1.1 GENERAL

A. The intent of the progress schedule is to assist the Contractor, Engineer, and Owner in planning and executing Work and to assist the Project Coordinator and Owner in monitoring the construction progress for the purpose of coordination, communication, evaluation of Applications and Certificates for Payment, and evaluation of time extension requests.

B. The Project Coordinator’s review of the schedule will be to ensure that it conforms to the requirements of the contract documents. The construction means, methods, sequence and scheduling of the work is the Contractor’s responsibility and is not reviewed by the Project Coordinator or Owner. Contract completion date(s) is as specified in the Notice to Proceed and subsequent adjustments as ratified per Sections 007200 and 012613. The Project Coordinator’s review of the schedule does not change, revise, or amend that date(s), nor does it constitute an approval of the Contractor’s ability to complete the work within the Contract Time.

C. If the Contractor submits a schedule which indicates a construction completion date prior to the advertised contract completion date, it is understood that the Owner shall not be obligated for any costs associated with any extensions of the Contractor’s schedule which is still within the stipulated contract completion period. No contract time extension shall be granted until the contractor demonstrates that the Critical Path is directly impacted, and the construction completion date must be extended past the stipulated contract completion date.

1.2 FORMAT

A. Listings: Reading from left to right, in ascending order for each activity. Identify each activity with the applicable Specification section number.

B. Diagram Sheet Size: must be legible.

1.3 SCHEDULES

A. Provide a time scaled CPM precedence diagram with a separate activity bar for each work activity. Network diagram to illustrate order and interdependence of activities and sequences of work; how start of a given activity depends on completion of preceding activities, and how completion of the activity may restrain start of subsequent activities. Indicate early and late start, early and late finish, float time, duration, manpower loading and description of each activity. Indicate critical path.

B. Provide as many activities as necessary to clearly show how the project will be constructed within the time allowed. As a minimum, every item on the schedule of values must be shown on the progress schedule. Provide sub-net schedules where necessary to enhance clarity.
C. Show complete sequence of construction by activity, identifying work of separate stages and other logically grouped activities.
D. Show accumulated percentage of completion of each item of Work at time of each Application for Progress Payment.
E. As a sub-net show dates including specified Project Coordinator’s review time for shop drawings, product data, and samples. Indicate decision date for selection of finishes.
F. Show product delivery dates, including those furnished and/or installed by Owner.
G. Show dates when application for separate permits (i.e., fire alarm, fire sprinkler, etc.) will be made and when the permit will be received.
H. Show dates when application for warranties/guarantees will be made and when warranties will be delivered. Final payment will not be made until all warranties/guarantees have been received and determined to be acceptable.
I. Include dates for Project Coordinator’s punch list review and completion of punch list items.
J. Include dates for submission of operation and maintenance manuals and project record drawings (minimum of thirty days before final completion). Show Project Coordinator’s review time and re-submittal of corrected manuals and drawings.

1.4 UPDATING SCHEDULES

A. Maintain schedules to record actual start and finish dates of completed activities.
B. Indicate progress of each activity at the time of the revision date. Update diagrams to graphically depict current status of Work.
C. Indicate revision date on revised schedule.
D. Show changes occurring since previous Schedule submission such as:
   a. Any major changes in scope;
   b. Activities modified since previous submission;
   c. Revised projections for progress and completion, as applicable;
   d. Any other identifiable changes.
E. Provide narrative report as needed to define:
   a. Problem areas; anticipated delays; and impact of these on the project schedule.
   b. Corrective action recommended, and its effect.
F. The periodic Applications and Certificates for Payment will not be processed until the progress schedule is updated and submitted as specified.

1.5 SUBMITTALS

A. Within fourteen (14) calendar days after date of Owner-Contractor Agreement, submit proposed network diagram defining planned operations for the Work.
B. If required by Project Coordinator, participate in review of network diagrams jointly with General Contractor.
C. Submit updated network schedules with each Application for Payment or more frequent if directed by Project Coordinator.
D. Submit the number of opaque reproductions the Contractor requires, plus two (2) copies which will be retained by Project Coordinator.
1.6 DISTRIBUTION

A. Distribute copies of reviewed schedules to the project site file, Sub-Contractors, suppliers, Factory/Engineering Firm, Project Coordinator, and other concerned parties.
B. Instruct recipients to promptly report, in writing, problems anticipated by projections shown in schedules.

PART 2 PRODUCTS (Not Used)
PART 3 EXECUTION (Not Used)

END OF SECTION 013200
PART 1 GENERAL

1.1 SUBMITTAL PROCEDURES

A. Schedule submittals to expedite the Project. Transmit submittals in accordance with the currently approved Progress Schedule and in such a sequence as to avoid delays in the Work. Coordinate submission of related items with the progress schedule. Submit a Schedule of Submittals to the Project Coordinator prior to initial Application for Payment.

B. Make and deliver all submittals to the Engineer Point of Contact.

C. Provide space for General Contractor to review stamps.

D. General Contractor must review and certify each submittal prior to submission to the Engineer. Mark certification on each submittal with permanent marking ink.

E. Reproduce and distribute copies of reviewed submittals to all concerned/impacted parties. Instruct parties to promptly report any inability to comply with provisions. Pay all costs for reproduction, distribution, and materials.

F. Submit items requiring color selection within thirty (30) calendar days of contract award. Colors will be selected after all color submittals are received by Project Coordinator.

G. Coordinate submittals into groupings containing all associated items to facilitate review of inter-related items:
   a. Finishes, selection of colors, textures, or patterns.
   b. Associated items which require correlation for efficient function or for installation.
   c. Submit all Division 2 submittals at the same time. Failure to do so will delay processing and review by the Project Coordinator or Owner’s Consulting Engineer. Review will not occur until submittal is complete.

H. Identify in writing variations from Contract Documents. Identify in writing product or system limitations detrimental to successful performance of the completed Work.

I. Accompany submittals with transmittal letter containing:
   a. Date.
   b. Project title and number.
   c. Contractor’s name and address.
   d. Number of copies of Shop Drawings, Product Data, and Samples submitted.
   e. Identification of submittal as it relates to:
      i. Contractor/Supplier/Manufacturer.
         1. Name.
         2. Address.
         3. Telephone number.
         4. Representative’s name.
      f. Detail number and location in Construction Documents.
   g. Specifications reference number and paragraph.
   h. Applicable Standards.
      e. Finishes.
      f. Identification of deviations from Contract Documents.

J. Additional Information Required:
a. Relation to adjacent structure or materials.
b. Fabrication methods, assembly, special installation requirements, accessories, fasteners, and other pertinent information.
c. Field dimensions, clearly identified.
d. Coordination with other trades. Stamped and signed by affected trades.

K. Distribution of Submittals:
   a. Project Coordinator will retain a minimum of two (2) copies of all submittals, with one (1) set of reviewed submittals retained as “Record Documents”. Mark up with as-built information and provide to Owner as part of Project Record Documents.
   b. General Contractor to maintain one (1) set of reviewed submittals at project site.

1.2 PROPOSED PRODUCTS LIST AND CONTRACTORS LIST

A. Prior to submission of First Application for Payment, submit complete list of Contractors and suppliers to be used for the Work. Provide specification section identification number, addresses, and telephone numbers for each listed Contractor and supplier.

B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.3 SHOP DRAWINGS

A. Prior to submission of First Application for payment, submit complete list of all shop drawings, product data and/or sample submittals as required by these specifications. List to include date columns showing anticipated and actual Submittal dates to General Contractor and Project Coordinator as well as return dates from General Contractor and Project Coordinator. Update this list for use at the Progress Meetings.

B. Present in clear and thorough manner. Title each drawing with Project name and number; identify each element of drawings by reference to sheet number and detail, schedule, or room number of Contract Documents.

C. Identify field dimensions; show relation to adjacent or critical features or Work or products.

D. Minimum Sheet Size: 8½ x 11 inches.

E. Do not submit freehand drawings.

F. On shop drawings requiring Code Agency approval, submit on format and media required by Approval Agency. Include information required by Project Documents and Approval Agency.

G. Submit four (4) copies to General Contractor for review. The General Contractor will return two (2) reviewed copies with comments. After review and correction the Contractor shall reproduce and distribute copies of the shop drawings as required for Contractor use and contractor’s needs. Provide the copy of final Submittal to Owner for the Project records.

H. Do not provide Submittals not required by these specifications. They will be returned to the Contractor and/or Factory/Engineering Firm without review.

1.4 PRODUCT DATA
A. Submit only pages which are pertinent; mark each copy of standard printed data to identify pertinent products, referenced to Specification Section and Paragraph number. Show reference standards, performance characteristics, and capacities; wiring and piping diagrams and controls; component parts; finishes; dimensions; and required clearances.

B. Do not submit Material Safety Data Sheets (MSDS). MSDS are Contractor and Factory/Engineering Firm safety, means and methods responsibilities. MSDS will not be reviewed.

C. Modify manufacturer’s standard schematic drawings and diagrams to supplement standard information and to provide information specifically applicable to the Work. Delete information not applicable.

D. Submit four (4) copies of product data and manufacturer’s instructions to General Contractor for review. The General Contractor will return two (2) reviewed copies with comments. After review and correction, the Contractor shall reproduce and distribute copies as required for Contractor use and contractor’s needs. Provide the copy of final submittal to Owner and Project Coordinator for their records.

1.5 SAMPLES

A. Submit full range of manufacturer’s standard and special finishes except when more restrictive requirements are specified, indicating colors, textures, and patterns, for Project Coordinator’s selection.

B. Submit samples which may be used in the Work as indicated in the Specification section.

C. Label each sample with identification required for transmittal letter.

D. Submit two (2) samples of each product requiring color or texture/finish selection unless specified otherwise in individual specification sections: one (1) sample will be retained by Project Coordinator, one (1) sample will be returned to the Contractor to be retained at the job site.

E. Field samples are to be maintained at the site of the Work and are to be removed after substantial completion unless directed otherwise.

F. Reviewed samples which may be used in the Work are indicated in individual specification Sections.

1.6 MANUFACTURER’S CERTIFICATES AND WARRANTIES

A. When specified in individual specification Sections, submit manufacturer’s certificate and/or warranty to Project Coordinator for review, in quantities specified for Product Data.

B. Indicate material or Product conforms to or exceeds specified requirements. Submit supporting reference date, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on material or Product, but must be acceptable to Project Coordinator.

D. Provide certificate and/or warranty by manufacturer on company letterhead paper or forms signed by an officer of the manufacturer. On document name the Owner, project, project location, Contractor, and Contractor’s address. Indicate product furnished, quantity furnished, and date of delivery.
1.7 CONTRACTOR REVIEW

A. Coordinate submittals with requirements of Work and of Contract Documents.
B. Apply Contractor’s stamp with signature. The submittal signed by the Contractor certifies that the Contractor has reviewed the submittal for accuracy, completeness, and compliance in accordance with the General Conditions. It also certifies that the Contractor has verified product required, field dimensions, adjacent construction Work and Contract Documents. Submittals without Contractor’s stamp and signature will be rejected. Notify Project Coordinator in writing at time of submittal of any deviations from requirements of Contract Documents.

1.8 RESUBMITTALS

A. Revise and resubmit submittals as required, identify all changes made since previous submittal.
B. Shop Drawings and Product Data:
   a. Revise initial drawings or data, and resubmit as specified for the initial submittal.
   b. Indicate any changes which have been made including those requested by the Project Coordinator.
C. Samples: Submit new samples as required.

1.9 PROJECT COORDINATOR REVIEW

A. Project Coordinator will review shop drawings, product data, and samples and return submittals within twenty-one (21) calendar days.
B. For Project Coordinator’s color selection, allow thirty (30) calendar days from time all color samples for the Work have been delivered to the Project Coordinator.
C. Project Coordinator review is only for general conformance and compliance with Project design concept and Contract Documents. Any action shown is subject to Contract Document’s requirements. Contractor is responsible for dimensions (confirm and correlate at job site); fabrication processes; construction techniques; quantities; space requirements; coordination of work with that of all other trades; union jurisdiction; infringements of patent rights; possible cause of injury to persons or property; and satisfactory performance of the work.
D. Project Coordinator’s review of separate items does not constitute review of assembly in which it functions.

END OF SECTION 013300
PART 1: GENERAL

1.1 Description

A. The following requirements supplement the General Conditions, 007200.

PART 2: PRODUCTS (not used)

PART 3: EXECUTION

3.1 Constraints and Mitigations

A. The Owner has completed an environmental review process governed by the various rules, regulations, and codes of the regulating body. In compliance with the environmental review document, the Contractor’s operations are subject to the following constraints and environmental protection measures. In addition to these, the Contractor is also responsible for compliance with any and all constraints or environmental protection measures that may be noted in other sections of the Technical Specifications.

B. The Contractor’s operations are subject to the following constraints and mitigations:

1. If buried materials are encountered, all soil disturbing work should be halted at the location of any discovery until a qualified archaeologist completes a significance evaluation of the find(s) pursuant to Section 106 of the national Historic Preservation Act (36CFR60.4). The Owner should be contacted immediately. Prehistoric archaeological site indicators expected within the general area include: chipped chert and obsidian tools and tool manufacture waste flakes; grinding and hammering implements that look like fist-size river tumbled stones, and for some rare sites, locally darkened soil that generally contains abundant archaeological specimens. Historic remains expected in the general area commonly include items of ceramic, glass, and metal. Features that might be present include structure remains (e.g., cabins or their foundations) and pits containing historic artifacts.

3.2 Site Conditions

A. Coordination with the Engineer:

1. Contact the Engineer at least five (5) days in advance of any planned removal of historic fabric, demolition, or ground disturbance work. The Engineer will in turn notify the Archaeologist/Cultural/Natural Resource Specialist when such work is planned.

2. Contractor shall coordinate directly with the Engineer regarding archaeological/cultural/natural specialist monitoring. Any ensuing directives from the archaeologist/cultural/natural specialist in relation to need for interruption of specific contractor work will be made through the Engineer.
B. Limit of Work
1. Contractor shall layout all planned removal, demolition, or ground disturbance work for review and approval prior to such work commencing.
2. Contractor shall avoid all removal, demolition, ground disturbance, and other destructive activities that may disturb historic fabric, artifacts, archaeological, cultural or natural resources until the Engineer gives approval to proceed.

C. Role of Archaeologist/Cultural/Natural Specialist
1. Prior to the construction start date, but during the submittal period, archaeologist/cultural/natural specialist(s) will attempt to mark or identify, where certain historical fabric, cultural resources are to be documented, salvaged, or left in situ place on the building/structure/feature/site as identified in the construction documents. This by no means is meant to indicate that during the course of demolition, ground disturbance, or destructive activities, that the contractor is free to move forward without first obtaining permission to proceed from the Engineer, or that during the course of such actions, new or previously unknown areas will not be marked or identified by the archaeologist/cultural specialist.
2. During construction, archaeologist/cultural/natural specialist will monitor all demolition, ground disturbance, or destructive activities.
3. Archaeologist/cultural/natural specialist will determine whether appropriate treatments such as handwork, will be necessary for certain demolition, ground disturbance, or destructive activities. Directives in relation to need for alteration of technique or interruption of specific contractor work will be given by the Engineer.

D. Down Time
1. If unforeseen cultural/natural resources are uncovered during execution of the work, the Engineer will put work on hold at that specific location, and the Contractor will be redirected to other tasks. The archaeologist/cultural/natural specialist will record and evaluate the find and implement avoidance, preservation, or recovery measures as appropriate compliance with environmental law and department resource directives prior to Engineer directing resumption of work at that specific location.
2. Contractor shall include in the project schedule, consideration of up to (not less than) five (5) calendar days down time for unforeseen conditions uncovered during execution of work that may require further resource analysis. Down time days must be approved by the Engineer.

3.3 Protection of Existing Resources

A. Provide required protection, in areas identified on drawings, or as directed by the Engineer to maintain integrity of the resources to be protected during the course of the project.

END OF SECTION 013591
SECTION 014500
QUALITY CONTROL

PART 1: GENERAL

1.1 SUMMARY

A. This section includes administrative and procedural requirements for quality assurance and quality control.

B. Contractor reserves the right to arrange and pay for a qualified independent testing agency to perform required testing for the project. Test reports shall be submitted to the Owner within forty-eight (48) hours of receipt by Contractor.

C. Owner will retain its own third party independent firm to conduct field testing/inspections and provide for all necessary laboratory tests and reports.

D. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve the Contractor of responsibility for compliance with the contract Document requirements.

1. Specified test, inspections, and related actions do not limit the Contractor’s quality-control efforts as necessary to provide compliance with the Contract Document requirements.

2. Requirements for the Contractor to provide quality-control services required by the Designer, the Owner, or authorities having jurisdiction are not limited by the provisions of this section.

1.2 DEFINITIONS

A. Quality-Assurance Services: activities, actions, and procedures performed before and during execution of the work to guard against defects and deficiencies and ensure that proposed construction complies with requirements.

B. Quality-Control Services: tests, inspections, procedures, and related actions before, during, and after execution of the work to evaluate completed construction complies with contract and construction industry requirements. Quality control services do not include contract enforcement activities performed by the Owner or the Designer of record.

C. Testing Agency: an entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

1.3 DELEGATED DESIGN

A. Performance and Design Criteria: where professional design services or certifications by a design professional are specifically required of the Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to the Owner.
1.4 SUBMITTALS

A. Qualification Data: for testing agencies specified in “Quality Assurance” Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

B. Delegated-Design Submittal: in addition to Shop Drawings, Product Data, and other required submittals, submit a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to the Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

C. Contractor’s Daily quality Control reports: the contractor shall designate an individual responsible for maintaining control over the quality of the work. For each day on which work is scheduled to be performed, the Contractor’s Quality Control Representative shall prepare and submit certified written reports that include the following:
   1. Date of report preparation and date work was performed.
   2. Project title and number.
   3. Name, address, and telephone number of testing agency.
   4. Dates and locations of samples, tests, or inspections.
   5. Names of individuals making tests and inspections.
   6. Description of the work performed that day, and the reasons for non-work.
   7. Item of work tested or inspected. Test and inspection methods.
   8. Identification of products delivered/installed and corresponding specification sections.
   9. Complete test or inspection data.
   10. Test and inspection results and an interpretation of test results.
   11. Weather conditions. Ambient conditions at time of sample taking, testing and inspecting.
   12. Comments or professional opinion on whether tested or inspected work complies with the Contract Document requirements.
   13. Name and signature of Quality Control Representative, and laboratory inspector.
   14. Recommendations on retesting and re-inspecting.

D. Permits, licenses, and certificates: for the Owner’s records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, documents, established for compliance with standards and regulations bearing on performance of the work.

1.5 QUALITY ASSURANCE

A. 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.

B. Factory-Authorized service Representative Qualifications: an authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer’s products that are similar in material, design, and extent to those indicated for this project.
C. Installer Qualifications: a firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this project, whose work has resulted in construction with a record of successful in-service performance.

D. 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.

E. 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.

F. 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.
   1. Requirement for specialists shall not supersed building codes and similar regulations governing the work, nor interfere with local trade-union jurisdictional settlements and similar conventions.

G. Testing Agency Qualifications: an agency with the experience and capability to conduct testing and inspecting indicated, as documented by ASTM E 548, and that specializes in the types of tests and inspections to be performed.

1.6 QUALITY CONTROL

A. Owner Responsibilities: the Owner may engage a qualified testing agency to perform additional testing services.
   1. The Owner will furnish the Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of the types of testing and inspecting they are engaged to perform.
   2. Costs for retesting and re-inspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to the Contractor, and the Contractor shall cover the expense of such retesting and re-inspection at no additional cost to the Owner.
   3. The presence or absence of the Owner’s inspector or testing agency does not relieve the Contractor of the sole responsibility for compliance with the Contract Documents.

B. Contractor Responsibilities: the Contractor is solely responsible for controlling the work to comply with the Contract Documents. Unless otherwise indicated, provide quality-control services specified and required by authorities having jurisdiction.
   1. Where testing or inspection services are not indicated the Owner’s responsibility, engage a qualified testing agency to perform these quality-control services.
      i. The Contractor shall not employ the same entity engaged by the Owner, unless agreed to in writing by the Owner.
2. Notify the Owner’s testing agencies, Inspector of Record, and Contractor’s testing agencies at least forty-eight (48) hours in advance of time when work that requires testing or inspecting will be performed.

3. Where testing or inspection services are indicated as Contractor’s responsibility, submit a certified written report, in duplicate, of each testing or inspection service.

4. Testing and inspecting requested by the Contractor and not required by the Contract Documents are the Contractor’s responsibility.

C. Special Tests and Inspections: the Contractor will engage a testing agency to conduct special tests and inspections required by authorities having jurisdiction.
   1. The testing agency will notify the Owner and the Contractor promptly of irregularities and deficiencies observed in the work during performance of its services.
   2. Testing agency will submit a certified written report of each test, inspection, and similar quality-control service to the Owner with a copy to the Contractor and to authorities having jurisdiction.
   3. Testing agency will submit a final report of special tests and inspections at substantial completion, which includes a list of unresolved deficiencies.
   4. Testing agency will interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
   5. Testing agency will retest and re-inspect corrected work.

D. Manufacturer’s Field Services: where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing.

E. Re-testing/Re-inspecting: regardless of whether original tests or inspections were the Contractor’s responsibility, provide quality-control services, including re-testing and re-inspecting, for construction that revised or replaced work that failed to comply with requirements established by the Contract Documents.

F. Testing Agency Responsibilities: cooperate with the Owner and the Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
   1. Notify the Owner and the Contractor promptly of irregularities or deficiencies observed in the work during performance of its services.
   2. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
   3. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through the Contractor.
   4. Do not release, revoke, alter, or increase requirements of the Contract Documents or approve or accept any portion of the work.
   5. Do not perform any duties of the Contractor.

G. Associated Services: cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following.
   1. Access to the work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
4. Facilities for storage and field-curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
7. Security and protection for samples and for testing and inspecting equipment at the project site.

H. Coordination: coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
   1. Schedule times for tests, inspections, obtaining samples, and similar activities.

PART 2: PRODUCTS (not used)

PART 3: EXECUTION

3.1 REPAIR AND PROTECTION

A. General: on completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
   1. Provide materials and comply with installation requirements specified in other sections of these specifications. Restore patched areas and extend restoration into adjoining areas in a manner that eliminates evidence of patching.
B. Protect construction exposed by or for quality-control service activities.
C. Repair and protection are the Contractor’s responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014500
SECTION 015000
TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
   A. The Contract Documents, Drawings and Individual Specification Sections; apply to this Section.

1.2 SUMMARY
   A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
   B. Related Sections:
      a. Section 011000: Summary of Work.

1.3 USE CHARGES
   A. General: Installation, removal, and use charges for temporary facilities shall be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to, the Owner, the Design Professionals, occupants of the Project, testing agencies, and authorities having jurisdiction.
   B. Sewer Service: Contractor is responsible for payment of sewer service use charges for sewer usage by all entities for construction operations.
   C. Water Service: Contractor is responsible for payment of water service use charges for water used by all entities for construction operations.
   D. Electric Power Service: Contractor is responsible for payment of electric power service use charges for electricity used by all entities for construction operations.

1.4 INFORMATIONAL SUBMITTALS
   A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel (if applicable).
   B. Erosion and Sedimentation Control Plan: Show compliance with requirements of stormwater erosion and sediment control including Storm Water Pollution Prevention Plan (if applicable).
   C. Moisture-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage; including delivery, handling, and storage provisions for materials subject to water absorption or water damage, discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water damaged Work.
      a. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
   D. Dust-Control and HVAC-Control Plan: For all enclosed construction activities, submit coordination drawing and narrative that indicates the dust-control and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their
operation. Identify further options if proposed measures are later determined to be inadequate. Include the following:
   a. Locations of dust-control partitions at each phase of the work.
   b. HVAC system isolation schematic drawing.
   c. Location of proposed air filtration system discharge.
   d. Other dust-control measures.
   e. Waste management plan.

1.5 QUALITY ASSURANCE
   A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations and requirements of authority having jurisdiction for temporary electric service. Install service to comply with NFPA 70.
   B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.
   C. Accessible Temporary Egress: Comply with applicable provisions in ADA-ABA Accessibility Guidelines and ANSI A117.1.

1.6 PROJECT CONDITIONS
   A. Temporary Use of Permanent Facilities: Engage installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before the Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS
   A. Chain-Link Fencing: Minimum 0.148-inch thick, galvanized steel, chain-link fabric fencing; minimum 8 feet high with galvanized steel pipe posts; minimum 2-3/8-inch OD line posts and 2-7/8-inch OD corner and pull posts, with 1-5/8-inch OD top rails.
   B. Portable Chain-Link Fencing: Minimum 0.148-inch thick, galvanized steel, chain-link fabric fencing; minimum 8 feet high with galvanized steel pipe posts; minimum 2-3/8-inch OD line posts and 2-7/8-inch OD corner and pull posts, with 1-5/8-inch OD top and bottom rails. Provide galvanized steel bases for supporting posts.
   C. Wood Enclosure Fence: Plywood, 8 feet high, framed with four 2-by-4-inch rails, with preservative-treated wood posts spaced not more than 8 feet apart.
   D. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10 mils minimum thickness, with flame-spread rating of 15 or less per ASTM E 84.
   E. Dust Control Adhesive-Surface Walk-off Mats: Provide mats minimum 36 by 60 inches.
   F. Insulation: Un-faced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.

2.2 TEMPORARY FACILITIES
   A. Field Offices (when required), General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.
B. Owner’s-Use Field Office (when required): Of sufficient size to accommodate needs of the Owner and construction personnel office activities and to accommodate project meetings. Keep office clean and orderly. Furnish and equip offices as follows:
   a. Furniture required for the Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
   b. Conference room of sufficient size to accommodate meetings of 20 individuals. Provide electrical power service and 120-V ac duplex receptacles, with not less than 1 receptacle on each wall. Furnish room with conference table, chairs, and 4-foot square tack and marker boards.
   c. Drinking water and private toilet.
   d. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F.
   e. Lighting fixtures capable of maintaining average illumination of 20 fc at desk height.
C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
   a. Store combustible materials apart from building.

2.3 EQUIPMENT
A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
B. HVAC Equipment: Unless the Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
   a. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
   b. Heating Units: Listed and labeled for type of fuel being consumed, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
   c. Permanent HVAC System: If the Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return air grille in system and remove at end of construction.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL
A. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION
A. General: Install temporary service or connect to existing service.
a. Arrange with utility company, the Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
   a. Connect temporary sewers to municipal system as directed by authorities having jurisdiction. Obtain all required permits.
C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction. Obtain all required permits.
D. Water Service: Connect to the Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to the Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
E. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
   a. Toilets: Use of the Owner's existing toilet facilities will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to the Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
F. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
G. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
   a. Prior to commencing work, isolate the HVAC system in area where work is to be performed in accordance with approved coordination drawings.
      i. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
      ii. Maintain negative air pressure within work area using HEPA-equipped air filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.
   b. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust containment devices.
   c. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.
H. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
   a. Provide dehumidification systems to maintain the facilities RH when required to reduce substrate moisture levels to level required to allow installation or application of finishes per manufacturer’s requirements and recommendations.
I. Electric Power Service: Connect to the Owner's existing electric power service. Maintain equipment in a condition acceptable to the Owner. Obtain all required permits.

J. Electric Power Service: Provide electric power service and distribution system of sufficient size, number of phases, capacity, and power characteristics required for construction operations and testing of all installed equipment.
   a. Install electric power service underground, unless otherwise indicated.
   b. Connect temporary service to the Owner's existing power source, as directed by the Owner.

K. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
   a. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
   b. Install lighting for the Project identification sign.

L. Telephone Service: Provide temporary telephone service in Owner’s-use facilities for use by all construction personnel. Install two telephone lines for each field office.
   a. Provide additional telephone lines for the following:
      i. Provide a dedicated telephone line for each facsimile machine in each field office.
   b. At each telephone, post a list of important telephone numbers.
      i. Police and fire departments.
      ii. Ambulance service.
      iii. Contractor's home office.
      iv. Design Professional’s office.
      v. Testing Consultant’s offices.
      vi. Owner's office.
      vii. Principal subcontractors' field and home offices.
   c. Provide superintendent with cellular telephone for use when away from field office.

3.3 SUPPORT FACILITIES INSTALLATION
A. General: Comply with the following:
   a. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
   b. Maintain support facilities until Substantial Completion inspection date is scheduled. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to the Owner.

B. Temporary Use of Permanent Roads and Paved Areas: Locate temporary roads and paved areas in same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.
   a. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
b. Prepare subgrade and install sub-base and base for temporary roads and paved areas specified in Individual Specification Sections.

c. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course pavement before installation of final course.

C. Traffic Controls: Comply with requirements of authorities having jurisdiction.
   a. Protect existing site improvements to remain including curbs, pavement, and utilities.
   b. Maintain access for fire-fighting equipment and access to fire hydrants.

D. Parking: Provide temporary parking areas for construction personnel.

E. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain the Project site, excavations, and construction free of water.
   a. Dispose of rainwater in a lawful manner that will not result in flooding the Project or adjoining properties nor endanger permanent Work or temporary facilities.
   b. Remove snow and ice as required to minimize accumulations.

F. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
   a. Identification Signs: Provide Project identification signs as specified in the Contract Documents.
   b. Temporary Signs: Provide other signs as required to inform public and individuals seeking entrance to the Project.
      i. Provide temporary, directional signs for construction personnel and visitors.
   c. Maintain and touchup signs so they are legible at all times.


H. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
   a. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

I. Temporary Elevator Use: Use of elevators is not permitted.

J. Existing Elevator Use: Use of the Owner's existing elevators will be permitted, provided elevators are cleaned and maintained in a condition acceptable to the Owner. At Substantial Completion, restore elevators to condition existing before initial use, including replacing worn cables, guide shoes, and similar items of limited life.
   a. Do not load elevators beyond their rated weight capacity.
   b. Provide protective coverings, barriers, devices, signs, or other procedures to protect elevator car and entrance doors and frame. If, despite such protection, elevators become damaged, engage elevator Installer to restore damaged work so no evidence remains of correction work. Return items that cannot be refinished in field to the shop, make required repairs and refinish entire unit, or provide new units as required.

K. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.

L. Existing Stair Usage: Use of the Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to the Owner. At Substantial Completion, restore stairs to condition existing before initial use.
a. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas so no evidence remains of correction work.

M. Temporary Use of Permanent Stairs: Use of new stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Substantial Completion.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

B. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to authorities having jurisdiction.
   a. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant- protection zones.
   b. Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
   c. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from the project site during the course of the project.
   d. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

C. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.

D. Tree and Plant Protection: Install temporary fencing outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.

E. Site Enclosure Fence: Before construction operations begin furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.
   a. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
   b. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one set of keys to the Owner.

F. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day.

G. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

H. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
I. Covered Walkway: Erect protective, covered walkway for passage of individuals through or adjacent to Project site. Coordinate with entrance gates, other facilities, and obstructions. Comply with regulations of authorities having jurisdiction.
   a. Construct covered walkways using scaffold or shoring framing.
   b. Provide overhead decking, protective enclosure walls, handrails, barricades, warning signs, exit signs, lights, safe and well-drained walkways, and similar provisions for protection and safe passage.
   c. Paint and maintain appearance of walkway for duration of the Work.

J. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weather-tight enclosure for building exterior.
   a. Where heating or cooling is needed and permanent enclosure is not complete, insulate temporary enclosures.

K. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by the Owner from fumes and noise.
   a. Construct dustproof partitions with fire rated gypsum wallboard with joints taped on occupied side, and fire-retardant plywood on construction operations side.
   b. Where fire-resistance-rated temporary partitions are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
   c. Insulate partitions to control noise transmission to occupied areas.
   d. Seal joints and perimeter. Equip partitions with gasketed dustproof doors and security locks where openings are required.
   e. Protect air-handling equipment.
   f. Provide walk-off mats at each entrance through temporary partition.

L. Fire Safety During Construction: Comply with all requirements identified herein as well as the more stringent requirements of the applicable codes (New York State Building and Fire Codes or New York City Building and Fire Codes).
   a. No smoking: Smoking shall be prohibited throughout the project/construction site. “No Smoking” signs shall be conspicuously posted at all entrances and throughout the site.
   b. The Contractor shall designate a Fire Prevention Program Superintendent/ Fire Safety Manager who shall be responsible for all fire safety efforts until completion and acceptance of the Work described in the Contract Documents that include but are not limited to the following:
      i. Prefire Plans. Develop in cooperation with the local Fire Chief and Fire Code Official. Any changes affecting the utilization of information contained in the plan shall result in notification to the local Fire Chief and Fire Code Official.
      ii. Training. Job site personnel shall be trained in fire safety practices and procedures and the proper use of fire protection equipment, including hand-held fire extinguishers, hose lines, fire alarm and sprinkler systems.
      iii. Fire Protection Devices. Fire protection and detection equipment shall be maintained and serviced.
      iv. Hot Work Operations. Welding, cutting, open torches, torch-applied roof system activities, and other hot work operations shall be conducted under a permit system. A fire watch and fire extinguishers shall be provided.
v. Impairment of Fire Protection Systems. Coordinate planned, emergency or accidental impairments of fire protection systems to include tagging of impaired systems and notification of Fire Department, Alarm Company, Building Owner/Operator, and Contractors.

vi. Temporary Covering of Fire Protection Devices. Coverings placed on or over fire protection devices for protection from damage shall be immediately removed upon the completion of the Work in the room or area in which the devices are installed.

c. Provide readily accessible telephone service for fire calls at a location or locations approved by the Owner.
   i. The Contractor shall pay all costs thereof until completion and acceptance of the Work or as otherwise directed by the Owner.
   ii. Provide/post the street address of the construction site and the emergency telephone number of the Fire Department adjacent to the telephone.

d. Provide or maintain a Temporary or Permanent Standpipe system for Fire Department use in accordance with the following:
   i. Buildings subject to the New York State Building Code: In buildings that require a standpipe system, such standpipe shall be installed when the progress of construction reaches a height of 40 feet.
   ii. Buildings subject to the New York City Building Code: In buildings that require a standpipe system, such standpipe shall be installed when the progress of construction reaches a height of 75 feet. The standpipe shall be equipped with an air pressurized alarm system.
   iii. Buildings being demolished: An existing standpipe system shall be maintained in operation on all floors, starting one floor directly below the floor being demolished. The existing standpipe can be converted to a dry standpipe if freezing conditions exist.

3.5 MOISTURE AND MOLD CONTROL


B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
   a. Protect porous materials from water damage.
   b. Protect stored and installed material from flowing or standing water.
   c. Keep porous and organic materials from coming into prolonged contact with concrete.
   d. Remove standing water from decks.
   e. Keep deck openings covered or dammed.

C. Partially Enclosed Construction Phase: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
   a. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
   b. Keep interior spaces reasonably clean and protected from water damage.
c. Periodically collect and remove waste containing cellulose or other organic matter.

d. Discard or replace water-damaged material.

e. Do not install material that is wet.

f. Discard, replace or clean stored or installed material that begins to grow mold.

g. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.

D. Controlled Construction Phase of Construction: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:

a. Control moisture and humidity inside building by maintaining effective dry-in conditions.

b. Use permanent HVAC system to control humidity.

c. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.

   i. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 48 hours are considered defective.

   ii. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record daily readings over a forty-eight hour period. Identify materials containing moisture levels higher than allowed. Report findings in writing to the Design Professional.

   iii. Remove materials that cannot be completely restored to their manufactured moisture level within 48 hours.

3.6 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.

   a. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

   a. Materials and facilities that constitute temporary facilities are property of the Contractor. The Owner reserves right to take possession of the Project identification signs.

   b. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape
development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.

c. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 – Contract Closeout Requirements.

END OF SECTION 015000
PART 1: GENERAL

1.1 Description

A. This section includes mobilization and demobilization to and from the jobsite.

PART 2: PRODUCTS (not used)

PART 3: EXECUTION

3.1 PREPARATION

A. Make arrangements to contact all public works departments prior to mobilizing to the job site and secure all necessary permits prior to performing work.

B. Notify Owner a minimum of forty-eight (48) hours in advance of mobilization to job site location.

C. Secure all required bonds and insurance and submit to the owner prior to mobilization.

D. The Contractor shall not mobilize until after the Owner has issued the Notice to Proceed.

3.2 MOBILIZATION

A. Move materials, equipment, and laborers as necessary to job site location with minimal disturbance. No separate payment will be made for subsequent mobilizations to the jobsite.

3.3 DE-MOBILIZATION

A. Remove all materials, equipment, laborers, solid waste and debris created by construction activities from job site location.

B. Maintain minimal disturbance to site upon departure.

END OF SECTION 017100
PART 1: GENERAL

1.1 Summary

A. Includes administrative and procedural requirements for Cleaning and Waste Management as described in Contract Documents.

1.2 Description

A. Dispose of waste, debris, and rubbish resulting from the construction of the project.
B. If excess excavation spoils cannot be suitably disposed of on site, as directed by the Inspector, it shall be hauled away at the Contractor’s expense.

PART 2: PRODUCTS (not used)

PART 3: EXECUTION

3.1 Requirements

A. Remove waste materials, debris, and rubbish from the site and legally dispose of at a public or private dumping area(s) off of site property. Use of private disposal facilities will require prior authorization by the Owner and provision of a signed release of liability by the facility Owner/Representative for the project Owner.
B. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
   a. Do not burn or bury rubbish and waste materials on the project site.
   b. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.
   c. Do not dispose of wastes into streams or waterways.

3.2 Progress Cleaning

A. Comply with regulations of authorities having jurisdiction and safety standards for cleaning.
B. Keep premises broom clean during progress of the Work.
C. During handling and installation, protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection from soiling, damage, or deterioration until Substantial Completion.
D. Supervise construction activities to ensure that no part of construction completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during construction period.
E. Clean exposed surfaces and protect as necessary to avoid damage and deterioration.
F. Construction Waste Management And Disposal:
a. Remove waste materials and rubbish caused by employees, Subcontractors, and contractors under separate contract with Owner and dispose of legally.
b. Do not deposit waste into storm drains, sanitary sewers, streams, or waterways. Do not discharge volatile, harmful, or dangerous materials into drainage systems.

3.3 Final Cleaning

A. Immediately before Substantial Completion, thoroughly clean the area where The Work was performed.
B. Comply with individual manufacturer's cleaning instructions.

END OF SECTION 017400
PART 1 GENERAL

1.01 SECTION INCLUDES

A. Project Record Documents.
B. Operation and Maintenance Data.
C. Warranties and bonds.

1.02 RELATED REQUIREMENTS

A. Individual Product Sections: Specific requirements for operation and maintenance data.
B. Individual Product Sections: Warranties required for specific products or Work.

1.03 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for certification of Substantial Completion, complete the following. List exceptions in the request.
   a. 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. Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum.
      i. If 100 percent completion cannot be shown, include a list of incomplete items, the value of incomplete construction, and reasons the Work is not complete.
   b. Advise Owner of pending insurance change-over requirements.
   c. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications and similar documents.
   d. 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.
   e. Submit record drawings, maintenance manuals, final project photographs, damage or settlement survey, property survey, and similar final record information.
   f. Deliver tools, spare parts, extra stock, and similar items.
   g. Make final change-over of permanent locks and transmit keys to the Owner.
      Advise the Owner's personnel of change-over in security provisions.
   h. Complete start-up testing of systems, and instruction of the Owner's operating and maintenance personnel. Discontinue or change over and remove temporary facilities from the site, along with construction tools, mock-ups, and similar elements.
      i. Complete final clean up requirements, including touch-up painting. Touch-up and otherwise repair and restore marred exposed finishes.
B. Inspection Procedures: On receipt of a request for inspection, the Engineer will either proceed with inspection or advise the Contractor of unfilled requirements. The Engineer will prepare:
   a. 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.
   b. The Engineer will repeat inspection when requested and assured that the Work has been substantially completed.
   c. Results of the completed inspection will form the basis of requirements for final acceptance.

C. Preliminary Procedures: Before requesting final inspection for certification of final acceptance and final payment, complete the following. List exceptions in the request.
   a. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.
   b. Submit a certified copy of the Engineer's final inspection list of items to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance and the list has been endorsed and dated by the Engineer.
   c. Submit consent of surety to final payment.

1.04 SUBMITTALS

A. Project Record Documents: Submit documents to Owner with claim for final Application for Payment.

B. Operation and Maintenance Data:
   a. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Owner will review draft and return one copy with comments.
   b. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within fourteen (14) calendar days after acceptance.
   c. Submit one copy of completed documents fourteen (14) calendar days prior to final inspection. This copy will be reviewed and returned after final inspection, with Owner comments. Revise content of all document sets as required prior to final submission.
   d. Submit two sets of revised final documents in final form within fourteen (14) calendar days after final inspection.

C. Warranties and Bonds:
   a. For equipment or component parts of equipment put into service during construction with Owner’s permission, submit documents within fourteen (14) calendar days after acceptance.
   b. Make other submittals within fourteen (14) calendar days after Date of Substantial Completion, prior to final Application for Payment.
   c. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within fourteen (14) calendar days after acceptance, listing the date of acceptance as the beginning of the warranty period.
PART 2 PRODUCTS - NOT USED
PART 3 EXECUTION

3.1 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:
   a. Drawings.
   b. Specifications.
   c. Addenda.
   d. Change Orders and other modifications to the Contract.
   e. Reviewed shop drawings, product data, and samples.
   f. Manufacturer's instruction for assembly, installation, and adjusting.
B. Ensure entries are complete and accurate, enabling future reference by Owner.
C. Store record documents separate from documents used for construction.
D. Record information concurrent with construction progress.
E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
   a. Changes made by Addenda, change order, substitution, and modifications.
F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
   b. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
   c. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
   d. Field changes of dimension and detail.
   e. Details not on original Contract drawings.

3.2 OPERATION AND MAINTENANCE DATA

A. For Each Product or System: List names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.3 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

A. For Each Product, Applied Material, and Finish:
a. Product data, with catalog number, size, composition, and color and texture designations.

b. Information for re-ordering custom manufactured products.

B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.

3.4 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

A. For Each Item of Equipment and Each System:
   a. Description of unit or system, and component parts.
   b. Identify function, normal operating characteristics, and limiting conditions.
   c. Include performance curves, with engineering data and tests.
   d. Complete nomenclature and model number of replaceable parts.

B. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

C. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

D. Provide servicing and lubrication schedule, and list of lubricants required.

E. Include manufacturer's printed operation and maintenance instructions.

F. Include sequence of operation by controls manufacturer.

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

H. Additional Requirements: As specified in individual product specification sections.

3.5 OPERATION AND MAINTENANCE MANUALS

A. Prepare instructions and data by personnel experienced in maintenance and operation of described products.

B. Prepare data in the form of an instructional manual.

C. Binders: Commercial quality, 8-1/2 by 11 inch (216 by 280 mm) three D side ring binders with durable plastic covers; 2 inch (50 mm) maximum ring size. When multiple binders are used, correlate data into related consistent groupings.

D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.

E. Provide tabbed dividers for each separate product and system, with typed description of product and major component parts of equipment.

F. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, in three parts as follows:
   a. Part 1: Directory, listing names, addresses, and telephone numbers of Owner, Contractor, Subcontractors, and major equipment suppliers.
b. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
   i. Significant design criteria.
   ii. List of equipment.
   iii. Parts list for each component.
   iv. Operating instructions.
   v. Maintenance instructions for equipment and systems.
   vi. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.

c. Part 3: Project documents and certificates, including the following:
   i. Shop drawings and product data.

3.6 WARRANTIES AND BONDS

A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within fourteen (14) calendar days after completion of the applicable item of work. Except for items put into use with Owner’s permission, leave date of beginning of time of warranty until the Date of Substantial completion is determined.
B. Verify that documents are in proper form, contain full information, and are notarized.
C. Co-execute submittals when required.
D. Retain warranties and bonds until time specified for submittal.
E. Include originals of each in operation and maintenance manuals, indexed separately on Table of Contents.

END OF SECTION 017800
SECTION 022100
SURVEY CONSTRUCTION STAKING

PART 1: GENERAL

1.1 Description

A. The work to be done under this section shall be by an agent of the Owner and shall consist of furnishing and setting construction stakes and marks by the Owner to establish the lines and grades required for completion of the work as shown on the plans and specified in the project specifications.
B. The Contractor shall provide or procure surveying services as necessary for the successful completion of the work for all work required beyond that initially provided by the Owner.
C. The Contractor is responsible for all day-to-day grade-setting (using Owner provided survey and grade control) and field measurement needed to build all proposed developments.

PART 2: PRODUCTS (not used)

PART 3: EXECUTION

A. Construction staking shall be performed under the direction of a licensed land surveyor or registered professional engineer familiar with construction surveying and staking.
B. Construction staking shall be performed as necessary to control the work. Construction stakes and marks shall be furnished and set with accuracy adequate to assure that the completed work conforms to the lines, grades, and sections shown on the plans.
C. The Owner will provide the following construction staking:
   1. Benchmark and reference control
   2. Clearing and Grubbing limits including all horizontal transition points. Limit to be marked at fifty foot intervals along straight runs unless otherwise requested by the Contractor in writing prior to mobilization for marking.
   3. Road centerline horizontal and vertical control at fifty foot intervals for straight runs, curve (vertical and horizontal) beginning; ending; and radii center (for horizontal only), and super-elevation transitions in compliance with Caltrans requirements.
   4. All buried utility beginning, transition (horizontal/vertical), and ending elevation and locations. Note: if buried utility is consistent in alignment w/ roadway centerline alignment then such will be provided as a cross-section in the civil plan set and site staking will reflect the plan set in reference.
   5. All overhead utility pole, guy, and overhead-to-underground transition.
   6. Cut and fill hinge and toe locations in fifty-foot intervals for straight runs and all transitions of grade and direction.
   7. All earth retaining system alignments based on face badder at leveling course and leveling course and finish elevations. Alignment to include all horizontal transitions.
   8. Building badder based on one major wall (minimum) at beginning and end, and
finish floor elevation.

D. Additional construction staking requested by the Contractor, not specifically itemized under standard Owner provided staking above will be at the Contractor's expense. Owner will provide original staking of the above items and no charge to the Contractor. Subsequent or replacement staking of the items will be at the Contractor's expense.

E. The Contractor shall provide a construction staking request in writing to the Owner and Engineer no less than seventy-two (72) hours prior to the desired time for construction staking to be performed.

F. Construction stakes shall be removed from the site by the Contractor when no longer needed. Removal and disposal of construction staking materials is the sole responsibility of the Contractor.

G. In the event the Contractor’s operations destroy any of the Owner’s survey control points, the Contractor shall either replace such control points at his expense, subject to verification by the Engineer, or request the Owner to replace the destroyed control points. If requested to replace the control points, the Owner will do so within fourteen (14) calendar days. The cost of any such verification or replacement of the Owner's control surveys will be the sole responsibility of the Contractor with no additional cost to the Owner. The Contractor will not be allowed any adjustment in contract time for such verification or replacement of survey control points.

H. The Contractor must preserve all Geographic Reference Stations, section corners, and all other legal property monuments of any kind during all construction and related activities. It is the Contractor's responsibility to become familiar with the survey control and monumentation of the site and surrounding property prior to conducting activities on the site that may potentially jeopardize such facilities.

I. The Contractor shall give written notice to the Owner and Engineer at least five (5) working days in advance of any need to disturb or destroy any of the monuments of the site. Contractor must receive approval for such destruction or disturbance from the Owner and Engineer prior to conducting the work.

J. Only a Professional Land Surveyor registered in the State of California will be permitted to perform surveying to reset or replace destroyed monuments. The Professional Land Surveyor shall follow all rules, regulations, provisions, and laws of the State of California, as applicable for such work.

K. The cost of replacement of monuments destroyed or disturbed by the Contractor will be the sole responsibility of the Contractor and be at no additional cost to the Owner.

PART 4: MEASUREMENT

A. The Owner will provide construction staking including benchmarks and layout. No payment will be made to the Contractor for these items.

END SECTION 022100
SECTION 024000
DEMOLITION

PART 1 GENERAL

1.1 Description

A. Includes demolition of existing developments, facilities, and improvements as required to accommodate new construction. Also includes supplementary clearing and grubbing requirements.

PART 2 PRODUCTS (not used)

PART 3 EXECUTION

3.1 Infrastructure Removal

A. Existing infrastructure, developments, and site improvements scheduled for removal must be addressed in strict compliance with applicable laws and regulations.

B. Contractor to secure authorized facility(ies) for disposal of generated rubble and demolition debris. Facility authorization must be submitted to the Owner and approved for use prior to beginning work.

C. Dust and other airborne particles generated by demolition activities must be controlled and reduced to acceptable air quality levels. Airborne particle retardant practices in strict accordance with erosion and pollution requirements are to be administered.

D. Noise pollution is to be minimized during demolition activities. Excessive noise generating activities are to be scheduled between 0900 and 1600 hours, Monday through Friday to reduce the potential impact to adjacent property owners and occupants.

3.2 Protection

A. Locate, identify, and protect existing facilities (scheduled to remain) from damage.

B. Identify and protect trees, plant growth, and features designated to remain as final landscaping.

C. Protect benchmarks from damage and displacement.

3.2 Clearing

A. Clear only those areas required for access to site and execution of Work as depicted in construction plans and described in scope of work.

3.3 Removal
A. Remove paving, brush, trees, and other debris as required and dispose of off-site in strict accordance with applicable laws and regulations and only at facilities approved and authorized for such disposal.

END OF SECTION 024000
SECTION 032000
CONCRETE REINFORCING

PART 1 - GENERAL

1.1 SUMMARY

A. Related Documents:
   1. Drawings and general provisions of the Subcontract apply to this Section.
   2. Review these documents for coordination with additional requirements and information that apply to work under this Section.

B. Section Includes: Concrete reinforcement and accessories.

C. Related Sections:
   1. Division 01 Section "General Requirements."
   2. Division 01 Section "Special Procedures."

1.2 REFERENCES

A. General:
   1. The following documents form part of the Specifications to the extent stated. Where differences exist between codes and standards, the one affording the greatest protection shall apply.
   2. Unless otherwise noted, the referenced standard edition is the current one at the time of commencement of the Work.
   3. Refer to Division 01 Section "General Requirements" for the list of applicable regulatory requirements.

B. ACI – American Concrete Institute:
   1. ACI 117 Tolerances for Concrete Construction
   2. ACI 301 Specifications for Structural Concrete
   3. ACI 315 Standard Practice for Detailing Reinforced Concrete Structures

C. ASTM International:
   1. ASTM A185 / A185M Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete
   2. ASTM A615 / A615M Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
   3. ASTM A706 / A706M Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement
   4. ASTM A970 / A970M Standard Specification for Headed Steel Bars for Concrete Reinforcement

1.3 SUBMITTALS

A. Submit under provisions of Division 01 Section "General Requirements."

B. Shop Drawings: Prepare placing drawings in accordance with ACI 315. Show size, shape and location of bars and wire fabric in structure. Show splice locations and lengths. Where details are not shown, conform to standards of practice indicated in ACI 315 and submit for approval.
   1. Bill reinforcing bars for walls on elevations. Bill reinforcing bars for slabs on plans. Plans and elevations need not be true views. When more than one wall or slab are identical, only one such wall or slab is required. Take sections to clarify the arrangement of reinforcement. Identify, but do not bill bars on sections.
   2. Unless the location of reinforcing is clear, give dimensions to some structural feature that will be readily distinguishable at time bars are placed.
   3. Make placing drawings complete, including the location of support bars and chairs, without reference to the design drawings.

C. Submit data required to evaluate proposed mechanical splices.

D. Submit manufacturer's certified mill test reports on each heat of reinforcing steel delivered, showing physical and chemical analysis before placing reinforcement.

1.4 QUALITY ASSURANCE

A. Codes and Standards: Comply with provisions of ACI 301 CRSI's "Manual of Standard Practice", except where more stringent requirements are shown or specified.

B. Requirements of Regulatory Agencies: Proprietary products, including bar couplers, shall have an active ICBO Evaluation Report.

C. Material Quality Assurance: Mill test reports including chemical analysis, tensile properties and bend test shall be examined for all reinforcing. Conform to one of the following:

D. Maintain positive identification of reinforcing by heat number. Provide certified mill test reports to Testing Laboratory.

E. Where positive identification cannot be made and procedures are not deemed adequate to ensure compliance, Testing Laboratory will randomly sample and make one tensile and one bend test from each 2-1/2 tons or fraction thereof of each size of reinforcement. Subcontractor will bear the cost of testing.
PART 2 - PRODUCTS

2.1 REINFORCING MATERIALS

A. Bar Reinforcement: ASTM A615, Grade 60, deformed billet bars.
   1. ASTM A706, where noted on Drawings.
   2. Recycled content shall be a minimum of 75 percent recycled post consumer steel.


C. Spirals: ASTM A82.


E. Threaded Bars: Grade 75, manufactured by DYWIDAY Systems International, Williams Form Engineering Corp. or equal substituted per Division 1.

F. Smooth Dowels, ASTM A615, Grade 40 or 60, smooth; sawcut or grind one end to remove offsets; shop paint with iron oxide zinc chromate primer.

G. Welded Deformed Bar Anchors: ASTM A-108 $f_y = 70,000$ psi, flux-filled deformed bar anchors welded to structural steel as shown; Nelson D2L, or equal substituted per Division 1.

H. Mechanical Bar Couplers: Provide mechanical couplers with a current ICC evaluation report. Coupler to develop 160% percent of specified minimum yield strength of spliced reinforcement. Subject to compliance with requirements provide one of the following, or approved equal:
   1. Barteck, Dextra Inc.
   2. Lenton Taper Threaded Connection, Erico Inc.
   3. Bar Lock, Dayton Superior Inc.

2.2 ACCESSORIES

A. Tie Wire: Minimum 16-gage black annealed wire.

B. Bar Supports:
   1. At surfaces not exposed to view in completed structure: Precast concrete bar supports with two 16 ga. embedded wires or CRSI Class 2 wire supports.
   2. Supports placed against ground or on top of vapor barrier: Precast concrete blocks not less than 3 inches square (1935 mm²) with two 16 ga. embedded wires.
   3. At Architectural Concrete and surfaces exposed to weather: CRSI Class 2 stainless steel or CRSI Class 1 plastic protected.
   4. Where support is no closer to concrete surface than 1/2 inch (13 mm): CRSI Class 3 wire supports.
2.3 FABRICATION

A. Fabricate reinforcement in accordance with ACI 315 where specific details are not shown.

PART 3 - EXECUTION

3.1 PLACEMENT

A. Surface Condition of Reinforcement: Before placing concrete, clean reinforcement of loose scale, dirt, grease and other substances which would impair bond with concrete.

B. Place reinforcement in accordance with the Drawings and the CRSI Manual.
   1. Steel bars shall be of size and length indicated, accurately bent or formed to shapes detailed or scheduled by experienced shops by methods that will not injure the materials. Reinforcing bars shall be shop fabricated to lengths and bends shown on the drawings. Fabrication tolerance shall be in accordance with the requirements of ACI 315.
   2. Reinforcing bars shall be as long as possible with a minimum number of joints.
   3. Steel reinforcement shall not be bent or straightened in a manner that will injure the material or the embedding concrete. Bars with kinks or bends not shown on the Drawings shall not be used. Heating of reinforcement for bending will not be permitted.
   4. Reinforcement shall be tagged with suitable identification to facilitate sorting and placing.

C. Place reinforcing bars accurately as to spacing and clearance and securely tied at intersections and supports with wire and in such a manner as will preclude displacement during pouring of concrete. Placing tolerances shall be in conformance with the requirements of ACI 117.

D. Place and secure reinforcement to maintain the proper distance and clearance between parallel bars and from the forms. Provide vertical steel with metal spreaders to maintain steel properly centered in the forms. Horizontal reinforcement shall be supported at proper height on concrete pads, chairs or transverse steel bars.

E. After placing, maintain bars in a clean condition until completely embedded in concrete.

F. Bars shall not be spaced closer than 1-1/2 diameters of the largest of two adjacent bars, 1-1/2 times the maximum aggregate size, nor one inch, except at bar laps. Where reinforcement in members is placed in two layers, the clear distance between layers shall be not less than one inch (25 mm) or more than 1-1/2 inches (13 mm) unless otherwise noted on the drawings. The bars in the upper layer shall be placed directly above those in the bottom layer unless otherwise detailed.
G. Coverage of bars shall be as shown and scheduled. Conform to ACI 301 where not indicated.

H. Where obstruction prevents the intended placement of reinforcement, provide additional reinforcement as directed by the Owner around the obstruction.

I. Splice bars as indicated by lapping and securely wiring together. Splices at locations other than those indicated are subject to the approval of the Owner. Splices of reinforcement shall not be made at the point of maximum stress. Splices shall provide sufficient lap to transfer the stress between bars by bond and shear. Bars shall be spread the minimum distance specified. Stagger splices of adjacent bars where possible.

J. Reinforcing bars shall not have welded joints.

K. Mechanical Bar Couplers: Install in accordance with applicable ICC evaluation report. Maintain clearance and coverage at coupler. Stagger couplers wherever practical.

3.2 FIELD INSPECTION

A. Owner's Inspector will:
   2. Special Inspect placement of reinforcement for conformance with the Contract Documents and as required by CBC Chapter 17.
   3. Special Inspect installation of mechanical couplers in accordance with requirements of applicable ICC evaluation report.
   4. Special Inspect shop and field welding as required by CBC Chapter 17

END OF SECTION 032000
PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Shop fabricated steel items.

1.02 RELATED REQUIREMENTS
   A. Section 099100 - Paints and Coatings: Paint finish.

1.03 SUBMITTALS
   A. See Section 013300 - Administrative Requirements, for submittal procedures.
   B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
   C. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL
   A. Steel Sections: ASTM A36 / A36M.
   B. Steel Tubing: ASTM A500, Grade B cold-formed structural tubing.
   C. Plates: ASTM A283.
   E. Bolts, Nuts, and Washers: ASTM A325 (ASTM A325M), Type 1, galvanized to ASTM A153 / A153M when connecting galvanized components.
   F. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
   G. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
   H. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.02 FABRICATION
   A. Fit and shop assemble items in largest practicable sections, for delivery to site.
   B. Fabricate items with joints tightly fitted and secured, per AISC specifications.
   C. Continuously seal joined members by intermittent welds and plastic filler.
   D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
   E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
   F. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.
2.03 FINISHES - STEEL
   A. Prime paint all steel items.
      1. Exceptions: Do not prime surfaces in direct contact with concrete,
         where field welding is required, and items to be covered with sprayed
         fireproofing.
   B. Prepare surfaces to be primed in accordance with SSPC-SP2.
   C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
   D. Prime Painting: One coat.
   E. Finish Painting: Two coats flat black.
   F. Steel fabrications are to be Galvanized steel as indicated on the drawings.

PART 3 EXECUTION

3.01 INSTALLATION
   A. Install items plumb and level, accurately fitted, free from distortion or defects.
   B. Provide for erection loads, and for sufficient temporary bracing to maintain true
      alignment until completion of erection and installation of permanent
      attachments.
   C. Field weld components indicated.
   D. Perform field welding in accordance with AWS D1.1 / D1.1M.
   E. Obtain approval prior to site cutting or making adjustments not scheduled.
   F. After erection, prime welds, abrasions, and surfaces not shop primed or
      galvanized, except surfaces to be in contact with concrete.

END OF SECTION 055000
SECTION 061000
ROUGH CARPENTRY

PART 1  GENERAL

1.1 REFERENCES

A. MIL-L-1914-C Lumber and Plywood, Fire Retardant Treated.
B. MIL-V-13518C(1) Wood Preservative, Surface Sealing Compound.
F. ASME B18.2.1 – Square and Hex Bolts and Screws (Inch Series).
H. PS 1 - Construction and Industrial Plywood.
J. PS 58 - Basic Hardwood.
L. WWPA - Western Wood Products Association
O. APA – American Plywood Association.
P. WCLIB – West Coast Lumber Inspection Bureau: Standard Grading Rules for West Coast Lumber.
Q. WRCLA – Western Red Cedar Lumber Association
R. Structural General Notes on Structural Drawings.

1.2 QUALITY ASSURANCE

B. When applicable, fabricate site made finish carpentry items in accordance with recommendations of Quality Standards of Architectural Woodwork Institute (AWI).
C. Lumber grading Agency: Certified by WCLIB or WWPA.
D. Plywood Grading Agency: Certified by APA.
E. Each piece of lumber and plywood shall be stamped with grade by grading agency.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver shop fabricated carpentry items until site conditions are adequate to receive the work. Protect items from weather while in transit. Do not allow uneven exposure to sunlight.
B. Store indoors, in ventilated areas with a constant, minimum temperature of 60°F, maximum relative humidity of 55 percent.

1.4 SUBMITTALS

A. Submit shop drawings under provisions of Section 013300.
B. Indicate dimensions, wood grades, component profiles, drilled holes, fasteners, connectors, erection details and sequence.

1.5 COORDINATION

A. Coordinate and provide solid backing for wall and ceiling mounted items.

PART 2 PRODUCTS

2.1 ROUGH CARPENTRY MATERIALS

A. Lumber: PS 20, graded in accordance with established Grading rules, maximum moisture content of nineteen (19) percent, of following species and grades:
   1. Non-structural Light Framing: Stress group Western Woods construction grade.
   2. Structural Lumber: See Structural General Notes
B. Preservative Wood Treatment: Pressure-treat above-ground items with water-borne preservatives to a minimum retention of 0.25 pcf. For interior uses, after treatment, kiln-dry lumber and plywood to a maximum moisture content, respectively, of nineteen (19) percent and fifteen (15) percent. Pressure-treat wood members in contact with the ground with water-borne preservatives to a minimum retention of 0.40 pcf. Complete fabrication of treated items prior to treatment where possible. If cut after treatment, coat cut surfaces. Refer to Structural General Notes for fastener requirements.
C. Plywood: Douglas Fir Plywood, C-C, exterior glue, thickness as required, each piece shall bear an Underwriter's Laboratories, Inc., label; plywood shall be dried to an average moisture content of fifteen (15) percent. See Structural General Notes.
D. Oriented Strand Board (OSB): DOC PS2.
      a. Span Rating: sixteen inch (16”) centers or less
      b. Nominal Thickness: not less than 3/8-inch OSB
   2. Roof Sheathing: Exposure I, Structural I.
      a. Span Rating: sixteen inch (16”) centers or less
      b. Nominal Thickness: not less than 15/32 inch
   3. Floor Sheathing: ¾ inch T&G
E. Nails, Screws, Spikes, and Staples: Galvanized for exterior locations, high humidity locations and treated wood, plain finish for other interior locations, size and type to suit application. Refer to Structural General Notes for fastener requirements in treated wood.
F. Bolts, Nuts, Washers, Lags, Pins, and Screws: Medium carbon steel, sized to suit application galvanized for exterior locations, high humidity locations and treated wood,
plain finish for other interior locations. Refer to Structural General Notes for fastener requirements in treated wood.

G. Fasteners:
1. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
   a. Where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating per ASTM A153 or AISI Type 304 stainless steel. Refer to Structural General Notes for additional requirements for fasteners in treated wood.
4. Wood Screws: ANSI B18.6.1
5. Lag Bolts: ANSI B 18.2.1

H. Posts: Premium grade Douglas Fir, see Structural General Notes.

I. Post Bases: Simpson Strong Tie EPB (elevated post base) mode EPB44ga, galvanized finished.

J. Glued Laminated Beams (as applicable):
1. Lumber: Comply with ANSI / AITC A190.1 and applicable lumber association standards cited herein for grades required to achieve glulam requirements for design values, appearance, fabrication limitations, and species.
2. Stress Values for Beams, Purlins, and Arches: Provide glued laminated members, sized as shown on drawings.
3. Lumber Species: Douglas Fir-Larch,
5. End Sealer: Manufacturer’s standard, transparent, colorless wood sealer, effective in retarding transmission of moisture at cross-grain cuts.
6. Penetrating Sealer: Manufacturer’s standard, translucent, penetrating wood sealer that will not interfere with application of wood stain and transparent finish or paint finish.

K. Prefabricated Structural Wood (as applicable):
1. Manufacturer: Trus Joist Weyerhaeuser, Louisiana-Pacific, Boise Cascade or approved. Trus Joist Weyerhaeuser is specified for type, quality, and construction required. See Structural Notes on drawings.
   a. Prefabricated Parallel Strand Lumber Materials: Parallam PSL materials manufactured from strands of wood fiber in continuous process with strands oriented to length of member. Adhesives to be waterproof type per ASTM D2559.
   b. Prefabricated Laminated Veneer Lumber Member: Microlam LVL materials manufactured from sheets of thin veneer structurally bonded together with adhesive. Adhesives to be waterproof type per ASTM D2559.
   c. Prefabricated Laminated Strand Lumber Member: TiberStrand LSL materials manufactured from strands of wood fiber structurally bonded together with adhesive. Adhesives to be waterproof type per ASTM D2559.
L. Miscellaneous Lumber: Provide lumber for support or attachment of other construction including rooftop equipment curbs and support bases, cant strips, bucks, nailers, blocking, furring, grounds, stripping, and similar members.

M. Miscellaneous Materials:
   1. Sill Sealer Gaskets: ¼ inch thick, ribbed, closed cell polyethylene foam in continuous roll; match width of sill plate.
   2. Insect Screen: Galvanized hardware cloth.

2.2 FINISH CARPENTRY MATERIALS

A. Graded in accordance with the requirements of WCLB, WRCLA, or AWI.
B. Nails: Size and type to suit application. #7 Trim head screws. black oxide at interior use, for installation of cedar paneling/ceiling boards.
C. Bolts, Nuts, Washers, Lags, Pins, and Screws: Size and type to suit application; non-corrosive plain finish in concealed location.
D. Interior Cedar Paneling/Ceiling Boards: Western Red Cedar, 1x12, A & Better, KD, S1S2E, smooth side exposed.
E. Interior Cedar Trim: Western Red Cedar, C & Better, clear, S1S2E, smooth side exposed, sizes as indicated on the drawings.
F. Interior Hardwood Trim: Premium grade Alder.
G. Fiber glass out looker “poles” (exterior, at eaves): custom fabricate from fiber glass tube, with applied texture and paint to match image provided by Project Coordinator, Reference Sunbacker, Fiberglass Inc, Phone 1-877-851-9052, Alfred Lewis.
H. Alternate Interior Redwood Paneling: Clear grade, vertical grain, kiln dried 1x10 tongue and groove, smooth planed faced.

2.3 FABRICATION OF FINISH CARPENTRY ITEMS

A. Fabricate finish carpentry items in accordance with recommendations of AWI. Shop-fabricate items where possible.
B. Use exposed fastening devices or nails only when unavoidable.
C. Shop-assemble finish carpentry items for delivery to site in sizes easily handled and to ensure passage through building openings.

2.4 PREPARATION OF FINISH CARPENTRY ITEMS

A. Sand work smooth and set exposed nails and screws. Apply wood filler in exposed nail and screw indentations of hardwood leaving ready to receive site applied finishes.
B. Preservation treat surfaces in contact with cementitious materials.

PART 3 EXECUTION

3.1 INSTALLATION OF CARPENTRY ITEMS

A. Install blocking to provide secure fastening. Blocking for vertical siding shall be installed between framing members @ 24” o.c. max.
B. Scribe joints for tight fit.
C. Set and secure carpentry items in place rigid, plumb, and square.
D. Use purpose designed fixture attachments for mounted components.
E. When necessary to cut and fit on site, make material with ample allowance for cutting. Provide trim for scribing and site cutting.
F. Counter-sink concealed anchorage devices used to mount components and conceal with solid plugs of species to match surrounding wood. Place flush with surrounding surfaces.
G. Install Cedar paneling / siding / trim in accordance with Western Red Cedar Lumber Association guidelines.
H. Secure Cedar paneling to plywood with trim head screws, 16" o.c. providing a uniform pattern. Countersink screws 1/16".
I. Framing shall comply with N.F.P.A. “Manual for Wood Frame Construction”, unless otherwise indicated.
J. Anchor and nail as shown, and to comply with the following:
   1. National Evaluation Report No. NER 272 for pneumatic or mechanical driven staples, P-nails, and allied fasteners.
   2. Published requirements of manufacturer of metal framing anchors.
K. Firestop concealed spaces of wood framed walls and partitions at the ceiling line of the top story. Where firestops are not automatically provided by the framing system used, use closely fitted wood blocks of nominal 2-inch-thick lumber of the same width as framing members.

3.2 STUD FRAMING

A. General: Arrange studs so that wide face of stud is perpendicular to direction of wall or partition and narrow face is parallel. Install single bottom plate and double top plates using 2-inch-thick members unless noted otherwise on Structural Drawings whose widths equal that of studs; except single top plate may be used for non-load-bearing partitions. Nail or anchor plates to supporting construction.
   1. For exterior walls install wood studs spaced 16 inches o.c. unless noted otherwise.
   2. For interior partitions and walls install studs spaced 16 inches o.c. unless noted otherwise.
B. Construct corners and intersections with not less than 3 studs. Install miscellaneous blocking and framing as shown and as required for support of facing materials, fixtures, specialty items, and trim.
   1. Install continuous horizontal blocking row at mid-height of single-story partitions over 8 feet high, using 2-inch thick members of same width as wall or partitions.
C. Frame openings with multiple studs and headers. Install nailed header members of thickness equal to width of studs. Set headers on edge and support on jamb studs.
   1. For nonbearing partitions, install double-jamb studs and headers not less than 4 inches deep for openings 3 feet and less in width, and not less than 6 inches deep for wider openings.
2. For load-bearing partitions, install double-jamb studs for openings 6 feet and less in width, and triple-jamb studs for wider openings unless noted otherwise. See Structural Drawings for additional information. Install headers of depth shown, or if not shown, as recommended by N.F.P.A. “Manual for House Framing.”

3.3 RAFTER AND CEILING JOIST FRAMING

A. Ceiling Joists: Install ceiling joists with crown up. Face nail to ends of parallel rafters.
B. Rafters: Notch to fit exterior wall plates and toe nail or use special metal framing anchors. Double rafters to form headers and trimmers at openings in roof framing (if any), and support with metal hangers. Where rafters abut at ridge, place directly opposite each other and nail to ridge member or use metal ridge hangers.

3.4 TIMBER FRAMING

A. Install timber framing with crown edge up and provide not less than 4 inches of bearing on supports. Install continuous members unless shown; tie together over supports if not continuous.
B. Where beams or girders are framed into pockets of exterior concrete walls, provide ½-inch air space between sides and ends of wood members and supporting wall.
C. Where built-up beams or girders of nominal 2-inch dimension lumber on edge are shown, fasten together with 2 rows of 20d nails spaced not less than 32 inches o.c. Locate one row near top edge and other near bottom edge. Locate end joints in members over supports; for continuous members, stagger ends at quarter points between supports.
D. Seal ends of timber beams and posts exposed to weather with a water-repellent preservative.

3.5 INSTALLATION OF CONSTRUCTION PANELS

B. Fastening Methods: Fasten panels as indicated below:
   1. Sheathing: Nail to framing in accordance with structural notes and shear wall schedule.

3.6 SILL GASKET

A. Install continuously, on concrete wherever exterior wall wood framing members abut concrete (wall bottom plates, at end of framed walls, etc.).
B. Puncture gasket clean and fit tight to protruding foundation anchor bolts.

END OF SECTION 061000
SECTION 061753
SHOP-FABRICATED WOOD TRUSSES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Wood roof trusses.
   2. Wood floor trusses.
   3. Wood girder trusses.
   4. Wood truss bracing.
   5. Metal truss accessories.

1.2 DEFINITIONS

A. Metal-Plate-Connected Wood Trusses: Planar structural units consisting of metal plate-connected members fabricated from dimension lumber and cut and assembled before delivery to Project site.
B. TPI: Truss Plate Institute, Inc.
C. Lumber grading agencies, and the abbreviations used to reference them, include the following:
   2. NLGA: National Lumber Grades Authority.
   4. WCLIB: West Coast Lumber Inspection Bureau.
   5. WWPA: Western Wood Products Association.

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide metal-plate-connected wood trusses capable of withstanding design loads within limits and under conditions indicated. Comply with requirements in TPI 1 unless more stringent requirements are specified below.
   1. Design Loads: As indicated.
   2. Maximum Deflection Under Design Loads:
      b. Floor Trusses: Vertical deflection of 1/480 of span.

1.4 SUBMITTALS

A. Product Data: For fire-retardant treated lumber, metal-plate connectors, metal truss accessories, and fasteners.

   1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
3. For fire-retardant treatments specified to be High-Temperature (HT) type, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.
4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to truss fabricator.
5. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

B. Shop Drawings: Prepared by or under the supervision of a qualified professional engineer. Show fabrication and installation details for trusses.

1. Show location, pitch, span, camber, configuration, and spacing for each type of truss required.
2. Indicate sizes, stress grades, and species of lumber.
3. Indicate locations of permanent bracing required to prevent buckling of individual truss members due to design loads.
4. Indicate type, size, material, finish, design values, orientation, and location of metal connector plates.
5. Show splice details and bearing details.
6. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

C. Product Certificates: For metal-plate-connected wood trusses, signed by officer of truss fabricating firm.

D. Qualification Data: For metal-plate manufacturer, fabricator, and Installer.

E. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.

F. Research/Evaluation Reports: For the following, showing compliance with building code in effect for Project:
1. Wood-preservative-treated lumber.
2. Fire-retardant-treated wood.
3. Metal-plate connectors.
4. Metal truss accessories.

1.5 QUALITY ASSURANCE

A. Metal Connector-Plate Manufacturer Qualifications: A manufacturer that is a member of TPI and that complies with quality-control procedures in TPI 1 for manufacture of connector plates.
1. Manufacturer's responsibilities include providing professional engineering services needed to assume engineering responsibility.
2. Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.

B. Fabricator Qualifications: Shop that participates in a recognized quality-assurance program that complies with quality-control procedures in TPI 1 and that involves third-party inspection by an independent testing and inspecting agency acceptable to Architect and authorities having jurisdiction.

C. Source Limitations for Connector Plates: Obtain metal connector plates from a single manufacturer.

D. Comply with applicable requirements and recommendations of the following publications:
   1. TPI 1, "National Design Standard for Metal Plate Connected Wood Truss Construction."
   2. TPI DSB, "Recommended Design Specification for Temporary Bracing of Metal Plate Connected Wood Trusses."
   3. TPI HIB, "Commentary and Recommendations for Handling, Installing & Bracing Metal Plate Connected Wood Trusses."

E. Wood Structural Design Standard: Comply with applicable requirements in AF&PA's "National Design Specifications for Wood Construction" and its "Supplement."

F. Forest Certification: Provide metal-plate-connected wood trusses produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC 1.2, "Principles and Criteria."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Handle and store trusses to comply with recommendations of TPI HIB, "Commentary and Recommendations for Handling, Installing & Bracing Metal Plate Connected Wood Trusses."
   1. Store trusses flat, off of ground, and adequately supported to prevent lateral bending.
   2. Protect trusses from weather by covering with waterproof sheeting, securely anchored.
   3. Provide for air circulation around stacks and under coverings.

B. Inspect trusses showing discoloration, corrosion, or other evidence of deterioration. Discard and replace trusses that are damaged or defective.

1.7 SEQUENCING

A. Time delivery and erection of trusses to avoid extended on-site storage and to avoid delaying progress of other trades whose work must follow erection of trusses.

PART 2 - PRODUCTS

2.1 DIMENSION LUMBER
A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
   1. Factory mark each piece of lumber with grade stamp of grading agency.
   2. For exposed lumber indicated to receive a stained or natural finish, omit grade stamp and provide certificates of grade compliance issued by grading agency.
   3. Provide dressed lumber, S4S.
   4. Provide dry lumber with 19 percent maximum moisture content at time of dressing.

B. Grade and Species: For truss chord and web members, provide dimension lumber of any species, graded visually or mechanically, and capable of supporting required loads without exceeding allowable design values according to AF&PA's "National Design Specifications for Wood Construction" and its "Supplement."

C. Grade and Species: Provide visually graded dimension lumber for truss chord and web members, of not less than the following grade and any of the following species:
   1. Grade for Chord Members: No. 1 minimum.
   2. Grade for Web Members: Same grade as indicated for chord members.
   3. Species: Douglas fir-larch; WCLIB or WWPA.

D. Grade and Species: Provide dimension lumber of any species for truss chord and web members, graded as follows and of the following minimum design values for size of member required according to AF&PA's "National Design Specifications for Wood Construction" and its "Supplement":
   1. Grading Method: Visual
   2. Design Values: As indicated on Drawings.
   3. Design Values: See structural plans for product requirements

E. Minimum Chord Size For Roof Trusses: 2 by 6 inches nominal (38 by 140 mm actual).

F. Permanent Bracing: Provide wood bracing that complies with requirements for miscellaneous lumber in Division 06 Section "Rough Carpentry".

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

A. Preservative Treatment by Pressure Process: AWPA C2, except that trusses that are not in contact with the ground and are continuously protected from liquid water may be made from lumber treated according to AWPA C31 with inorganic boron (SBX).
   1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
   2. For exposed trusses indicated to receive a stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
1. For exposed trusses indicated to receive a stained or natural finish, mark end or back of each piece.

D. Application: Treat trusses where indicated on Drawings.

2.3 FIRE-RETARDANT-TREATED WOOD

A. General: Comply with performance requirements in AWPA C20.
   1. Use Exterior type for exterior locations and where indicated.
   2. Use Interior Type A, High Temperature (HT) for enclosed roof trusses and where indicated.
   3. Use Interior Type A, unless otherwise indicated.

B. Identify fire-retardant-treated wood with appropriate classification marking of testing and inspecting agency acceptable to authorities having jurisdiction.
   1. For exposed trusses and bracing indicated to receive a stained or natural finish, mark end or back of each piece.

C. For exposed trusses indicated to receive a stained or natural finish, use chemical formulations that do not bleed through, contain colorants, or otherwise adversely affect finishes.

D. Application: Treat items indicated on Drawings, and the following:
   1. Floor trusses for bowling lanes and raised platforms.
   2. Roof trusses.

2.4 METAL CONNECTOR PLATES

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

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Alpine Engineered Products, Inc.
   2. Cherokee Metal Products, Inc.; Masengill Machinery Company.
   3. CompuTrus, Inc.
   4. Eagle Metal Products.
   5. Jager Building Systems, Inc.
   6. MiTek Industries, Inc.; a subsidiary of Berkshire Hathaway Inc.
   7. Robbins Engineering, Inc.
   8. TEE-LOK Corporation; a subsidiary of Berkshire Hathaway Inc.

C. General: Fabricate connector plates to comply with TPI 1.

D. Hot-Dip Galvanized Steel Sheet: ASTM A 653/A 653M; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G60 (Z180) coating designation; and not less than 0.036 inch (0.9 m) thick.
   1. Use for interior locations where stainless steel is not indicated.
E. Stainless-Steel Sheet: ASTM A 666, Type 316, and not less than 0.035 inch (0.88 mm) thick.
   1. Use for exterior locations and where indicated.

2.5 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
   1. Where trusses are exposed to weather, in ground contact, made from pressure preservative treated wood, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M or Type 304 stainless steel.

B. Nails, Brads, and Staples: ASTM F 1667.


D. Wood Screws: ASME B18.6.1.

E. Lag Bolts: ASME B18.2.1 (ASME B18.2.3.8M).

F. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.

G. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.

2.6 METAL TRUSS ACCESSORIES

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

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

C. Basis-of-Design Products: Subject to compliance with requirements, provide products indicated on Drawings or comparable products by one of the following:
   1. KC Metals Products, Inc.
   2. Simpson Strong-Tie Co., Inc.
   3. USP Structural Connectors.

D. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.
   1. Use for interior locations where stainless steel is not indicated.
F. Stainless-Steel Sheet: ASTM A 666, Type 316.
   1. Use for exterior locations and where indicated.
G. Truss Tie-Downs: Bent strap tie for fastening roof trusses to wall studs below, 1-1/2 inches (38 mm) wide by 0.050 inch (1.3 mm) thick. Tie fastens to one side of truss, top plates, and side of stud below.
H. Truss Tie-Downs (Hurricane or Seismic Ties): Bent strap tie for fastening roof trusses to wall studs below, 2-1/4 inches (57 mm) wide by 0.062 inch (1.6 mm) thick. Tie fits over top of truss and fastens to both sides of truss, top plates, and one side of stud below.
I. Truss Tie-Downs (Hurricane or Seismic Ties): Bent strap tie for fastening roof trusses to wall studs below, 2-1/2 inches (63 mm) wide by 0.062 inch (1.6 mm) thick. Tie fits over top of truss and fastens to both sides of truss, inside face of top plates, and both sides of stud below.
J. Roof Truss Clips: Angle clips for bracing bottom chord of roof trusses at non-load bearing walls, 1-1/4 inches (32 mm) wide by 0.050 inch (1.3 mm) thick. Clip is fastened to truss through slotted holes to allow for truss deflection.
K. Floor Truss Hangers: U-shaped hangers, full depth of floor truss, with 1-3/4-inch- (44-mm-) long seat; formed from metal strap 0.062 inch (1.6 mm) thick with tabs bent to extend over and be fastened to supporting member.
L. Roof Truss Bracing/Spacers: U-shaped channels, 1-1/2 inches (38 mm) wide by 1 inch (25 mm) deep by 0.040 inch (1.0 mm) thick, made to fit between 2 adjacent trusses and accurately space them apart, and with tabs having metal teeth for fastening to trusses.

2.7 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: SSPC-Paint 20, with dry film containing a minimum of 94 percent zinc dust by weight.
B. Protective Coatings: SSPC-Paint 22, epoxy-polyamide primer or SSPCPaint 16, coal-tar epoxy-polyamide paint.

2.8 FABRICATION

A. Cut truss members to accurate lengths, angles, and sizes to produce close-fitting joints.
B. Fabricate metal connector plates to sizes, configurations, thicknesses, and anchorage details required to withstand design loads for types of joint designs indicated.
C. Assemble truss members in design configuration indicated; use jigs or other means to ensure uniformity and accuracy of assembly with joints closely fitted to comply with tolerances in TPI 1. Position members to produce design camber indicated.
   1. Fabricate wood trusses within manufacturing tolerances in TPI 1.
D. Connect truss members by metal connector plates located and securely embedded simultaneously in both sides of wood members by air or hydraulic press.
PART 3 - EXECUTION

3.1 INSTALLATION

A. Install wood trusses only after supporting construction is in place and is braced and secured.
B. If trusses are delivered to Project site in more than one piece, assemble trusses before installing.
C. Hoist trusses in place by lifting equipment suited to sizes and types of trusses required, exercising care not to damage truss members or joints by out-of-plane bending or other causes.
D. Install and brace trusses according to TPI recommendations and as indicated.
E. Install trusses plumb, square, and true to line and securely fasten to supporting construction.
F. Space trusses as indicated; adjust and align trusses in location before permanently fastening.
G. Anchor trusses securely at bearing points; use metal truss tie-downs or floor truss hangers as applicable. Install fasteners through each fastener hole in truss accessories according to manufacturer's fastening schedules and written instructions.
H. Securely connect each truss ply required for forming built-up girder trusses.
   1. Anchor trusses to girder trusses as indicated.
I. Install and fasten permanent bracing during truss erection and before construction loads are applied. Anchor ends of permanent bracing where terminating at walls or beams.
   1. Install bracing to comply with Division 06 Section "Rough Carpentry".
   2. Install and fasten strongback bracing vertically against vertical web of parallel chord floor trusses at centers indicated.
J. Install wood trusses within installation tolerances in TPI 1.
K. Do not cut or remove truss members.
L. Replace wood trusses that are damaged or do not meet requirements.
   1. Do not alter trusses in field.

3.2 REPAIRS AND PROTECTION

A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
B. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
C. Repair damaged galvanized coatings on exposed surfaces with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
D. Protective Coating: Clean and prepare exposed surfaces of metal connector plates. Brush-apply primer, when part of coating system, and one coat of protective coating.
   1. Apply materials to provide minimum dry film thickness recommended by coating system manufacturer.

END OF SECTION 061753
SECTION 064619
WOOD TRIM AND SHOE MOLDING

PART I - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Interior standing and running trim.

1.2 QUALITY ASSURANCE

A. Fabricator Qualifications: Certified participant in AWI's Quality Certification Program.

1.3 SUBMITTALS

A. Contractor to submit manufacturer information including; style, size, and material.
   Owner to make selection based on submittals. Contractor to order and secure trim only
   after Owner's official selection.

PART 2- PRODUCTS

2.1 WOOD TRIM, GENERAL

A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork
   Standards" for grades of wood trim indicated for construction, finishes, installation, and
   other requirements.
   1. Provide labels from AWI certification program indicating that woodwork
      complies with requirements of grades specified.

2.2 INTERIOR STANDING AND RUNNING TRIM FOR OPAQUE FINISH

A. Grade: Custom.
B. Wood Species: Eastern white pine, sugar pine, or western white pine.
C. Molding Patterns. Made to patterns included in WMMPA WM 12.
   2. Shoe-Mold Pattern: WM 126, 1/2-by-3/4-inch (13-by-19-mm) quarter-round shoe
      mold.

2.3 WOOD MATERIALS

A. Wood Products: Provide materials that comply with requirements of referenced quality
   standard for each type of wood trim and quality grade specified unless otherwise
   indicated.
   1. Wood Moisture Content for Interior Materials: nine (9) percent.
2.4 MISCELLANEOUS MATERIALS

A. Adhesives: Do not use adhesives that contain urea formaldehyde.
B. VOC Limits for Installation Adhesives and Sealants: Use products that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
   1. Wood Glues: 30 g/L.
   2. Multipurpose Construction Adhesives: 70 g/L.
   3. Structural Wood Member Adhesive: 140 g/L.
   4. Architectural Sealants: 250 g/L.

2.5 FABRICATION

A. Fabricate wood trim to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:
   1. Edges of Solid-Wood (Lumber) Members: 1/16 inch (1.5 mm) unless otherwise indicated.
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.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before installation, condition wood trim to average prevailing humidity conditions in installation areas.

3.2 INSTALLATION

A. Grade: Install wood trim to comply with same grade as item to be installed.
B. Install wood trim level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm).
C. Scribe and cut wood trim to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
D. Anchor wood trim to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing. Use fine finishing nails for exposed fastening, countersunk and filled flush with woodwork.
E. Standing and Running Trim: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to greatest extent possible. Do not use pieces less than 36 inches (900 mm) long except where shorter single-length pieces are necessary. Scarf running joints.

END OF SECTION 064619
SECTION 072600
MOISTURE/VAPOR PROTECTION

PART 1 – GENERAL

1.1 Summary

A. Includes but not limited to:
   1. Weather Barrier Membrane
   2. Seam Tape
   3. Flashing
   4. Fasteners

1.2 References

A. AATCC127: Water Resistance Hydrostatic Head Test.
G. ASTM D5733-9 Trapezoidal Test.
L. TAPPI T-410: Grams of Paper and Paperboard (Weight per Unit Area).
M. TAPPI T-460: Air Resistance (Gurley Hill Method)

1.3 Submittals

A. Refer to Section 013300 for Submittal Procedures.
B. Product Data: Submit manufacturer current technical literature for each component.
C. Samples: Weather Barrier membrane, minimum 8-1/2 inches by 11 inch.
D. Quality Assurance: Submit copies of test results showing performance characteristics equaling or exceeding those specified.
E. Manufacturer Instructions: Provide manufacturer’s written installation instructions.
F. Closeout Submittals: refer to section 017800.

1.4 Quality Assurance

A. Installer shall have experience with installation of similar weather barrier assemblies under similar conditions.
B. Installation shall be in accordance with manufacturer’s installation guidelines and recommendations.
C. Source Limitations: Provide weather barrier and accessory materials produced by single manufacturer. Provide all materials procured new for this project.

1.5 Delivery, Storage, and Handling

A. Deliver weather barrier materials and components in manufacturer’s original, unopened, undamaged containers with identification labels intact.
B. Store weather barrier materials as recommended by manufacturer.

1.6 Scheduling

A. Review requirements for sequencing of installation of weather barrier assembly with installation of windows, doors, louvers and flashings to provide a weather-tight barrier assembly.
B. Preferred install is prior to window and door.

PART 2 – PRODUCTS

2.1 Water-Resistant Barrier

A. Spunbonded polypropylene or polyolefin weather membrane with a microporous coating, non-woven, Non-perforated.
B. Performance Characteristics
   1. Gurley Hill [TAPPI T-460] [sec/100cc] >2500.
   2. Water Vapor Transmission 9-15 perms as tested by ASTM E-96-90, Method A.
   3. Water penetration resistance of 865 cm on hydrostatic head in accordance with AATCC-127.
   4. Trapezoidal Test of 30/33 in accordance with ASTM D-5733-9.
   5. Air-Ins < .02L/S·M2 @ 75 PA.
C. Approved Manufacturers:
   1. Typar Weather-Protection Membrane by Fiberweb (www.typar.com).
   2. DuPont; 4417 Lancaster Pike, Chestnut Run Plaza 728, Wilmington, DE  19805; 1-800-44-TYVEK (8-9835); http://www.construction.tyvek.com
D. Manufacturer’s Warranty:
   1. Lifetime limited product warranty (for single-family residential applications) plus an incredible 10-year warranty on labor and materials (restrictions apply, see warranty for details).

2.2 Sealing Tape/Fasteners

A. Approved Tape Manufacturers
   1. Typar Construction Tape, by Fiberweb.
   2. DuPont Seam Tyvek Tape.
B. Recommended Sealants against logo side coating.
1. Elastomeric polymer based, butyl rubber, rubber based, meeting ASTM C920 evaluation.

C. Recommended Fasteners for Wood, Insulated Sheathing Board, Exterior Gypsum
   1. Plastic cap nails.
   2. Plastic cap staples.

D. Recommended Fasteners for Steel Frame construction
   1. Rust-resistant screws with washers.

E. Recommended Fastening to Masonry
   2. Mechanical: Masonry fastener with washer.

PART 3 – EXECUTION

3.1 Installation

A. Verify substrate and surface conditions are in accordance with weather barrier manufacturer recommended tolerances prior to installation of weather barrier and accessories.

B. Install in accordance with Manufacturer’s instruction over exterior sheathing or open studs. Seal joints and penetrations through weather resistive barrier with specified tape and fasteners prior to installation of finish material. Air infiltration barrier shall be air tight and free from holes, tears, and punctures. All window and door penetrations are to be flashed and sealed per ASTM 2112, AMMA guidelines and manufacturer instructions. Cover with exterior cladding within 6 months of installation.

3.2 Weather Barrier

A. Install weather barrier over exterior face of exterior wall substrate in accordance with manufacturer recommendations.

B. Start weather barrier installation at a building corner, leaving 6-12 inches of weather barrier extended beyond corner to overlap.

C. Install weather barrier in a horizontal manner starting at the lower portion of the wall surface. Maintain weather barrier plumb and level.

D. Extend bottom roll edge over sill plate interface 2” to 3” minimum. Seal weather barrier with sealant or tape. Shingle weather barrier over back edge of thru-wall flashings and seal weather barrier with sealant or tape. Ensure weeps are not blocked.

E. Subsequent layers shall overlap lower layers a minimum of 6 inches horizontally in a shingling manner.

F. Window and Door Openings: Extend weather barrier completely over openings.

G. Weather Barrier Attachment:

   H. Attach weather barrier to studs through exterior sheathing. Secure using weather barrier manufacturer recommended fasteners, spaced 12 -18 inches vertically on center along stud line, and 24 inch on center, maximum horizontally.

   I. Apply 4 inch by 7 inch piece of flash to weather barrier membrane prior to the installation cladding anchors.
3.3 Seaming

A. Seal seams of weather barrier with seam tape at all vertical and horizontal overlapping seams.
B. Seal any tears or cuts as recommended by weather barrier manufacturer.

3.4 Opening Preparation

A. Cut weather barrier in an “I-cut” pattern. A modified I-cut is also acceptable.
   1. Cut weather barrier horizontally along the bottom and top of the window opening.
   2. From the top center of the window opening, cut weather barrier vertically down to the sill.
   3. Fold side and bottom weather barrier flaps into window opening and fasten.
B. Cut a head flap at 45-degree angle in the weather barrier membrane at window head to expose 8 inches of sheathing. Temporarily secure weather barrier membrane flap away from sheathing with tape.

3.5 Flashing

A. Cut 9-inch wide wrap a minimum of 12 inches longer than width of sill rough opening. Apply primer as recommended by the manufacturer.
B. Cover horizontal sill by aligning wrap edge with inside edge of sill. Adhere to rough opening across sill and up jambs a minimum of 6 inches. Secure flashing tightly into corners by working in along the sill before adhering up the jambs.
D. On exterior, apply continuous bead of sealant to wall or backside of window mounting flange across jambs and head. Do not apply sealant across sill.
E. Install window according to manufacturer’s instructions.
F. Apply 4-inch wide strips of flash at jambs overlapping entire mounting flange across jambs and head. Extend jamb flashing 1-inch above top of rough opening and below bottom edge of sill flashing.
G. Apply 4-inch wide strip of flash as head flashing overlapping the mounting flange. Head flashing should extend beyond outside edges of both jamb flashings.
H. Position weather barrier head flap across head flashing. Adhere using 4-inch wide flash over the 45-degree seams.
I. Tape head flap in accordance with manufacturer recommendations.
J. On interior, install backer rod in joint between frame of window and flashed rough framing. Apply sealant around entire window to create air seal. Apply sealant in accordance with sealant manufacturer’s instructions and ASTM C1193.

3.6 Thru Wall Flashing Installation

A. Apply primer per manufacturer’s written instructions.
B. Install preformed corners and end dams bedded in sealant in appropriate locations along wall.
C. Starting at a corner, remove release sheet and apply membrane to primed surfaces in lengths of 10 feet.
D. Extend membrane through wall and leave ¼ inch minimum exposed to form drip edge.
E. Roll flashing into place. Ensure continuous and direct contact with substrate.
F. Lap ends and overlap preformed corners 4 inches minimum. Seal all laps with sealant.
G. Trim exterior edge of membrane 1-inch and secure metal drip edge per manufacturer’s written instructions.
H. Terminate membrane on vertical wall. Terminate into counterflashing or with termination bar.
I. Apply sealant bead at each termination.

3.7 Thru Wall Flashing/Weather Barrier Interface at Base of Wall

A. Overlap thru-wall flashing with weather barrier by 6-inches.
B. Mechanically fasten bottom of weather barrier through top of thru-wall flashing.
C. Seal vertical and horizontal seams with tape or sealing membrane.

3.8 Thru Wall Flashing/Weather Barrier Interface at Shelf Angle

A. Seal weather barrier to bottom of shelf angle with sealing membrane.
B. Apply thru-wall flashing to top of shelf angle. Overlap thru-wall flashing with weather barrier by 6-inches.
C. Seal bottom of weather barrier to thru-wall flashing with tape or sealing membrane.

3.9 Thru Wall Flashing/Weather Barrier Interface at Window Head

A. Cut flap in weather barrier at window head.
B. Prime exposed sheathing.
C. Install lintel as required. Verify end dams extend 4 inches minimum beyond opening.
D. Install end dams bedded in sealant.
E. Adhere 2 inches minimum thru-wall flashing to wall sheathing. Overlap lintel with thru-wall flashing and extend ¼ inch minimum beyond outside edge of lintel to form drip edge.
F. Apply sealant along thru-wall flashing edges.
G. Fold weather barrier flap back into place and tape bottom edge to thru-wall flashing.
H. Tape diagonal cuts of weather barrier.
I. Secure weather barrier flap with fasteners.

END SECTION 072600
SECTION 073113
ASPHALT SHINGLES

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section specifies organic felt and fiberglass asphalt shingles.
B. Provide granular surface asphalt shingle roofing, as specified herein and as needed for a complete and proper installation. Inspect roof and repair damaged or incomplete roofs with new shingles to assure that all roofing and flashing leaves the building in a watertight condition for a minimum of 30 years.

1.2 SUMITTALS

A. Submit in accordance with Section 013300, shop drawings, product data, and samples.
B. Samples: Shingles, each type, color and texture.
C. Manufacturer's Literature and Data:
   1. Shingles, each type
   2. Installation instructions
   3. Warranty

1.3 QUALITY ASSURANCE

A. Perform work in accordance with NRCA Steep Roofing Manual.
B. Perform work in strict accordance with the manufacturer specifications.

ENVIRONMENTAL REQUIREMENTS

A. Do not install shingles if the ambient temperature is out of the recommended range of the product manufacturer.

1.4 DELIVERY AND STORAGE

A. Deliver materials in manufacturer's unopened bundles or containers with the manufacturer's brand and name clearly marked thereon.
B. Shingle bundle wrapping shall bear the label of Underwriters Laboratories, Inc.
C. Store shingles in accordance with manufacturer's printed instructions. Store rolled goods on end in an upright position.
D. Keep materials dry, covered completely and protected from the weather.

1.5 APPLICABLE PUBLICATIONS

A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.
B. American Society for Testing and Materials (ASTM):
D226-09 ..........................Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing
D1970-11 ........................Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection
D2178-04 ..........................Asphalt Glass Felt used in Roofing and Waterproofing
D3018-11 ........................Class A Asphalt Shingles Surfaced with Mineral Granules
D3462-10 ..........................Asphalt, Shingles Made from Glass Felt and Surfaced with Mineral Granules
F1667-11 ..........................Driven Fasteners: Nails, Spikes, and Staples

C. Underwriter’s Laboratories Inc. (UL):

UL790-08 ..........................Fire Tests of Roof Covering

PART 2 - PRODUCTS

2.1 SHINGLES

A. Class A: (Fire resistive), per UL790. ASTM D3018, Type I and ASTM 3462, square butt for a maximum exposure of 125 mm (5 inches), headlap minimum 50 mm (2 inches), wind resistant, self sealing. Minimum weight: 10.3 Kg/sqm (210 lbs/100sft). Warranty minimum thirty (30) year, 110 mph wind.

2.2 ROOFING NAILS

A. ASTM F1667; Type I, Style 20, galvanized steel, deformed shanks, with heads 9.5 mm to 11 mm (3/8-inch to 7/16-inch) diameter.
B. Use nails 32 mm (1-1/4 inches) long for shingles and 19 mm (3/4-inch long) for felt.

2.3 ROOFING FELT

A. No 15 asphalt saturated roofing felt.
B. Fiberglass Felt: ASTM D2178.
C. Organic Felt: ASTM D226, TYPE I.
D. Modified bitumen; ASTM D 1970.

2.4 FLASHING

A. Non-corrosive sheet metal. Use flashing at all roof penetrations. Apply non-peel paint application to all visible surfaces in color of complementary or similar roof color.
PART 3 EXECUTION

3.1 PREPARATION

A. Roof surfaces shall be sound, reasonably smooth and free from defects which would interfere with roofing installation.
B. Roof accessories, vent pipes and other projections through the roof must be in place and roof flashing installed or ready for installation before laying shingles.

3.2 LAYING

A. Lay felt under shingles over entire roof.
B. Install asphalt felt underlayment, lapping a minimum of 300 mm (12 inches) at ends, 150 mm (6 inches) at head and 300 mm (12 inches) over ridge. Extend felt 13 mm (1/2-inch) beyond edges of roof. Nail felt 125 mm (five inches) on centers along laps.
C. At eaves, install strip of 41 Kg (90 pound) mineral surface roll roofing not less than 460 mm (18 inches) wide and starter course of roof shingles with tabs reversed. Both shall overhang lower edge of roof 13 mm (1/2-inch).
D. Lay shingles with maximum exposure of 125 mm (5 inches). Nail shingles in accordance with manufacturer's published directions.

3.3 METAL DRIP EDGES

A. At rakes, install metal drip edges made of stainless steel. Apply the metal drip edge directly over the underlayment along the rakes.
B. Secure metal drip edges with compatible nails spaced not more than 250 mm (10 inches) on center along the inner edges.

3.4 FLASHINGS

A. Provide metal flashings at the intersections of roofs, adjoining walls, and projections through the deck such as chimneys and vent stacks. Give careful attention to the installation of all flashings.

3.5 RIDGE

A. Bend each ridge shingle lengthwise down center to provide equal exposure on each side of ridge. Beginning at one end of ridge, apply shingles with maximum 125 mm (5 inches) exposure.
B. Secure each shingle with one nail on each side, 210 mm (8-1/2 inches) back from exposed end and one inch up from edge.
3.6 VALLEY FLASHING

A. Install metal valley flashing.
B. Secure valley flashing in accordance with shingle manufacturer's printed instructions.
C. Expose flashing in open portion of valley a minimum of 125 mm (5 inches) and lap the shingles over the flashing a minimum of 125 mm (5 inches).

3.7 ROOF ACCESSORIES

A. Lap shingles over all roof accessories flashing a minimum of 125 mm (5 inches).

End of Section 073113
PART 1 GENERAL

1.1 QUALITY ASSURANCE

A. Source Limitations for Siding and Soffit: Obtain each type, color, texture, and pattern of siding and soffit, including related accessories, through one source from a single manufacturer.

B. Mockup: Build mockup to verify selections made under sample submittals and to demonstrate aesthetic effects.
   1. Build mockup approximately 48 inches long by 60 inches high. Include outside corner on one end of mockup and inside corner on other end, include finish coating representative of standard for each material. Do not proceed with installation until mock up is approved by Owner.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated and manufacturer’s written installation instructions.

B. Samples for Selection: For each siding and soffit type, color, texture, and pattern.

C. Product Certificates: For each type of siding and soffit, signed by product manufacturer.

D. Research/Evaluation Reports: For each type of siding required.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Store materials in a dry, well-ventilated, weather tight place.

1.4 PROJECT CONDITIONS

A. Weather Limitations: Proceed with siding installation only if substrate is completely dry and if existing and forecasted weather conditions permit siding to be installed according to manufacturer’s written instructions.

1.5 SEQUENCING

A. Coordinate installation with flashings and other adjoining construction to ensure proper sequencing.

1.6 WARRANTY

A. Provide Manufacturer's Warranties: 50-year product warranty for Hardiplank and Hardipanel siding, 10-year product warranty for Harditrim and 25-year for Hardisoffit panels.

1.7 EXTRA MATERIALS
A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.  
1. Furnish full lengths of siding and trim in a quantity no less than two percent (2%) of the amount installed.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with requirements of the Contract Documents and provided the manufacturer meets the standards established by the specifically listed product, manufacturers offering products which maybe incorporated in the work include, but are not limited to those identified in this section or indicated on the drawings, provided substitution prior approval, in accordance with Instructions to Bidders, was given.

B. Substitutions under provisions of Section 012500.

2.2 SIDING

A. Reinforced Fiber-Cement Siding: Siding made from fiber-cement board that does not contain asbestos fibers; complies with ASTM C 1186, Type A, Grade II; is classified as noncombustible when tested according to ASTM E 136; and has a flame-spread index of 25 or less when tested according to ASTM E 84.


2. Acceptable Manufacturers:
   a. Cemplank, Inc.
   b. CertainTeed Corp.
   c. James Hardie Inc.

3. Pattern: provide Owner with submittal patterns. Owner to select pattern. Do not order or install without prior submittal approval.

4. Factory Priming: Manufacturer’s standard alkali-resistant acrylic primer, for custom coating per section.

2.3 TRIM


2.4 SOFFIT

A. Reinforced Fiber-Cement Vented Soffit: Panels made from fiber-cement board that does not contain asbestos fibers; complies with ASTM C 1186, Type A, Grade II; is classified as noncombustible when tested according to ASTM E 136; and has a flame-spread index of 25 or less when tested according to ASTM E 84.

1. Acceptable Manufacturers: Same manufacturers listed for fiber-cement siding.

2. Pattern and texture from smooth soffit panels.

3. Size: Minimum panel size – 12” x 12’ x ¼” thick.

4. Ventilation: 5 sq. inches of net free ventilation per linear foot of soffit.
5. Factory Priming: Manufacturer's recommended flat primer.
6. Colors for siding. As selected by Owner.

2.5 ACCESSORIES

A. Siding Accessories: Provide starter strips, edge trim, corner cap, and other items as recommended by siding manufacturer for building configuration.
   1. Provide accessories made from same material as adjacent siding, unless otherwise indicated.
   2. Provide accessories matching undercoating, color and texture of adjacent siding, unless otherwise indicated.

B. Flashing:
   1. Provide flashing complying with Division 7 Section "Sheet Metal Flashing and Trim" at window and door heads and where indicated.
   2. Penetration Flashing: Huber + Suhner, Vidiflex - F

C. Elastomeric Joint Sealant: Single-component neutral-curing silicone joint sealant for Use NT (nontraffic) and for Uses M, G, A, and, as applicable to joint substrates indicated, O joint substrates.

D. Fasteners:
   1. For fastening to wood, use siding nails or ribbed bugle-head screws of sufficient length to penetrate a minimum of 1 inch into substrate.
   2. For fastening aluminum, use aluminum fasteners. Where fasteners will be exposed to view, use prefinished aluminum fasteners in color to match item being fastened.
   3. For fastening fiber-cement siding, use hot-dip galvanized fasteners.

E. Drainage Mat: To go behind siding: Colbond Enkabarrier, with weather resistive barrier on the sheathing side surface.

F. Weather Resistive Barrier @ siding side of exterior wall: WallShield by VaproShield.
   1. Thickness and Weight: 0.023 inches thick and 5.161 oz./sq. yd.
   2. Water Vapor Transmission: 212 perms per ASTM E 96-00, Method B (as tested by CNRC).
   3. Water Penetration Resistance: 68 cm per ATTCC-127.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of siding. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrates of projections and substances detrimental to application.
3.3 INSTALLATION, GENERAL

A. Comply with siding manufacturer's written installation instructions applicable to products and applications indicated unless more stringent requirements apply. Center nails in elongated nailing slots without binding siding to allow for thermal movement. Overlap joints to shed water away from direction of prevailing wind.

3.4 ADJUSTING AND CLEANING

A. Remove damaged, improperly installed, or otherwise defective siding materials and replace with new materials complying with specified requirements.
B. Clean finished surfaces according to siding manufacturer's written instructions and maintain in a clean condition during construction.

END OF SECTION 074646
SECTION 077123
GUTTERS & DOWNSPOUTS

PART 1 GENERAL

1.1 REFERENCES

A. ASTM A446 - Steel Sheet, Zinc Coated, (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality.
B. ASTM B32 - Solder Metal.
C. ASTM B486 - Paste Solder.
D. FS O-F-506 - Flux, Soldering, Paste and Liquid.

1.2 SUBMITTALS

A. Submit under provisions of Section 013300.
B. Shop Drawings: Indicate locations, configurations, jointing methods, fastening methods, locations, and installation details.
C. Product Data: Provide data on prefabricated components.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site per manufacturer’s requirements.
B. Stack preformed and prefinished material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope to drain.
C. Prevent contact with materials during storage which may cause discoloration, staining, or damage.
D. Schedule delivery of materials to site to reduce total amount of time that materials are required to be stockpiled on site prior to installation.

1.4 COORDINATION

A. Coordinate the work with downspout discharge pipe inlet.

PART 2 PRODUCTS

2.1 MATERIALS

A. Pre-Coated Galvanized Steel: ASTM A446, Grade A, G90 zinc coating; 26 gauge core steel, shop pre-coated.

2.2 COMPONENTS

A. Downspouts: SMACNA 3" x 3” minimum plain rectangular profile.
B. Gutters: SMACNA Style F, sized per detailing.
C. Debris Guards: Profiled to suit downspouts and gutters, manufactured from same or similar material(s) as gutters.
D. Accessories: Profiled to suit downspouts and gutter.

2.3 ACCESSORIES

A. Anchorage Devices: SMACNA requirements.
B. Downspout Supports: Straps.
C. Gutter Spreader/Support bracket, cleats and fasteners per SMACNA.
D. Fasteners: Galvanized steel; finish exposed fasteners same as flashing metal.
E. Solder: ASTM B32; 50/50 type.
F. Flux: FS O-F-506.

2.4 FABRICATION

A. Form downspouts and gutters of profiles and size indicated on drawings.
B. Fabricate with required connection pieces.
C. Form sections square, true, and accurate in size, in maximum possible lengths, free of distortion or defects detrimental to appearance or performance.
D. Hem exposed edges of metal.
E. Solder shop formed metal joints. After soldering, remove flux. Wipe and wash solder joints clean. Weather seal joints.
F. Fabricate accessories; seal watertight.

2.5 FINISHES

A. Prepare and paint surfaces in accordance with Section 099100.
B. Back paint concealed metal surfaces in contact with dissimilar materials.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that surfaces are ready to receive work.

3.2 INSTALLATION

A. Join lengths with seams soldered watertight.
B. Solder metal joints for full metal surface contact. After soldering, wash metal clean with neutralizing solution and rinse with water.
C. Secure downspout and gutter to building.
D. Connect downspouts to storm sewer system (where applicable).

END OF SECTION 077123
SECTION 081400
WOOD DOORS

PART 1  GENERAL

1.1 REFERENCES
A. AWI Quality Standards of Architectural Woodwork Institute.
B. NWMA Industry Standard I.S. 1-80.

1.2 SUBMITTALS
A. Submit shop drawings and product data under provisions of Section 013300.
B. Indicate general construction, jointing methods, stile and rail reinforcement, hardware locations, and locations of cut-outs for glass.

1.3 WARRANTY
A. Provide warranty under provisions of Section 017800.
B. Warranty: Provide for replacing, including cost of re-hanging and refinishing, at no cost to the Owner, wood doors exhibiting defects in materials or workmanship including warp and de-lamination within minimum period of two years from Date of Substantial Completion of the Work.

1.4 QUALITY ASSURANCE
A. Wood doors shall conform to applicable regulations of Underwriters Laboratories, Inc. or I.C.B.O. for standard as required per door schedule.

PART 2  PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS
A. Subject to compliance with requirements of the Contract Documents and provided the manufacturer meets the standards established by the specifically listed product, manufacturers offering products which maybe incorporated in the work include, but are not limited to those identified in this section or indicated on the drawings, provided substitution prior approval, in accordance with Instructions to Bidders, was given.
B. Substitutions under provisions of Section 012500.
C. Standards established by a specifically listed product shall include but not be limited to visual matching. The final judgment whether a product proposed by the contractor, visually matches the specified product satisfactorily will be determined by the Engineer.
D. Manufacturers of wood doors:
   1. Cal-Wood Doors
   2. Jeld-Wen
2.2 DOOR TYPES

A. Flush faced type wood doors.

2.3 DOORS

A. Flush Interior Doors: 1-3/4 inches thick; solid core construction with plastic laminate face veneers.
B. Fire Rated Flush Doors: 1-3/4 inches thick; plastic laminate face veneers; 1-1/16” laminated wood fiber stile for hinge attachment at mineral core fire rated doors. Refer to Drawings for label requirements.
C. Core: Softwood core blocks not over 2-1/2 inches wide or longer than 14 inches. Glue under heat and pressure with grain running lengthwise. Subcontractor may substitute particle board in accordance with ANSI A208.1.
D. Edgebands: Minimum 1-1/2 inch thick hardwood at sides with 1-1/8” softwood or hardwood at top and bottom, suitable for painting.
E. Glass Stops: Pressed Steel.

2.4 FABRICATION

A. Fabricate doors in accordance with requirements of AWI Quality Standards.
B. Fabricate fire rated doors in accordance with requirements of Underwriters' Laboratories (UL).
C. Make cut-outs and provide stops for glass.
D. Provide astragals for double doors. Provide in accordance with UL requirements.
E. Bevel strike edge of single acting doors 1/8 inch (3 mm) in two inches (51mm). Radius strike edge of double acting swing doors 2-1/8 inches (55mm).
F. Prepare doors to receive hardware. Refer to Section 08710 for hardware requirements.
G. Plastic laminate face veneers and dutch door shelf surfaces.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install wood doors plumb and square, and with maximum diagonal distortion of 1/16 inch.
B. Coordinate installation of glass and glazing in wood doors.
C. Install in accordance with finish carpentry specifications.
D. Clearances:
   1. Between door and frame at head and jamb: 1/8"
   2. At sill without threshold: 3/8" for single door, 1/4" for a pair of doors.
   3. At sill with threshold: 1/4" between door and threshold.

3.2 FINISH

A. Provide finish options to Owner under submittal provisions Section 013300.
B. Door edges shall be painted per Section 099100. Color to match face finish.

END OF SECTION 081400
SECTION 081600
FIBERGLASS REINFORCED PLASTIC (FRP) DOORS & FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Fiberglass reinforced plastic (FRP) doors.
   2. Hinges and other door hardware.
   3. Accessories.
   4. Removable mullions installed in framing.

B. Products Installed but not Furnished Under this Section:
   1. Hardware for fiberglass reinforced plastic (FRP) Doors: Unless otherwise specified, receive hardware items specified in Hardware Sets for "Fiberglass Reinforced Plastic (FRP) Door Hardware" in DIVISION 08 and provide factory installation of hardware items to ensure proper coordination of hardware items with corresponding reinforcement or modification of Fiberglass reinforced plastic (FRP) doors and door frames. Provide receipt for hardware items to Hardware Supplier.

1.2 REFERENCES

B. ANSI A250A - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors and Hardware Reinforcing.
D. ASTM B 209 - Aluminum and Aluminum-Alloy Sheet and Plate.
E. ASTM B 221 - Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
F. ASTM D 256 - Determining the Pendulum Impact Resistance of Notched Specimens of Plastics.
H. ASTM D 570 - Water Absorption of Plastics.
I. ASTM D 638 - Tensile Properties of Plastics.
L. ASTM D 1621 - Compressive Properties of Rigid Cellular Plastics.
M. ASTM D 1623 - Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics.
N. ASTM D 2126 - Response of Rigid Cellular Plastics to Thermal and Humid Aging.
O. ASTM D 2583 - Indentation Hardness of Rigid Plastics by Means of a BarcolImpressor.
Q. ASTM D 6670-01 - Standard Practice for Full-Scale Chamber Determination of Volatile Organic Emissions from Indoor Materials/Products.
T. ASTM E 283 - Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
V. ASTM E 331 - Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
W. ASTM F 476 - Security of Swinging Door Assemblies.
X. SFBC PA 201 - Impact Test Procedures.
Y. SFBC PA 203 - Criteria for Testing Products Subject to Cyclic Wind Pressure Loading.
Z. SFBC 3603.2 (b) (5) - Forced Entry Resistance Test.
BB. ASTM D 635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Self Supporting Plastics in a Horizontal Position.
DD. ASTM E 152 - Standard Methods of Fire Tests of Door Assemblies.
EE. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies.
FF. SOI 100 - Recommended Specifications for Steel Doors and Frames.
GG. UL 305 - Standard for Panic Hardware ..

1.3 SYSTEM DESCRIPTION

A. Performance Requirements: Systems tested according to the following, unless higher loads are required by Code requirements
1. Thermal Movement: Fabricate exterior components' from manufacturer's stock systems that have been designed to provide for expansion and contraction resulting from ambient temperature range of 120 degrees F.
   a. Design Wind Load: Comply with applicable requirements of California Building Code including applicable 2009 International Building Code 2009 requirements
   b. Code Requirements for Wind Pressures:
      ii. Adjust wind pressures at corners, edges, and field areas.

1.4 SUBMITTALS

A. Procedure: Comply with submittal requirements indicated below and as stipulated In Section 013300.
B. Product Data: Submit manufacturer's product literature for fiberglass reinforced plastic (FRP) doors, frames, and related components and accessories, demonstrating compliance with requirements specified, including structural and performance requirements.

C. Shop Drawings: Show layout and profiles; include assembly methods. Submit shop drawings for fabrication and installation of Fiberglass reinforced plastic (FRP) doors and frames, related assemblies and associated components prepared by door and frame system manufacturer.

D. Samples: Upon request by Owner, Submit three (3) samples of each fiberglass reinforced plastic (FRP) finish, on twelve (12) inch long extrusions or six (6) inch square sheets to be used. Where normal color and texture variations are to be expected, include two (2) or more units in each sample to show range of such variations. Owner review shall be for color and texture only; compliance with other requirements remains the exclusive responsibility of the Contractor.

E. Maintenance Data: Include instructions for repair of minor scratches and damage.

F. Maintenance Manual: Submit manufacturer's maintenance and cleaning instructions for doors, including maintenance and operating instructions for hardware.

G. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer; include detailed terms of warranty.

H. Test Reports: Submit certified test reports from qualified independent testing agency indicating doors comply with specified performance requirements.

I. Quality Control Submittals:

J. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with not less than ten (10) years of documented successful experience.

K. Installer Qualifications: Company specializing in installing products of the type specified in this section with not less than five (5) years of documented successful experience. Provide certification from manufacturer that installer is a certified installer of the product being utilized. Submit documentation of above.

L. Contract Closeout Submittals: Comply with requirements of SECTION 017800, including submission of operating and maintenance instructions described in that section.

M. Verification of Conditions (by Installer/Applicator): Examine conditions under which products of this section are to be installed in coordination with Installer of materials and components specified in this Section and notify the General Contractor in writing, with copies to the Owner's Representative and Engineer, of any conditions detrimental to proper and timely installation. Do not proceed with installation until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

N. When Installer confirms conditions are acceptable to ensure proper and timely installation of the proposed products and confirms requirements for applicable warranty or guarantee can be satisfied; submit to General Contractor written confirmation, with copies to the Owner's Representative and Engineer, from applicable Installer. Failure to submit written confirmation and subsequent installation will be assumed to indicate conditions are acceptable to Installer.
O. Sustainability / Environmental Submittals: Show evidence including but not limited to the following:
1. Recycled content - documentation showing product supports pre and post-consumer content.
2. Indoor Environmental Quality - product is VOC compliant in the state and jurisdiction the project is located.
3. Provide products, where possible, that are manufactured within a 500-mile radius of the project site and are considered to be a locally produced material which supports regional materials and resources.
4. Comply with recycling program and waste management procedures.

P. Contract Closeout Submittals: Comply with the applicable sections noted in DIVISION 1, including but limited to the following:
1. Requirements of Section 017800 CLOSEOUT PROCEDURES;
2. Submission of maintenance instructions described in 017823 OPERATION AND MAINTENANCE DATA;

1.5 QUALITY ASSURANCE

A. Single Source Responsibility: Obtain fiberglass reinforced plastic (FRP) doors and associated components by single firm specializing in type of construction required, so that there will be a single point of responsibility for specified performance of all component parts, including following:
1. Glazing of fiberglass reinforced plastic (FRP) doors.
2. All hardware installed on doors.
3. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with not less than ten (10) years of documented successful experience.
4. Installer Qualifications: Company specializing in installing products of the type specified in this section with not less than five (5) years of documented successful experience and (S) successful projects in the past (3) years and approved in writing by manufacturer to install their products.
5. Provide certification from manufacturer that installer is a certified installer of the product being utilized.
6. Provide evidence of a compliant documented quality management system.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Mark doors with location of installation, door type, color, and weight.
1. Deliver materials in manufacturer's-original, unopened, undamaged containers with identification labels intact clearly identifying opening door mark and manufacturer.

B. Store materials in original packaging, under cover, protected from exposure to harmful weather conditions and from direct contact with water.
1. Store in clean, dry area at temperature and humidity conditions recommended by manufacturer.
2. Do not use non-vented plastic or canvas shelters.
3. Immediately remove wet wrappers.
C. Store in position recommended by manufacturer, elevated minimum 4 inches (102 mm) above grade, with minimum 114 inches (6 mm) space between doors.

1.7 PROJECT CONDITIONS

A. Obtain hardware manufacturer's templates prior to starting fabrication.
B. Do not install doors until structure is enclosed.
C. Maintain temperature and humidity at manufacturer's recommended levels during and after installation of doors.

1.8 WARRANTY

A. Submit two (2) copies of written guarantee signed by Manufacturer, Installer and Prime Contractor, agreeing to replace fiberglass reinforced plastic (FRP) doors, frames and components, which fail in materials or workmanship within ten (10) years of date of acceptance.
1. Warrant framing against failure in materials and workmanship, including excessive deflection and deterioration of finish or construction in excess of normal weathering.
2. Warrant door system including doors, frames, vision lites, transom lites, and factory installed hardware.
3. Warranty Period: Ten (10) years starting on date of substantial completion.

B. Failure of materials or workmanship include but are not limited to excessive leakage or air infiltration, excessive deflections, delamination of panels, deterioration of finish or metal in excess of normal weathering, and defects in accessories, weather-stripping, and other components, Warranty shall also cover any and all repair of damaged materials in building.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. As a basis of design, details and specifications have been based on products specified below by the following manufacturers:
1. Special-Lite, Inc
   a. Special-Lite, Inc., PO Box 6, Decatur, Michigan 49045. P: (800) 821-6531
   b. Web Site: www.special-lite.com
2. Other Manufacturer's that may be acceptable upon a compliance review include:
   a. Kawneer Corporation
   b. Vistawall Engineering Products
   c. Milgard
   d. Therma-Tru
   e. Jeld-Wen
   f. Provide all fiberglass doors from a single source manufacturer.
2.2 MATERIALS

A. Fiberglass Reinforced Polyester (FRP) Face: Embossed fiberglass reinforced polyester sheet, minimum 0.120-inch thick; provide material with Class A rating with flame spread less than 25 per ASTM E84 for faces with interior exposure.

B. Insulation: Froth-in-place or foamed-in-place urethane foam, not less than 5 lb/cubic ft density, free of chlorofluorocarbon (CFC) blowing agents.

C. Fasteners: Aluminum, non-magnetic stainless steel, or other materials warranted by manufacturer to be non-corrosive and compatible with aluminum components. Do not use exposed fasteners, except where unavoidable for application of hardware. Match finish of adjoining metal.

D. Brackets and Reinforcements: Manufacturer's high-strength aluminum units where feasible; otherwise, non-magnetic stainless steel or hot-dip galvanized steel complying with ASTM A-386.

E. Bituminous Coatings: Cold-applied asphalt mastic, compounded for min. 30-mil thickness.

F. Glazing: Provide glass types as indicated on Drawings. Refer to DIVISION 08 - Glazing.

2.3 FIBERGLASS REINFORCED PLASTIC (FRP) DOORS

A. Flush Door with FRP Face
   1. As a basis of design, details and specifications have been based on the following products:
      a. Special-Lite, Inc: SL-17 FRP "Flush Door" with SpecLite3 fiberglass reinforced polyester (FRP) face sheets.
   2. Other Manufacturer's include:
      b. Kawneer Corp.: "Flush line Entrance FRP Door"
      c. Vistawall Engineering Products: "Vision Lite FRP Door"
   3. Door Construction:
      a. Door Thickness: 1-3/4 inches
      b. Stiles and Rails: Aluminum Alloy 6063-T5, minimum of2-5/16-inch depth.
      c. Corners: Mitered.
      d. 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.
      e. Securing Internal Door Extrusions: 3/16-inch angle blocks and locking hex nuts for joinery. Welds, glue, or other methods 'are not acceptable.
      f. Furnish extruded stiles and rails with integral reglets to accept face sheets. Lock face sheets into place to permit flush appearance.
      g. Rail caps or other face sheet capture methods are not acceptable.
      h. Extrude top and bottom rail legs for interlocking continuous weather bar.
      i. Meeting Stiles: Pile brush weather-seals. Extrude meeting stile to include integral pocket to accept pile brush weather-seals.
j. Bottom of Door: Install bottom weather bar with nylon brush weather-stripping into extruded interlocking edge of bottom rail.

k. Glue: Use of glue to bond sheet to core or extrusions is not acceptable.

l. Exposed Stops and metal Edges: Kynar paint finish. Color selected by Engineer from full range of colors, textures, and patterns. Color to match door skin of FRP door unless otherwise required by Engineer.

2.4 GLAZING

A. Design glazing system for replacement of glass.
B. Manufacturer’s standard glazing system of applied stops as indicated on the Drawings.
C. Allow for thermal expansion on exterior units.
D. Glazing @ Exterior of Building:
   1. Provide 1 inch (25 mm) thick fabricated insulating units with Low-E coating with Argon gas filled, tempered glass for exterior locations of building. Tinted to match curtain wall glazing.
E. Glazing System: Dry glazed with EPDM or other elastomeric extrusion in aluminum glazing stops; fixed stop one side with removable stop on other side providing for replacement of glass panel.

2.5 COMPONENTS

A. Arrange for delivery of hardware items to door manufacturer for factory-installation.
   1. Provide concealed reinforcement in the frame where hardware is to be installed. Designate reinforcement locations on shop drawings.
   2. Accessories: Provide all accessories required for frames to receive FRP doors including but not limited to stops, weather stripping, astragal, door sweep, gaskets, hardware reinforcement, hardware accessories, and fittings. Submit all products for review and approval during the shop drawing sequence.

2.6 FABRICATION

A. Sizes and Profiles: Nominal size and profile requirements for door and frame units are indicated on Drawings, with variable dimensions required to achieve design requirements and coordination with other construction.
B. Coordination of Fabrication: Field measure before fabrication and show recorded measurements on shop drawings.
C. Prefabrication: To greatest extent possible, complete fabrication, assembly, finishing, hardware application, and other construction before shipment to Site. Disassemble components only as necessary for shipment and installation.
D. Assembly: Complete cutting, fitting, forming, drilling, and grinding of metal before assembly. Remove burrs from cut edges.
E. Welding: Field welding of framing is not acceptable.
F. 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.

G. Sealant: per manufacturer recommendations.

H. Sequencing: Complete cutting, fitting, forming, drilling, and grinding of metal work prior to cleaning, finishing, surface treatment, and application of finishes. Remove arises from cut edges, and ease edges and corners to radius of approx. 1/64 inch.

I. Reinforcing: Install reinforcing as necessary for performance requirements; separate dissimilar metals with bituminous paint or other separator that will prevent corrosion.

J. Continuity: Maintain accurate relation of planes and angles, with hairline fit of contacting members.

K. Fasteners: Conceal fasteners wherever possible. If fasteners are exposed provide tamper resistant heads flush with finished surface of frame.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions (by Installer/Applicator): Examine conditions under which products of this section are to be installed in coordination with Installer of materials and components specified in this Section and notify the General Contractor in writing, with copies to the Owner's Representative and Engineer, of any conditions detrimental to proper and timely installation. Do not proceed with installation until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

B. When Installer confirms conditions are acceptable to ensure proper and timely installation of the proposed products and confirms requirements for applicable warranty or guarantee can be satisfied; submit to General Contractor written confirmation, with copies to the Owner's Representative and Engineer, from applicable Installer. Failure to submit written confirmation and subsequent installation will be assumed to indicate conditions are acceptable to Installer.

C. Verify actual dimensions of openings by field measurements before door fabrication; show recorded measurements on shop drawings.

D. Do not begin installation until substrates have been properly prepared.

E. If substrate preparation is the responsibility of another installer, notify Contractor of unsatisfactory preparation, in writing with copies to Engineer, and Owner, before proceeding. Do not proceed with installation until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

F. When Installer confirms conditions as acceptable to ensure proper and timely installation and to ensure requirements for applicable warranty or guarantee can be satisfied, submit to Prime Contractor written confirmation, with copies to the Owner's Representative and Engineer, from applicable Installer. Failure to submit written confirmation and subsequent installation will be assumed to indicate conditions are acceptable to Installer.
3.2 PREPARATION

A. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
B. Clean and prepare substrate in accordance with manufacturer's directions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions; do not penetrate frames with anchors, provide a complete assembly and installation of (doors, frames, hardware, operators, and other components.
B. Install fire-rated assemblies in accordance with NFPA 80.
C. Set units plumb, level and true to line, without warping or racking of doors or frames, sash, or panels and with specified clearances. Anchor securely in place;
D. Make suitable provision for thermal expansion in assembly of groups of units.
E. In masonry walls, install frames prior to laying masonry; anchor frames into masonry mortar joints; fill jambs with grout as walls are laid up. Seal entire perimeter joints on exterior and interior sides of door frame units in accordance with the requirements of Division 07 Joint Sealants.
F. Set sill members, thresholds and other members in full bed of sealant compound to provide weather-tight construction.
G. Provide suitable gaskets or coatings where dissimilar metals are in contact.
H. Install exterior doors to be weather-tight in closed position.

3.4 ADJUSTING

A. Lubricate, test, and adjust doors to operate easily, free from warp, twist and distortion, and to fit watertight for entire perimeter.
B. Adjust hardware for smooth and quiet operation.
C. Adjust doors to fit snugly and close without sticking or binding.
D. Adjust doors and hardware to provide tight fit at contact points and at weather-stripping (if any), for smooth operation and weather-tight closure.

3.5 CLEANING AND PROTECTION

A. Remove temporary coverings and protection of adjacent work areas.
B. Clean installed products in accordance with manufacturer's instructions prior to owner's acceptance. Repair or replace damaged installed products.
C. Protect adjacent work areas and finish surfaces from damage during installation.
D. Protect installed product and finish surfaces from damage during subsequent construction.
E. Repair minor damages to finish in accordance with manufacturer's instructions and as approved by Engineer.
F. Remove and replace damaged components that cannot be successfully repaired as determined by Engineer.
G. Comply with waste management and recycling program requirements.
H. Dispose of waste legally and in accordance with local jurisdiction requirements.

END OF SECTION 081600
SECTION 085300
POLY VINYL CHLORIDE (PVC) WINDOWS

PART 1  GENERAL

1.1 REFERENCES

I. CAWM 301 - Forced Entry Testing; California Association of Window Manufacturers.

1.2 PERFORMANCE REQUIREMENTS

B. Air infiltration: Maximum 0.14 CFM per square foot of overall sash crack at inward test pressure of 1.57, ASTM E 283. 5220 Series maximum 0.22 CFM per foot of overall sash crack at inward test pressure of 1.57, ASTM E 283. 5620 Series maximum 0.13 CFM per foot of overall sash crack at inward test pressure of 1.57, ASTM E 283.
C. Water penetration: No water penetration at inward test pressure of 3.75 psf, ASTM E 331.
D. Structural performance: No glass breakage, damage to hardware, permanent deformation at positive and negative test pressure of 37.5 psf, ASTM E 330.
E. Conform to ASTM 4099-85 and ICBO. Provide a copy of the Manufacturer’s ICBO report.
F. Provide certification for overall U-Value as rated in accordance with National Fenestration Rating Council (NFRC) standards.

1.3 SUBMITTALS

A. Product data: Submit manufacturer’s product specifications, technical support data, installation and maintenance recommendations and standard details for each type of unit required, including finishing methods, hardware and accessories.
B. Shop Drawings: Submit for approval the following:
   1. Elevation for each style window and door specified; indicate sizes, glazing types, muntin types and designs.
   2. Schedule: Indicate each window and door in project; reference each unit to specific elevation style.
   3. Details: Head, jamb, and sill details for each project condition.
C. Color samples: Submit samples of each required exterior finish on PVC sample. Submit sample of co-extruded PVC material with required interior and exterior finish.
D. Certification: Provide certification by a recognized, independent testing laboratory certifying that each required type of window complies with performance requirements indicated.
E. Quality Assurance/Control Submittals:
   2. U-Factor and structural rating charts required for AAMA and NFRC labeling requirements.
F. Closeout Submittals: Reference Section 017800- Closeout Submittals; submit the following items:
   1. Temporary window labels marked to identify windows that labels were applied to.
   3. Special Warranties

1.4 DELIVERY, STORAGE AND HANDLING

A. Protect products from moisture, construction traffic, and damage in accord with manufacturer's instructions.
B. Do not use non-vented plastic or canvas shelters; provide 1/4 inch (6 mm) space between units to promote air circulation.

1.5 QUALIFICATIONS

A. Manufacturer Qualifications: Minimum three years documented experience producing products specified in this section.
B. Installer Qualifications: Minimum three years documented experience installing products specified in this section.
C. Certifications: Provide window units independently tested and third party certified for air infiltration, water resistance, and structural performance to AAMA/NWWDA 101/I.S.2; for thermal transmission and solar heat gain coefficient by NFRC; and insulating glass certified by ALI/IGCC to ASTM E 774, Class CBA.

1.6 WARRANTY

A. Residential Special Warranty (Owner Occupied Single Family Residential):
   1. Full Lifetime Warranty to original owner.
   2. Transferability:
      a. Permit unlimited transfer of ownership in first ten (10) years.
b. Upon first transfer of ownership, warranty period shall become ten years from date of original purchase.
c. Warranty windows against defect in materials and workmanship including costs for parts and labor.

3. Submit, for Owner’s acceptance, manufacturer’s Full Lifetime Warranty document.

B. Commercial Special Warranty:
1. 10-year Warranty.
2. Warranty windows against defects in materials and workmanship including costs for parts and labor.

PART 2 PRODUCTS

2.1 MANUFACTURERS: Use one of the followings, or as approved by Project Coordinator.

A. Subject to compliance with requirements of the Contract Documents and provided the manufacturer meets the standards established by the specifically listed product, manufacturers offering products which may be incorporated in the work include, but are not limited to those identified in this section or indicated on the drawings, provided substitution prior approval, in accordance with Instructions to Bidders, was given.

B. Substitutions under provisions of Section 012500.

C. Milgard Manufacturing Inc.


E. Insulate Windows, a division of CertainTeed.

2.2 GENERAL PERFORMANCE REQUIREMENTS

A. Thermal Performance: Comply with NFRC 100.


C. Forced-Entry Resistance: Comply with ASTM E 588.

2.3 COMPONENTS

A. Window Frame and Sash Members: Impact resistant, exterior grade polyvinyl chloride extrusions complying with AAMA 303 and ASTM D 4726, based on Milgard Vinyl Windows, Classic Series, for 1” glazing, fixed and horizontal sliders.

1. Ignition Temperature: Minimum of 824 degrees F (440 degrees C), when tested in accordance with ASTM D 1929.

2. Flammability: Burn time of less than 5 seconds and burn distance of less than 10 mm, when tested in accordance with ASTM D 635.

3. Non-corroding, non-flaking, non-chipping, non-rotting; no electrical conductance; low thermal conductance.

4. Minimum External Wall Thickness: 0.070 inch (1.8 mm) nominal.

5. Finish of Surfaces Exposed to View: Solid vinyl with smooth gloss finish and uniform consistent color.
B. Glass and Glazing: Provide manufacturer’s standard clear sealed insulating glazing material that complies with ASTM E 774 Class A and is at least 1” overall in thickness.
   1. Glass: Factory installed insulated with 1/2-inch minimum airspace.
   3. Factory inside glazed except where field glazing is required due to large window unit dimensions. Units shall be reglazeable without dismantling sash framing.
C. Screens: Type installable from interior side, providing reasonable insect control (only) when operable sash is in open position; re-wirable glass fiber mesh, 14 x 18 mesh, secured in channel of aluminum box frame with continuous vinyl spline.
   1. Frame Color: Matching frame and sash interior color.
D. Hardware: Operating sash hardware to function according to the type of window indicated on the Drawings. Provide the manufacturer’s standard hardware fabricated from a corrosive resistant material and of sufficient strength to perform its intended function. For application of exposed hardware, use fasteners that match the finish of the hardware being fastened. All locking hardware must have certified forced entry resistance performance per CMBSO 1-79, CAWM 300/301.
E. Fasteners: Corrosion-resistant.
F. Weatherstripping: Types for specified operable-sash windows and operable doors.
G. Mullions: Structural mullion system complying with AAMA Grade deflection requirements for supported windows; extruded aluminum core; internal and external rigid PVC caps color to match adjacent window frames; system is anchored to rough opening with reinforcement brackets.
H. Frame Extensions: Foamed polyvinyl chloride (PVC) extrusion, 5/8 inch (16mm) thick.

2.4 FABRICATION

A. Fabricate framing, mullions and sash members with mitered and fusion welded corners and joints. Supplement frame sections with internal reinforcement where required for structural rigidity. Trim and finish corners and welds to match adjacent areas.
B. Glazing: Factory inside glazed, except where field glazing is required due to unit dimensions. Designed for easy replacement without dismantling sash framing.
C. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
D. Provide internal offset weepholes and channels to migrate moisture to exterior. Weepholes should be covered.
E. Prepare components to receive anchor devices.
F. Provide integral weather stop flange to perimeter of unit.
G. Provide double or triple seal polypropylene for weatherstripping depending on type of operable window.
H. Assemble insect screens to fully integrate with window frame. Frames to be manufactured of cambered formed aluminum and reinforced with rigid plastic corner keys. Screen mesh to fit taut in frame and secured. Door screens made of extruded aluminum for strength and durability.
2.5 FINISHES

A. PVC: (Poly Vinyl Chloride) solid, homogeneous.
B. Framing members and grid pattern shall be white in color, or as approved by Project Coordinator.
C. All exposed PVC surfaces shall be smooth, glossy, and uniform in appearance.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify wall openings and adjoining air and vapor seal materials are ready to receive work of this section.
B. Examine openings in which windows will be installed.
   1. Verify that framing complies with AAMA 2400 (“Mounting Flange Installation”).
   2. Verify that fasteners in framed walls are fully driven and will not interfere with window installation.
C. Coordinate with responsible entity to correct unsatisfactory conditions.
D. Commencement of work by installer is acceptance of substrate conditions.

3.2 INSTALLATION

A. Install windows in framed walls in accordance with AAMA 2400 (“Mounting Flange Installation”).
B. Comply with manufacturer’s specifications and recommendations for installation of window units, hardware, operators, accessories and other window components.
C. Windows shall be factory sized to fit in each framed opening so that the net sized window is 1/2” smaller than the framed (rough) opening to allow 1/4” clearance on all sides (tolerance +/- 1/16”).
D. Windows shall be fabricated to rough opening size with 1/2” deductions automatically made, so that no additional calculations will be required.
E. Opening panels must be closed and locked during installation. Windows must be installed level, plumb and square with 1/4” clearance on all sides and with weep holes at bottom, and as recommended by manufacturer.
F. Headers must not be nailed. Nail through fin into framing along sides and base. At the head, finishing nails may be placed 1/2” above fin and bent down over fin to allow for header deflection. Full support is required along entire length of sill.
G. Operating sash and hardware should fit tight at contact points and weather stripping.
H. Field applied trim stops and secondary weather stripping to be of compatible materials. The installer is to seal and check each window to ensure weather tightness and proper operation.
I. Install products level, plumb and in true alignment; fasten to building substrate to meet applicable code requirements – to a minimum fasten per manufacturer’s written installation instructions.
3.3 ADJUSTING

A. Ensure that windows operate correctly, free from binding or other defects.

3.4 CLEANING

A. Remove protective material from pre-finished surfaces.
B. Wash down surfaces with solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
C. Do not use petroleum distillants to clean windows.

END OF SECTION 085300
PART 1 GENERAL

1.1 REFERENCES

C. ANSI/ASTM C645 - Non-Load (Axial) Bearing Steel Studs, Runners (Track), and Rigid Furring Channels for Screw Application of Gypsum Board.
D. ANSI/ASTM C646 - Steel Drill Screws for the Application of Gypsum Sheet Material to Light Gauge Steel Studs.
E. ANSI/ASTM C754 - Installation of Framing Members to Receive Screw Attached Gypsum Wallboard, Backing Board, or Water Resistant Backing Board.
F. GA-201 - Gypsum Board for Walls and Ceilings.
G. GA-216 - Recommended Specifications for the Application and Finishing of Gypsum Board.

1.2 QUALITY ASSURANCE

A. Performance gypsum board systems work in accordance with recommendations of ASTM C754, GA 151, GA 201 and GA 216 unless otherwise specified in this Section.
B. Delivery and Storage of Gypsum Wallboard: All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.
C. Environmental Conditions: In cold weather and during gypsum panel application and joint finishing, temperatures within the building shall be maintained within the range of 55° to 70°F or per manufacturer specification if different. Adequate ventilation shall be provided to carry off excess moisture.

1.3 REGULATORY REQUIREMENTS

A. Fire-Rated Partitions and Shafts: Listed and labeled by UL.
B. Fire-Rated Soffits: Listed and labeled by UL.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with requirements of the Contract Documents and provided the manufacturer meets the standards established by the specifically listed product, manufacturers offering products which maybe incorporated into the work include, but are not limited to those identified in this section or indicated on the drawings, provided substitutions with approval, in accordance with Instructions to Bidders, is given.
B. Substitutions must be submitted and approved under provisions of Section 012500.
C. Manufacturers of Gypsum Board Systems:
   2. Gold Bond Building Products
   3. Dontar Gypsum America, Inc.
D. Manufacturers of Metal Framing Materials:
   1. Angeles Metal Systems
   2. Gypsum Co.
   3. Inryco

2.2 METAL FRAMING

   A. Provide metal framing materials in accordance with GA 216.
   C. Channels: 1-1/2" Cold Rolled Channels.
   D. Galvanized Hanger Wire, 8 ga.
   E. Galvanized Tie Wire, 18 ga.
   F. Resilient Channels: 26 ga. galvanized steel.
   G. Fasteners and Anchorages: GA 216.
   H. Shaft Wall Studs: 2 ½ “ CH type, 33ksi hot dipped galvanized.

2.3 GYPSUM BOARD MATERIALS

   A. Gypsum Board: ANSI/ASTM C36; fire resistive type, UL rated; 5/8" thickness Type ‘X’, maximum permissible length; ends square cut, tapered edges.
   B. Wallboard-Moisture Resistant Fire-Rated: ASTM 630. 5/8" thickness unless otherwise noted, I.C.B.O. approved for installation in moisture areas; Exterior Ceiling Board ASTM C931 for all horizontal moisture areas. U.L. labeled and I.C.B.O. approved for fire resistive system details.
   C. Gypsum Sheathing - Fire-rated: ½ inch thick with water repellant paper on both sides and long edges; U.L. labeled and I.C.B.O. approved.
   D. Gypsum Shaft Wall Liner – fire rated: 1” thick, beveled edge 24” wide, U.L. Labeled and ICBO approved.

2.4 ACCESSORIES

   A. Acoustical Insulation: Owens Corning Sound Attenuation Fire Batt Insulation / Mineral Wool; preformed batts, friction fit type unfaced without integral vapor barrier membrane, 3 ½ inches thick, ASTM E 84 Flame Spread 5, Smoke Developed 0.
   B. Acoustical Sealant: Non-hardening, non-skinning, paintable, for use in conjunction with gypsum board, type as recommended by manufacturer of gypsum board.
   C. Corner Beads: Hot dipped galvanized corner bead in sizes required by board thickness.
   D. Edge Trim: L Shaped, U Shaped as detailed, hot dipped galvanized in sizes required.
   E. Fiberglass reinforcing Tape, Joint Compound, Adhesive, Water; GA 216.
F. Screws: Type S in required length for attachment to studs. Type S-12 in required length for attachment to heavier gauge metal framing. Bugle or pan head as required.

PART 3 EXECUTION

3.1 INSPECTION

A. Verify that site conditions are ready to receive work and opening dimensions are as instructed by the manufacturer.
B. Beginning of installation means acceptance of existing conditions.

3.2 CEILING FRAMING INSTALLATION

A. Install in accordance with GA 201 and GA 216.
B. Space hanging wires at 48" maximum along carrying channels and 6" from each end of carrying channel.
C. Install carrying channels at 24" o.c. at proper height, level, and secure with hanger wire saddle-tied along channels. Provide 1" clearance between runners and abutting walls and partitions. At channel splices, interlock flanges, overlap ends 12" and secure each end with double-strand 8 gauge tie wire.
D. Erect metal furring channels at right angles to 1-1/2" carrying channels. Space furring 24" o.c. and within 6" of walls. Provide 1" clearance between furring ends and abutting walls and partitions. Attach furring channels to 1-1/2" channels with metal furring channel clips installed on alternate sides of carrying channel.
E. Coordinate location of hangers with other work.
F. Install ceiling framing independent of walls, columns, and above-ceiling work.
G. Reinforce openings in ceiling suspension system which interrupt main carrying channels or furring channels, with lateral channel bracing. Extend bracing minimum 24" past each end of openings.
H. Laterally brace entire suspension system.

3.3 ACOUSTICAL ACCESSORIES INSTALLATION

A. Place acoustical insulation in partitions tight within spaces, around cut openings, behind and around electrical and mechanical items within or behind partitions, and tight to items passing through partitions.
B. Place acoustical insulation above suspended gypsum board and acoustical panel ceilings at locations adjacent to partitions and extending 3’ each side of partition unless indicated to a fuller extent. Lay such that insulating material is supported by ceiling suspension system and not solely supported by ceiling panels.
C. Install acoustical sealant within partitions in accordance with manufacturer's instructions.
3.4 GYPSUM BOARD INSTALLATION

A. Install gypsum board in accordance with GA 201 and GA 216.
B. Install moisture resistant wallboard behind all laundry sinks, janitor sinks, clinic sinks, and water closets without adjacent ceramic tile. Provide a minimum of 2 feet of water resistant gypsum wallboard beyond each side of each sink or water closet at a minimum height to 4 feet above the finished floor behind the fixture.
C. Erect single layer fire rated gypsum board vertically, with edges and ends occurring over firm bearing.
D. Use screws when fastening gypsum board to furring or framing.
E. Place corner beads at external corners. Use longest practical length. Place edge trim where gypsum board abuts dissimilar materials.
F. Fill all voids between decking and full height/to structure partitions.
G. Refer to drawings for lead lined gypsum board installation notes.
H. Paint Drywall Reveals to match adjacent wall finish per Section 09900.

3.5 JOINT TREATMENT

A. Treat joints, fasteners and corners in strict accordance with the printed instructions of the wallboard manufacturer. Control temperature and ventilation for best results.
B. Wall and Ceiling Bureau level 5 smooth finish gypsum wallboard complete and ready for painting. Correct all defects rejected by painter. After painter has applied a prime coat or finish coat, it may be necessary to resand or resurface the wall as defects may not appear until painting is applied. The reworking of a wall will be done with no additional cost to the Owner. The General Contractor's and Project Coordinator’s decision on the acceptability of finish painted surfaces will be final.

3.6 BACKER BOARD INSTALLATION FOR CERAMIC TILE

A. Install in accordance with manufacturer's instructions.

END OF SECTION 092000
PART 1  GENERAL

3.01  SUMMARY
   A. Section Includes:
      1. Flooring and accessories as shown on the drawings and schedules and as indicated
         by the requirements of this section.
   B. Related Documents
      1. Drawings and General Provisions of the Contract (including General and
         Supplementary Conditions and Division 1 sections) apply to the work of this
         section.
   C. Related Sections:
      1. Other Division 9 sections for floor finishes related to this section but not the work
         of this section.
      2. Division 3 Concrete; not the work of this section.
      3. Division 6 Wood and Plastics; not the work of this section.
      4. Division 7 Thermal and Moisture Protection; not the work of this section.

3.02  REFERENCES
   A. ASTM International:
      1. ASTM E 648 Standard Test Method for Critical Radiant Flux of Floor-Covering
         Systems Using a Radiant Heat Energy Source
      2. ASTM E 662 Standard Test Method for Specific Optical Density of Smoke
         Generated by Solid Materials
      3. ASTM F 710 Standard Practice for Preparing Concrete Floors to Receive
         Resilient Flooring
      4. ASTM F 1482, Standard Guide to Wood Underlayment Products Available for
         Use Under Resilient Flooring
      5. ASTM F 1700 Standard Specification for Solid Vinyl Tile
      6. ASTM F 1861 Standard Specification for Resilient Wall Base
      7. ASTM F 1869 Standard Test Method for Measuring Vapor Emission Rate of
         Concrete Subfloor Using Anhydrous Calcium Chloride
      8. ASTM F 2170 Standard Test Method for Determining Relative Humidity in
         Concrete Floor Slabs Using in situ Probes.
   B. National Fire Protection Association (NFPA):
      1. NFPA 253 Standard Method of Test for Critical Radiant Flux of Floor Covering
         Systems Using a Radiant Heat Energy Source
      2. NFPA 258 Standard Test Method for Measuring the Smoke Generated by Solid
         Materials

3.03  SYSTEM DESCRIPTION
   A. Performance Requirements: Provide flooring which has been manufactured,
      fabricated and installed to performance criteria certified by manufacturer without
      defects, damage, or failure.
   B. Administrative Requirements
      1. Pre-installation Meeting: Conduct an on-site pre-installation meeting to verify
         project requirements, substrate conditions, manufacturer’s installation instructions
C. Sequencing and Scheduling
   1. Install flooring and accessories after the other finishing operations, including painting, have been completed. Close spaces to traffic during the installation of the flooring.
   2. Do not install flooring over concrete slabs until they are sufficiently dry to achieve a bond with the adhesive, in accordance with the manufacturer's recommended bond, moisture tests and pH test.

3.04 SUBMITTALS
   A. Submit shop drawings, seaming plan, coving details, and manufacturer's technical data, installation and maintenance instructions for flooring and accessories.
   B. Submit the manufacturer's standard samples showing the required colors for flooring and applicable accessories.
   C. Submit Safety Data Sheets (SDS) available for adhesives, moisture mitigation systems, primers, patching/leveling compounds, floor finishes (polishes) and cleaning agents and Material Information Sheets for flooring products.
   D. If required, submit the manufacturer's certification that the flooring has been tested by an independent laboratory and complies with the required fire tests.
   E. Closeout Submittals: Submit the following:
      1. Operation and Maintenance Data: Operation and maintenance data for installed products in accordance with Division 1 Closeout Submittals (Maintenance Data and Operation Data) Section. Include methods for maintaining installed products, and precautions against cleaning materials and methods detrimental to finishes and performance.
      2. Warranty: Warranty documents specified herein

3.05 QUALITY ASSURANCE
   A. Single-Source Responsibility: provide types of flooring and accessories supplied by one manufacturer, including moisture mitigation systems, primers, leveling and patching compounds, and adhesives.
   B. Select an installer who is experienced and competent in the installation of Armstrong resilient solid vinyl tile flooring and the use of Armstrong Flooring subfloor preparation products.
      1. Engage installers certified as Armstrong Commercial Flooring Certified Installers
      2. Confirm installer's certification by requesting their credentials
   C. Fire Performance Characteristics: Provide resilient tile flooring with the following fire performance characteristics as determined by testing material in accordance with ASTM test methods indicated below by a certified testing laboratory or other testing agency acceptable to authorities having jurisdiction:
      1. ASTM E 648 (NFPA 253) Critical Radiant Flux of 0.45 watts per sq. cm. or greater, Class I
      2. ASTM E 662 (NFPA 258) (Smoke Generation) Maximum Specific Optical Density of 450 or less
      3. CAN/ULC-S102.2 – Flame Spread Rating and Smoke Developed – Results as tested

3.06 DELIVERY, STORAGE AND HANDLING
A. Comply with Division 1 Product Requirements Sections
B. Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
C. Deliver materials in good condition to the jobsite in the manufacturer's original unopened containers that bear the name and brand of the manufacturer, project identification, and shipping and handling instructions.
D. Store materials in a clean, dry, enclosed space off the ground, protected from harmful weather conditions and at temperature and humidity conditions recommended by the manufacturer. Protect adhesives from freezing. Store flooring, adhesives and accessories in the spaces where they will be installed for at least 48 hours before beginning installation.

3.07 PROJECT CONDITIONS
A. Maintain a minimum temperature in the spaces to receive the flooring and accessories of 65°F (18°C) and a maximum temperature of [100°F (38°C)][85°F (29°C)] for at least 48 hours before, during, and for not less than 48 hours after installation. Thereafter, maintain a minimum temperature of 55°F (13°C) in areas where work is completed. Protect all materials from the direct flow of heat from hot-air registers, radiators, or other heating fixtures and appliances. Refer to the Armstrong Flooring Guaranteed Installations Systems manual, F-5061 for a complete guide on project conditions.

3.08 LIMITED WARRANTY
A. Resilient Flooring: Submit a written warranty executed by the manufacturer, agreeing to repair or replace resilient flooring that fails within the warranty period.
B. Limited Warranty Period: 15 years for Parallel®20 or 7 years for Parallel®12.
C. The Limited Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.
D. For the Limited Warranty to be valid, this product is required to be installed using the appropriate Armstrong Flooring Guaranteed Installation System. Product installed not using the specific instructions from the Guaranteed Installation System will void the warranty.

3.09 MAINTENANCE
A. Extra Materials: Deliver extra materials to Owner. Furnish extra materials from same production run as products installed. Packaged with protective covering for storage and identified with appropriate labels.
   1. Quantity: Furnish quantity of flooring units equal to 5% of amount installed.
   2. Delivery, Storage and Protection: Comply with Owner's requirements for delivery, storage and protection of extra material.

PART 2 PRODUCTS
3.01 MANUFACTURER
A. Resilient tile flooring, wall base, adhesives and subfloor preparation products and accessories:
2. Manufacturer must have a headquarters in the United States of America

3.02 RESILIENT FLOORING MATERIALS
A. Provide 20 mil wear layer Luxury Solid Vinyl Tile Flooring.
   1. Description: A layered construction consisting of a tough, clear, vinyl wear layer protecting a high-fidelity print layer on a solid vinyl backing. Protected by a UV-cured polyurethane finish, the wear surface is embossed with different textures to enhance each of the printed visuals. Colors are insoluble in water and resistant to cleaning agents and light.
   3. Pattern and Color: to be selected by Owner under submittal process.
   4. Wear layer thickness: 0.020 in. (0.5 mm)
   5. Thickness: 0.100 in. (2.5mm)

3.03 PRODUCT SUBSTITUTION
A. Substitutions to be considered under valued engineering. Substitutions to be of equal or greater quality.

3.04 WALL BASE MATERIALS
A. Refer to baseboard and trim section.

3.05 ADHESIVES
A. Adhesive to be per flooring material manufacturer recommendation.

3.06 ACCESSORIES
A. For patching, smoothing, and leveling monolithic subfloors (concrete, terrazzo, quarry tile, ceramic tile, and certain metals), provide Armstrong [S-184 Fast-Setting Cement-Based Patch and Underlayment] [S-194 Cement-Based Patch, Underlayment and Embossing Leveler / S-195 Underlayment Additive] [S-453 Level Strong™ cement based self-leveling compound] [S-456 Patch Strong™ flexible patching and smoothing compound].
B. For priming porous substrates to aid in adhesive bond strength and reducing subfloor porosity, provide S-454 Prime Strong™ acrylic primer for porous substrates. For non-porous substrates, provide S-455 Prime Strong™ acrylic primer for non-porous substrates.
C. For creating a moisture barrier, provide S-452 Seal Strong™ two part moisture mitigation system.
D. For sealing joints between the top of wall base or integral cove cap and irregular wall surfaces such as masonry, provide plastic filler applied according to the manufacturer's recommendations.
E. Provide transition/reducing strips tapered to meet abutting materials.
F. Provide threshold of thickness and width as shown on the drawings.
G. Provide resilient edge strips of width shown on the drawings, of equal gauge to the flooring, homogeneous vinyl or rubber composition, tapered or bullnose edge, with color to match or contrast with the flooring, or as selected by the Architect from standard colors available.
H. Provide metal edge strips of width shown on the drawings and of required thickness to protect exposed edges of the flooring. Provide units of maximum available length
to minimize the number of joints. Use butt-type metal edge strips for concealed anchorage, or overlap-type metal edge strips for exposed anchorage. Unless otherwise shown, provide strips made of extruded aluminum with a mill finish.

PART 3   EXECUTION

3.01 MANUFACTURER’S INSTRUCTIONS
A. Compliance: Comply with manufacturer’s product data, including technical bulletins, product catalog, installation instructions, and product carton instructions for installation and maintenance procedures as needed.

3.02 EXAMINATION
A. Site Verification of Conditions: Verify substrate conditions (which have been previously installed under other sections) are acceptable for product installation in accordance with manufacturer's instructions (i.e. moisture tests, bond test, pH test, etc.).
B. Visually inspect flooring materials, adhesives and accessories prior to installation. Flooring material with visual defects shall not be installed and shall not be considered as a legitimate claim.
C. Examine subfloors prior to installation to determine that surfaces are smooth and free from cracks, holes, ridges, and other defects that might prevent adhesive bond or impair durability or appearance of the flooring material.
D. Inspect subfloors prior to installation to determine that surfaces are free from curing, sealing, parting and hardening compounds; residual adhesives; adhesive removers; and other foreign materials that might prevent adhesive bond. Visually inspect for evidence of moisture, alkaline salts, carbonation, dusting, mold, or mildew.
E. Report conditions contrary to contract requirements that would prevent a proper installation. Do not proceed with the installation until unsatisfactory conditions have been corrected.
F. Failure to call attention to defects or imperfections will be construed as acceptance and approval of the subfloor. Installation indicates acceptance of substrates with regard to conditions existing at the time of installation.

3.03 PREPARATION
A. Subfloor Preparation: Smooth concrete surfaces, removing rough areas, projections, ridges, and bumps, and filling low spots, control or construction joints, and other defects with Fast-Setting Cement-Based Patch and Underlayment.
B. Subfloor Preparation Moisture Mitigation: Smooth concrete surfaces, removing rough areas, projections, ridges, and bumps, and filling low spots, control or construction joints, mitigate moisture and other defects with Fast-Setting Cement-Based Patch and Underlayment.
C. Subfloor Cleaning: The surface shall be free of dust, solvents, varnish, paint, wax, oil, grease, sealers, release agents, curing compounds, residual adhesive, adhesive removers and other foreign materials that might affect the adhesion of resilient flooring to the concrete or cause a discoloration of the flooring from below. Remove residual adhesives as recommended by the flooring manufacturer. Remove curing and hardening compounds not compatible with the adhesives used, as indicated by a bond
test or by the compound manufacturer's recommendations for flooring. Avoid organic solvents. Spray paints, permanent markers and other indelible ink markers must not be used to write on the back of the flooring material or used to mark the concrete slab as they could bleed through, telegraphing up to the surface and permanently staining the flooring material. If these contaminants are present on the substrate they must be mechanically removed prior to the installation of the flooring material.

D. Wood subfloors: resilient floors are recommended on suspended wood subfloors with a 1/4" underlayment (see product installation systems for exceptions) and a minimum of 18" of well-ventilated air space below. Flooring does not recommend installing resilient flooring on wood subfloors applied directly over concrete or on sleeper-construction subfloors. Loading requirements for subfloors are normally set by various building codes on both local and national levels. Trade associations such as APA–The Engineered Wood Association provide structural guidelines for meeting various code requirements. Subfloor panels are commonly marked with span ratings showing the maximum center-to-center spacing in inches of supports over which the panels should be placed.

E. Wood subfloors - Surface Cleaning: Make subfloor free from dust, dirt, grease, and all foreign materials.

1. Check panels for sources of discoloration such as contamination from paint, varnish, stain overspray or spills, plumbing sealers, asphalt, heater fuel, markers or potential staining agents such as wood or bark not visible on the surface, edge sealers, logo markings, printed nail patterns and synthetic patches.

2. Remove old adhesive.

3. Cover adhesive, oil or wax residue with an appropriate underlayment. If the residue is tacky, place a layer of felt or polyethylene sheeting over it to prevent a cracking sound when walking on the floor.

4. Remove all paint, varnish, oil and wax from all subfloors. Many buildings constructed before 1978 contain lead-based paint, which can pose a health hazard if not handled properly. State and federal regulations govern activities that disturb lead-based painted surfaces and may also require notice to building occupants. Do not remove or sand lead-based paint without consulting a qualified lead professional for guidance on lead-based paint testing and safety precautions. Armstrong Flooring does not recommend the use of solvents to remove paint, varnish, oil, wax or old adhesive residues because the solvents can remain in the subfloor and negatively affect the new installation. Whenever sanding, be certain the work site is well ventilated and avoid breathing dust. If high dust levels are anticipated, use appropriate National Institute for Occupational Safety and Health (NIOSH) designated dust respirator. All power sanding tools must be equipped with dust collectors. Avoid contact with skin or eyes. Wear gloves, eye protection and long-sleeve, loose fitting clothes.

5. For additional information on the installation and preparation of wood and board-type underlayments see the current edition of ASTM F1482, “Standard Practice for Installation and Preparation of Panel Type Underlayments to Receive Resilient Flooring.”
6. Vacuum or broom-clean surfaces to be covered immediately before the application of flooring.

3.04 INSTALLATION OF FLOORING
A. Install flooring in strict accordance with the latest edition of flooring manufacturer installation systems manual.
B. Install flooring wall to wall before the installation of floor-set cabinets, casework, furniture, equipment, movable partitions, etc. Extend flooring into toe spaces, door recesses, closets, and similar openings as shown on the drawings.
C. If required, install flooring on pan-type floor access covers. Maintain continuity of color and pattern within pieces of flooring installed on these covers. Adhere flooring to the subfloor around covers and to covers.
D. Scribe, cut, and fit to permanent fixtures, columns, walls, partitions, pipes, outlets, and built-in furniture and cabinets.
E. Roll with a 100-pound (45.36 kilogram) roller in the field areas. Refer to specific rolling instructions of the flooring manufacturer.
F. Install flooring with adhesives, tools, and procedures in strict accordance with the manufacturer's written instructions. Observe the recommended adhesive trowel notching, open times, and working times.

3.05 INSTALLATION OF ACCESSORIES
A. Apply top set wall base to walls, columns, casework, and other permanent fixtures in areas where top-set base is required. Install base in lengths as long as practical, with inside corners fabricated from base materials that are mitered or cope. Tightly bond base to vertical substrate with continuous contact at horizontal and vertical surfaces.
B. Fill voids with plastic filler along the top edge of the resilient wall base or integral cove cap on masonry surfaces or other similar irregular substrates.
C. Place resilient edge strips tightly butted to flooring, and secure with adhesive recommended by the edge strip manufacturer. Install edge strips at edges of flooring that would otherwise be exposed.
D. Apply [butt-type] [overlap] metal edge strips where shown on the drawings, [before] [after] flooring installation. Secure units to the substrate, complying with the edge strip manufacturer's recommendations.

3.06 CLEANING
A. Perform initial and on-going maintenance according to the latest edition of Flooring Manufacturer Maintenance Recommendations and Procedures.

3.07 PROTECTION
A. Protect installed flooring as recommended by the flooring manufacturer against damage from rolling loads, other trades, or the placement of fixtures and furnishings.

END OF SECTION 096000
PART 1 GENERAL

1.1 SECTION INCLUDES

A. Flooring underlayment for sound impact reduction with floating laminate and wood flooring.
B. Flooring underlayment for insulation with ceramic tile and nailed wood flooring.
C. Flooring underlayment for substrate crack isolation with ceramic tile and nailed wood flooring.
D. Flooring underlayment for sound impact reduction with ceramic tile and nailed wood flooring.

1.2 RELATED SECTIONS

A. Section 033000 - Cast-In-Place Concrete.
B. Section 061000 - Rough Carpentry.
C. Section 093000 - Tiling.
D. Section 096400 - Wood Flooring.
E. Section 096500 - Resilient Flooring.
F. Section 096800 - Carpeting.

1.3 REFERENCES

A. ASTM International (ASTM):
   5. ASTM E 413 - Classification for Rating Sound Insulation.
   7. ASTM E 989 - Standard Classification for Determination of Impact Insulation Class (IIC).
   8. ASTM E 2179 - Standard Test Method for Laboratory Measurement of the Effectiveness of Floor Coverings in Reducing Impact Sound Transmission Through Concrete Floors

1.4 MEASUREMENT AND PAYMENT

A. Measurement and payment for underlayment shall be incidental to the finish flooring items and included in the bid prices for flooring per Section 004100.

1.5 SUBMITTALS

A. Submit under provisions of Section 013300.
B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.
C. Shop Drawings: Including but not limited to installation and perimeter details.

1.6 QUALITY ASSURANCE

A. Product Requirements:
   1. Anti-Microbial Properties:
      a. Synthetic fibers that do not support the growth of bacteria and fungus.
      b. High temperature manufacturing process to eliminate live organisms.
      c. EPA registered anti-microbial agent incorporated to control mold and bacteria.
   2. Flammability: Meets or exceeds Federal Flammability Standard: CPSC FF 1-70 (Pill Test).
   3. Recycled Content: Constructed with over 80 percent post industrial/pre-consumer fibers.
B. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
   1. Finish areas designated by Architect.
   2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
   3. Refinish mock-up area as required to produce acceptable work.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store and handle materials and products in strict compliance with manufacturer's instructions and recommendations and industry standards. Store materials within absolute limits for temperature and humidity recommended by manufacturer. Protect from damage.
B. Store products in manufacturer's labeled packaging until ready for installation.

1.8 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
1.9 WARRANTY

A. Manufacturer's Standard Limited Warranty:
   1. Warranty Period: 15 years.
   2. Warranty Period: Lifetime of product for original purchaser.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: MP Global Products, which is located at: 2500 Old Hadar Rd. P. O. Box 2283; Norfolk, NE 68702-2283; Toll Free Tel: 888-379-9695; Tel: 402-379-9695; Email: request info (dreimer@mpglobalproducts.com); Web: www.quietwalk.com

B. Requests for substitutions will be considered in accordance with provisions of Section 012500.

2.2 FLOORING UNDERLAYMENT

A. Underlayment: InsuLayment as manufactured by MP Global Products.
   1. Material: Blended synthetic fibers.
   2. R-Value: 4.19/inch (0.16/mm).
   3. Thickness: 0.11 inch (2.8 mm).
   4. Density: 18.9 lbs/cuft (303 gm/ltr).
   5. Weight: 2.78 oz/sf (878 gm/sqm).
   6. Sound Performance:
      a. Field Impact Insulation Class (FIIC) = 60:
         1) Application: 3/8 inch (9.5 mm) engineered wood flooring over underlayment, over 8 inches (203 mm) concrete sub-floor with no ceiling assembly (double glued).
         2) Application: Ceramic tile over underlayment (latex modified thin set and grout), over 8 inches (203 mm) concrete sub-floor with no ceiling assembly.
      b. Impact Insulation Class (IIC) = 52:
         1) Application: Ceramic tile over underlayment (latex modified thin set and grout), over wood floor structure with 1-1/2 inches (38 mm) of Gypcrete or manufacturer approved equal.
      c. Sound Transmission Class (STC) = 53:
         1) Application: Ceramic tile over underlayment (latex modified thin set and grout), over wood floor structure with 1-1/2 inches (38 mm) of Gypcrete or manufacturer approved equal.

7. Performance Level:
   a. Rated as "Extra Heavy" for extra heavy and high impact use in food plants, dairies, breweries, and kitchens when installed using porcelain tile and epoxy grout. (ASTM C 627 - Robinson Floor Test).
   b. Rated as "Light Commercial" for office space, reception areas, kitchens, and bathrooms when installed using residential tile and latex modified thin
set and grout. (ASTM C 627 - Robinson Floor Test).

8. Physical Properties:
   a. Tensile Strength:
      1) Length: 78.4 lb. (35562 gm).
      2) Width: 63.3 lb (28712 gm).
   b. Compression Resistance at 25 percent: 23.2 psi (0.015 kgf/sqmm).
   c. Compression Resistance at 30 percent: 37.0 psi (0.026 kgf/sqmm).
   d. Compression Resistance at 50 percent: 219.6 psi (0.154 kgf/sqmm).
   e. Compression Set at 25 percent: 18.8 percent.

B. Underlayment: QuietWalk as manufactured by MP Global Products.
   2. R-Value: 4.19/inch (0.16/mm).
   3. Thickness: 1/8 inch (3 mm).
   5. Weight: 2.22oz/sf (700 gm/sqm).
   6. Sound Performance:
      a. Sound Transmission Class (STC) = 52 (ASTM E 90, ASTM E 413):
      b. Impact Insulation Class (IIC) = 58 (ASTM E 492, ASTM E 989):
      c. Field Impact Insulation Class (FIIC) = 60:
         1) Application: As tested over 8 inches (203 mm) post-tension concrete sub-floor with no ceiling assembly.
   7. Physical Properties:
      a. Breaking Strength:
         1) Length: 72 lb (32659 gm).
         2) Width: 100 lb (45359 gm).
      b. Compression Resistance at 25 percent: 9.5 psi (.007 kgf/sqmm).
      c. Compression Resistance at 30 percent: 16.6 psi (.012 kgf/sqmm).
      d. Compression Resistance at 50 percent: 85.5 psi (.06 kgf/sqmm).
      e. Compression Set at 25 percent: 18.8 percent.
   8. Moisture Performance: Product will absorb and allow dispersion throughout the product of water moisture in accumulations not exceeding one gallon per 24 hrs per 300 square feet (28 sqm) of product when allowed to continue to accumulate for more than 7 days.
      a. Moisture Absorption Approximately: 650 percent by weight.

C. Underlayment: FiberBacker as manufactured by MP Global Products.
   1. Description: Multi-purpose flooring underlayment that insulates, deadens sound and suppresses lateral cracks.
   2. Materials: Blended synthetic fibers, randomly air-laid filaments
   3. Recycled Content: Certified by Scientific Certifications Systems (SCS) to contain 95 percent post industrial/pre-consumer fibers.
   4. R-Value: 0.42 hr-ft2-degF/Btu (4.2/ inch).
   5. Thickness: 0.10 inches (2.5 mm).
   7. Weight: 30.15 oz / sq yd (3.35 oz / sq ft).
8. Density: 25.5 lbs/ft³;
9. Physical Properties:
   b. Compression Resistance at 50 percent: Exceeds machine limit.
   c. Breaking Strength:
      1) Length: 78.4 lbs.
      2) Width: 63.3 lbs.
   d. Compression Set at 25 percent: 20.7 percent.
10. Sound Properties:
    a. Field Impact Insulation Class (FIIC) = 60:
       1) Application: 3/8 inch (9.5 mm) engineered wood flooring over
          underlayment, over 8 inches (203 mm) concrete sub-floor with no
          ceiling assembly (double glued).
       2) Application: Ceramic tile over underlayment (latex modified thin
          set and grout), over 8 inches (203 mm) concrete sub-floor with no
          ceiling assembly.
    b. Impact Insulation Class (IIC) = 52:
       1) Application: Ceramic tile over underlayment (latex modified thin
          set and grout), over wood floor structure with 1-1/2 inches (38 mm)
          of Gypcrete or manufacturer approved equal.
    c. Sound Transmission Class (STC) = 53:
       1) Application: Ceramic tile over underlayment (latex modified thin
          set and grout), over wood floor structure with 1-1/2 inches (38 mm)
          of Gypcrete or manufacturer approved equal.

D. Underlayment: SoundWalk as manufactured by MP Global Products.
   1. Impact Insulation Class (IIC) = 68 (ASTM E 492, ASTM E 989):
   2. Impact Insulation Class (IIC) = 73 (ASTM E 492, ASTM E 989):
   3. Sound Transmission Loss (STC) = 67 (ASTM E 90, ASTM E 413):
   4. Water Vapor Transmission (ASTM E 96): 0.3 lbs/1000ft² 2/day.

E. Underlayment: DuoFoam Economy as manufactured by MP Global Products
   1. Description: Polyethylene foam with recycled content, moisture resistant film on both sides, moisture resistant film lip and self sealing tape.
   3. Thickness (before film lamination): .080 inches (2 mm).
   4. Foam Density: 1.4 pound density.
   5. Film Thickness: 1 mil HD/LD in and out (includes self sealing tape and adhesive).
   6. Water Vapor Transmission Rate (WVTR): 6.95 g/m²/24 hour day (.45 g/100in²/day).

F. Underlayment: ReproFoam as manufactured by MP Global Products.
   1. Material: 100 percent reprocessed foam resin.
2. Foam Thickness: .080.
4. R-Value: 3 per inch.

G. Underlayment: ReproSound as manufactured by MP Global Products
1. Description: Reprocessed underlayment foam with self sealing film lip and adhesive liner tape.
2. Material: 100 percent reprocessed foam resin.
3. Foam Thickness: .120 inches (3 mm).
5. R-Value: 3 per inch.
7. Delta Sound Test Results IIC 22 (ASTM E 2179).

H. Underlayment: Cover II as manufactured by MP Global Products.
1. Description: Hard surface protective foam.
2. Location of Manufacture: Made in the U.S.A.
3. Recycled Content: 100 percent recycled.

I. Underlayment: MoistureBlock as manufactured by MP Global Products.
1. Description: Film barrier.
2. Thickness: 6 mil.
3. Sealing Tape: Factory applied, moisture resistant, self-sealing tape along the border.

PART 3 EXECUTION

3.1 PREPARATION

A. Do not proceed with installation until substrates have been properly prepared and deviations from manufacturer's recommended tolerances are corrected. Commencement of installation constitutes acceptance of conditions.
B. Prepare substrates using the methods recommended by the manufacturer for achieving the best result for the substrate under the project 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.

3.3 PROTECTION

A. Protect installed products until completion of project.
B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 096013
SECTION 099100
PAINTING

PART 1  GENERAL

1.1 FIELD QUALITY CONTROL

A. Request review of first finished room, space, or trim of each color scheme required by Project Coordinator for color, texture, and workmanship. Lighting type and intensity shall match lighting of finished work.
B. If approved, sample area will serve as a minimum standard for work throughout the project.

1.2 SUBMITTALS

A. Submit product data under provisions of Section 013300.
B. Prepare three 8x10 inch samples of all finishes. When possible, apply finishes on identical type materials to which they will be applied on job.
C. Identify each sample as to finish, formula, color name and number, and sheen name.
D. Final color acceptance will not occur until after Project Coordinator’s review of field samples.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Deliver paint materials in sealed original labeled containers, bearing manufacturer's name, type of paint, brand name, color designation, and instructions for mixing and/or reducing.
B. Provide adequate storage facilities. Store paint materials per manufacturer requirements or at minimum ambient temperature of 45 degrees Fahrenheit (in absence of manufacturer recommendation) in well ventilated area.
C. Take precautionary measures to prevent fire hazards and spontaneous combustion.

1.4 ENVIRONMENTAL REQUIREMENTS

A. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture contents of surfaces are below maximums established by manufacturer for each type of coating.
B. Ensure temperature of or on the substrate or the temperature of the air in the vicinity of the painting work is above 40 degrees Fahrenheit. Interior latex paints shall not be applied below 45 degrees Fahrenheit unless so authorized in writing by the manufacturer. Epoxy paints and other special resin coatings shall not be applied below 70 degrees Fahrenheit unless otherwise noted on the manufacturer's printed instructions.
C. Provide adequate continuous ventilation and sufficient heating facilities to maintain temperatures above 45 degrees Fahrenheit for twenty-four (24) hours before, during, and forty-eight (48) hours after application of finishes.
D. Provide minimum twenty-five (25) foot candles of lighting on surfaces to be finished.
1.5 EXTRA STOCK

A. Leave on premises, where directed by Owner, not less than five (5) gallons of each color used.
B. Containers to be tightly sealed and clearly labeled for identification.
C. Provide Owner with formulas for future duplication.

1.6 FIELD SAMPLES

A. Provide samples (prior to mixing the entire job) under provisions of Section 013300.
B. Provide a twenty (20) foot hall field sample panel for each hall wall color; full height, illustrating installed color, texture, and finish. Include painting of door frames.
C. Provide complete field sample of one room, include accent paint.
D. Locate where directed.
E. Accepted sample may remain as part of the Work.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with requirements of the Contract Documents and provided the manufacturer meets the standards established by the specifically listed product, manufacturers offering products which maybe incorporated in the work include, but are not limited to those identified in this section or indicated on the drawings, provided substitution prior approval, in accordance with Instructions to Bidders, was given.
B. Substitutions under provisions of Section 012500.
C. Standards established by a specifically listed product shall include but not be limited to visual matching. The final judgment whether a product proposed by the Factory/Engineering Firm, visually matches the specified product satisfactorily will be determined by the Project Coordinator.
D. As indicated in Paragraph 3.7, PAINTING AND FINISH SCHEDULE

2.2 MATERIALS

A. Paint and Coatings: Type and brand listed herein.
B. Paint Accessory Materials: (Linseed oil, shellac, turpentine and other materials not specifically indicated herein but required to achieve the finishes specified) of high quality and approved manufacturer.
C. Paints: Ready-mixed except field catalyzed coatings. Pigments fully ground maintaining a soft paste consistency, capable of readily and uniformly dispersing to a complete homogeneous mixture.
D. Paints to have good flowing and brushing properties and be capable of drying or curing free of streaks or sags.
E. Paint sheen shall fall within the following gloss ranges when tested in accordance with ASTM D-523, 60 degree gloss meter: Flat below 15, Eggshell 15 to 20, Satin 15-35, Semi-Gloss 30-65, Gloss over 65.

PART 3 EXECUTION

3.1 INSPECTION

A. Thoroughly examine surfaces scheduled to be painted prior to commencement of work. Report in writing to the General Contractor and Project Coordinator any condition that may potentially affect proper application. Do not commence work until such defects have been corrected.

B. Correct defects and deficiencies in surfaces which may adversely affect work of this Section.

3.2 PROTECTION

A. Adequately protect other surfaces from paint and damage. Repair damage as a result of inadequate or unsuitable protection.

B. Furnish sufficient drop cloths, shields, and protective equipment to prevent spray or droppings from fouling surfaces not being painted and in particular, surfaces within storage and preparation area.

C. Place cotton waste, cloths, and material which may constitute a fire hazard in closed metal containers and remove daily from site.

D. Remove electrical plates, surface hardware, fittings and fastenings, prior to painting operations. These items are to be carefully stored, cleaned, and replaced on completion of work in each area. Do not use solvent to clean hardware that may remove permanent lacquer finish.

E. Protect labels on fire rated doors and frames.

3.3 PREPARATION

A. Remove mildew, by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry completely.

B. Remove surface contamination from aluminum surfaces requiring a paint finish by steam, high pressure water, or solvent washing. Apply etching primer or acid etch. Apply paint immediately if acid etching.

C. Remove contamination, acid etch, and rinse new concrete floors with clear water. Ensure required acid-alkali balance is achieved. Allow to thoroughly dry.

D. Remove contamination from gypsum board surfaces and prime to show defects, if any. Paint after defects have been remedied.

E. Remove surface contamination and oils from galvanized surfaces and wash with solvent. Apply coat of etching type primer. Touch up factory hot-dipped finish to eliminate defects.

F. Remove surface contamination and oils from zinc coated surfaces and prepare for priming in accordance with metal manufacturer's recommendations.
G. Remove dirt, loose mortar, scale, powder, and other foreign matter from concrete and concrete block surfaces which are to be painted or to receive a clear seal. Remove oil and grease with a solution of trisodium phosphate, rinse well and allow to thoroughly dry.

H. Remove stains from concrete and concrete block surfaces caused by weathering of corroding metals with a solution of sodium metasilicate after being thoroughly wetted with water. Allow to thoroughly dry.

I. Fill hairline cracks, small holes, and imperfections on plaster surfaces with patching plaster. Smooth off to match adjacent surfaces. Wash and neutralize high alkali surfaces where they occur.

J. Remove grease, rust, scale, dirt, and dust from steel and iron surfaces. Where heavy coatings of scale are evident, remove by wire brushing, sandblasting, or any other necessary method. Ensure steel surfaces are satisfactory before paint finishing.

K. Clean unprimed steel surfaces by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts and nuts are similarly cleaned. Prime surfaces to indicate defects, if any. Paint after defects have been remedied.

L. Sand and scrape shop primed steel surfaces to remove loose primer and rust. Feather out edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces.

M. Sand runs and drips from shop primed surfaces. Feather out edges and re-prime to provide a smooth surface.

N. Wipe off dust and grit from miscellaneous wood items and millwork prior to priming. Spot coat knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried and sand between coats. Back prime interior and exterior woodwork.

3.4 APPLICATIONS

A. Apply each coat at proper consistency and in strict accordance with manufacturer's instructions.

B. Each coat of paint is to be slightly darker than preceding coat.

C. Sand lightly between coats as required to achieve specified finish.

D. Do not apply finishes on surfaces that are not sufficiently dry.

E. Allow each coat of finish to dry before following coat is applied, unless directed otherwise by manufacturer.

F. Where clear finishes are required, ensure tint fillers match wood. Work fillers well into the grain before set. Wipe excess from the surface.

G. Backprime interior and exterior woodwork, which is to receive stain and/or varnish finish, with gloss varnish reduced twenty-five (25) percent with mineral spirits.

H. Prime top and bottom edges of wood and metal doors with enamel undercoat when they are to be painted.

I. Prime top and bottom edges of wood doors with gloss varnish when they are to receive a stain or clear finish.

J. Spray apply interior and exterior metals to provide a smooth surface void of sags and runs.

K. Recoat as required to eliminate holidays and provide full uniform coverage at no cost to the Owner.
L. At intersection of different colors/sheens, provide straight, crisp cut in.

3.5 MECHANICAL AND ELECTRICAL EQUIPMENT

A. Refer to mechanical and electrical sections with respect to painting and finishing requirements, color coding, and identification banding of equipment, ducting, piping and conduit. Mechanical and electrical Contractors are responsible for painting as outlined in their respective sections.

B. All exposed-to-view grilles, covers and access panels shall be painted to match adjacent surfaces. Remove grilles, covers, and access panels for mechanical and electrical systems from location and paint separately.

C. Paint exposed-to-view interior surfaces of air ducts, behind louvers, and grilles.

D. Finish paint primed equipment to color selected.

E. Prime and paint insulated and bare pipes, conduits, boxes, hangers, brackets, collars and supports, except where items are plated or covered with a pre-finished coating.

F. Replace identification markings on mechanical or electrical equipment when painted over or splattered.

G. Paint exposed conduit and electrical cabinets occurring in finished areas except fire alarm panels. Color and texture to match adjacent surfaces.

H. Paint both sides and edges of plywood backboards for electrical equipment before installing backboards and mounting equipment on them.

I. Color code equipment, piping, conduit and exposed ductwork in accordance with requirements indicated. Color banding and identification (flow arrows, naming, numbering, etc.).

J. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.6 CLEANING

A. As work proceeds and upon completion, promptly remove paint where spilled, splashed, or splattered.

B. During progress of work keep premises free from any unnecessary accumulation of tools, equipment, surplus materials, and debris.

C. Upon completion of work leave premises neat and clean, to the satisfaction of the General Contractor.

3.7 PAINTING AND FINISH SCHEDULE (All colors are custom as selected by the Project Coordinator)

A. Interior Wood – Cedar
   1. Finish – two (2) coats Fast Dry Sanding Sealer.
   2. Finish – 2 (2) coats Fast Dry Oil Varnish - Satin.

B. Interior Wood Veneer – Cedar
   1. Semitransparent or solid color stain with oil varnish overcoat, 3 different colors as approved by the Project Coordinator.

C. Interior Wood – Hardwood
1. Two (2) coats Stain
2. Two (2) coats Fast Dry Sanding Sealer.
3. Two (2) coats Fast Dry Oil Varnish – Gloss.
4. Two (2) coats Fast Dry Varnish – Satin.

D. Drywall (refer to Room Finish Schedule, paint type Eggshell)
   1. Paint finish – one (1) coat Latex Primer, B11 series.
   2. Paint finish – two (2) coats Low Odor Latex Eggshell B9 series.

E. Drywall (refer to Finish Schedule, paint type Semi-Gloss)
   1. Paint finish – one (1) coat Latex Primer, B11 series.
   2. Paint finish – two (2) coats Low Odor Latex Semi-Gloss B10 series.

F. Drywall (refer to Room Finish Schedule, paint type Epoxy)
   1. Paint finish – one (1) coat Latex Primer, B11 series.
   2. Paint finish – two (2) coats Water based Catalyzed epoxy, B70 series.

G. Miscellaneous Interior Metals and Metal Fabrications: (Hollow metal frames, doors, electrical panel doors, metal fabrications, mechanical grilles, access panels, ladders, vision panel frames, etc.)
   1. Paint finish – one (1) coat DuPont 67FD Alkyd Primer.
   2. Paint finish – two (2) coats DuPont Tufcote 72P Acrylic Enamel.

H. Pre-primed Epoxy Sheet Metal and Miscellaneous Exterior Metals (handrails, guardrails, fences and gates, HM door frames, HM doors, bollards, gutters, downspouts, steel column/beams/ornamentation, flashing, parapet caps, etc.)
   1. Paint finish – one (1) coat Galvite HS Primer B50 (not required at pre-primed epoxy sheet metal).

I. Exterior Siding and Trim – Fiber Cement Board
   1. Finish – two (2) coats Mason’s SelectWoodperfect Series coating, acrylic polymer, Project Coordinator approved custom mix as related to mockup review per Section 07460. Finish to provide natural cedar appearance.

J. Concrete Floors
   1. Sealer – one (1) coat Burke Spartan-Cote WB.

K. Interior M.D.O. Plywood
   1. Paint finish – one (1) coat Sherwin Williams 200 Wallboard Primer, B28W200 series.
   2. Paint finish – two (2) coats Sherwin Williams Health Spec Low Odor Latex Egg-shell B9 series.

3.8 COLORS

A. Approximately ten (10) different colors will be utilized in the project.
B. Approximately twenty five (25) percent of the wall surfaces will be painted with moderately deep accent colors.

END OF SECTION 099100
PART 1 GENERAL

1.1 SECTION INCLUDES

A. Bio-Based Penetrating Wood Stain for Vertical and Horizontal Surfaces

1.2 SUBMITTALS

A. Submit under provisions of Section 013300.
B. Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.
C. Supply two (2) color charts with all available colors from manufacturer.
D. Supply (2-ounce) samples of selected stain color for visual inspection and acceptance as
   applied on designated substrate surface.
E. Executed Warranties.

1.3 QUALITY ASSURANCE

A. Regulatory Requirements: Products shall comply with federal, state, and local volatile
   organic compounds (VOC) regulations.
B. Mock-Ups: Provide stain sample material for mock-ups specified in affected sections to
   finalized color acceptance or technique modification to desired architectural look.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store products of this section in manufacturer's unopened packaging until installation.
B. Maintain storage area conditions for products of this section in accordance with
   manufacturer's instructions until installation.

1.5 PROJECT CONDITIONS

A. Do not apply stain to surfaces below 50 degrees F (10 degrees C) or above 120 degrees F
   (49 degrees C) unless otherwise recommended by the manufacturer.
B. Do not apply stain outdoors when rain is predicted within twenty-four (24) hours or less
   than one (1) day after surface has been wet. Certain variances are possible with
   manufacturer instructions.
C. Do not stain in high or gusty winds.

1.6 WARRANTY

A. Provide a warranty against failure due to incorrect application for a period of no less than
   five (5) years from the date of Substantial Completion.
B. Provide the manufacturer's limited warranty against failure of sealer installation due to failure of sealer material for a period of no less than five (5) years from the date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Eco Safety Products, LLC, at 1542 E. Victory Street, Suite 3, Phoenix, AZ 85040. tel: 602.305.9397 fax: 602-305-6431. email: info@eco-safety.com website: www.ecoprocoe.com Products are also available at select dealers throughout the U.S.

B. Minwax® Company, 10 Mountainview Road, Upper Saddle River, NJ 07458. Phone: 800-523-9299.

C. Rustoleum, 6361 Box Springs Boulevard, Riverside, California 92507-0716

D. Requests for substitution will be considered in accordance with provisions of Section 012500.

2.2 MATERIALS

A. Bio-Based Penetrating Wood Stain: Waterborne, breathable, bio-based penetrating stain.
   1. Resistance to Water Penetration.
   4. UV Resistance. Non-Yellowing
   5. Solids Content: 35 percent, minimum.
   7. Non-Hazardous: Meets all environmental air quality requirements, No chemical compounds listed as carcinogens under OSHA, ACGIH, NTP, IARC, or Other.
   8. VOC Content: Less Than 25 g/l
   10. DOT Regulation: Non-Regulated

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that substrates to receive stain are prepared in accordance with manufacturer's instructions.

3.2 PREPARATION

A. Protect adjacent surfaces to prevent accidental application to surfaces not indicated to receive stain; remove accidental applications from surfaces immediately, following manufacturer's instructions.

B. Preparation of existing surfaces:
a. Remove loose or deteriorated materials, including, but not limited to, scale, spalling, paint, or other coatings.
b. Clean with detergent-based materials, as recommended by manufacturer's instructions; cleaning with solvent-based or oil-based cleaners is prohibited.
c. Sand existing surfaces to remove existing stains or coatings for proper colorization and adhesion.

3.3 APPLICATION

A. Apply stain in accordance with manufacturer's instructions for indicated project conditions; for multi-coat applications, allow specified curing time between subsequent coats.

B. Application of finish sealer is recommended by manufacturer for horizontal traffic applications. Application of specialty finish coats over sealer is acceptable per manufacturer instructions. (lacquers, varnish, polyurethanes, etc.).

C. Apply Wood Stain on the following compatible vertical or horizontal surfaces:
   1. Log Homes.
   2. Wood Decks.
   3. Wood Cabinets.
   5. Wood Beams.
   7. Wood Fences.
   8. Wood Paneling.

3.4 PROTECTION

A. Protect all surface areas during the construction project to prevent contamination of work.

B. Repair or refinish any damaged or contaminated areas at Contractor’s expense and at no additional cost to the Owner.

C. Avoid standing water and chemical cleaning during the manufacturers designated curing period.

END OF SECTION 099300
SECTION 103000
FIREPLACES AND STOVES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Manufactured Wood-Burning Fireplaces & Stoves.
B. Accessories.

1.2 RELATED SECTIONS

A. Section 06100 - Rough Carpentry: Wood framed rough opening and enclosure.

1.3 REFERENCES

A. UL 127 - Standard for Factory-Built Fireplaces.
B. CAN/ULC S610 - Factory-Built Fireplaces.

1.4 SUBMITTALS

A. Submit under provisions of Section 013300.
B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.
B. Protect materials from exposure to moisture. Do not deliver until after wet work is complete and dry.

1.6 WARRANTY

A. 20 year minimum warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Lennox Hearth Products, which is located at: 1508 Elm Hill Pike ; Nashville, TN 37210; Toll Free Tel: 800-655-2008; Tel: 615-925-3417; Email: request info; Web: www.lennoxhearthproducts.com
B. Harman Stove Company, 352 Mountain House Road, Halifax, PA 17032.
C. U.S. Stove Co.; 227 Industrial Park Road, South Pittsburg, TN 37380; 800-750-2723.
E. Requests for substitutions will be considered in accordance with provisions of Section 012500.

2.2 WOOD FIREPLACES

A. General:
   1. Provide all components and accessories required for a complete, functional, and acceptable unit.
   2. Comply with applicable building codes.
   3. Comply with UL 127.
   4. Comply with UL-CS610.
   5. Comply with NFPA.
   6. UL or WHI listed.
   7. Wood stove must have a specification plate attached to the back that gives the required clearances from combustibles and floor protection.

2.3 VENTS AND CHIMNEYS

A. Woodstove chimneys must terminate in accordance with the manufacturer’s installation instructions, generally 3’ above the point of penetration and 2’ above any part of the building within 10’. Wood stoves and factory built wood-burning fireplaces must be installed according to the manufacturer’s installation instructions.

B. Unvented fuel-burning appliances used for space heating are prohibited in residences.

C. Single wall pipe may be used only as a connector between an appliance and its vent or chimney and only in an exposed location. It can’t be used in an attic, or in any concealed space. When used with residential gas appliances, it must be kept at least 6” from combustible materials and for woodstoves at least 18”. All joints in single wall connectors must be fastened with sheet-metal screws or rivets, including the connection to the chimney or vent.

D. Concealed portions of vents and chimneys, other than masonry or concrete chimneys, must be constructed with listed pipe and fittings and must maintain the listed clearance from combustibles. In the case of gas appliances, listed pipe and fittings will be double-wall, or B-vent and generally require 1” clearance from combustibles. For woodstoves, a variety of listed chimney systems are available. These generally require 2” clearance from combustibles. Requirements for the installation of all these factory-made systems are found in the manufacturer’s installation instructions, not in the codebooks.

E. Pitch is important in gravity venting systems, since the tendency of heat to rise makes them work. If too much of the pipe is too flat, the system will stall. Connectors may be as flat as 1/4” rise per foot, but must be as short as possible. Beyond the connector, no part of a gas vent can be flatter than 60° from vertical. But the total horizontal run of connector and vent must not exceed 75% of the total vertical rise. Stated another way, the vent system must be more vertical than horizontal. This is sometimes a problem when people want all the vents toward the back of the roof where they can’t be seen from the street. If an appliance is too far toward the front of the house, this may not be possible.
F. Gravity-type venting systems, other than a Type BW system or a venting system, which is an integral part of a listed appliance, must extend at least 5 feet above the appliance vent collar.

A. Since gas vents must terminate at least 8’ from any wall or other vertical surface, they are normally extended above the (highest) roof, clear of all walls. The termination must be at least 3’ above or 10’ horizontally from any forced air intake.

PART 3 EXECUTION (not used)

END OF SECTION 103000
GENERAL

1.1 SUMMARY

A. Section includes interior woodwork for the following applications:
   1. Wood cabinets.
   3. Solid-surfacing-material countertops.

1.2 SUBMITTALS

A. Product Data: For the following:
   1. Cabinet hardware and accessories.
   2. Handrail brackets.
   3. Finishing materials and processes.

B. Shop Drawings: Include location of each item, plans and elevations, large-scale details, attachment devices, and other components.

C. Samples:
   1. Lumber and panel products for transparent finish, for each species and cut, finished on one side and one edge.
   2. Lumber and panel products with shop-applied opaque finish, for each finish system and color, with exposed surface finished.
   3. Plastic-laminate-clad panel products, for each type, color, pattern, and surface finish.
   4. Thermoset decorative-overlay surfaced panel products, for each type, color, pattern, and surface finish.
   5. Solid-surfacing materials.

1.3 REFERENCES

A. Cabinets:
   1. HUD Minimum Property Standards for Housing, 1984 (with updates).
   2. HUD Severe Use Requirements.
   3. ANSI/KCMA A161.1 Recommendations Performance and Construction Standards for Kitchen and Vanity Cabinets

B. Hardware:
   1. ANSI/BHMA A156.9 Cabinet Hardware, 1988.
1.4 QUALITY ASSURANCE

A. Cabinet Manufacturer Certification: Continuously tested, certified, and display label or seal of Kitchen Cabinet Manufacturer's Association (KCMA) or Southern California Association of Cabinet Manufacturer's Association in accordance with ANSI Z34.1.
   1. HUD Severe Use Cabinets: Bear KCMA Certification Seal and additional label indicating conformance to HUD Severe Use specifications.

B. Fire-Test-Response Characteristics: Where fire-retardant materials or products are indicated, provide materials and products with specified fire-test-response characteristics as determined by testing identical products per test method indicated by UL, ITS, or another testing and inspecting agency acceptable to the Owner.

C. Forest Certification: Provide interior architectural woodwork produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."

D. Mockups: Construct mockups at the jobsite to verify compliance with the construction documents and the written comments issued during the OWNER submittal reviews. Include the following mockups:
   1. Functional Mock Up: Fabricate from plywood or particle board in configuration indicated to confirm podium configuration, coordination and integration of all equipment including, but not limited to, computers, ticket spitters, monitors, and dynamic signage displays.
   2. Aesthetic Mock Up: Fabricated from specified and indicated materials; incorporate all requested modifications from the Functional Mock Up.
   3. Construct all mock ups at jobsite.
   4. Approved mock ups may not become part of the completed work.

E. Conduct pre-installation conference at the jobsite.

1.5 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and humidity at levels planned for building occupants during the remainder of the construction period. (NOTE: Whenever practical, the millwork is to be designed with integral cable raceways with future expansion in mind). Within this millwork, discretely locate any access panels that are to be provided for ease of cable and wiring maintenance. Such millwork installations will require coordination with electrical and communication disciplines. Underlying floor mounted electrical outlets are to be fully recessed with cover plates and smoothly aligned with the adjacent floor finishes.
PART 2 PRODUCTS

2.1 WOODWORK FABRICATORS

A. Fabricators: Subject to OWNER review.

2.2 HUD SEVERE USE CABINETS

A. Wall and Base Cabinets:
   1. Construct to produce sturdy and rigid construction.
   2. Constructed of solid lumber and/or exterior grade plywood with wood veneer core.
   3. Particle board, flakeboard, fiberboard, and hardboard are NOT allowed.
   4. Portion of cabinets touching the floor to be pressure treated solid lumber.
   5. Provide integral toe space of a minimum three inches (3") by three inches (3").
   6. Toe Kicks: 3/4" net thickness, pressure treated solid lumber.

B. Face Frames:
   1. 3/4 inch net thick kiln dried solid hardwood, free of knots and selected for light uniform color suitable for stain finish.
   2. Mortised and tenoned, dovetailed or doweled, glued and stapled under pressure and filled and sanded.
   3. Vertical end members (Stiles): minimum 1-1/2 inch net width.
   4. Vertical center members between doors and drawers (Mulls): minimum 2 inches net width.
   6. Stiles and top/bottom rails: dadoed to receive ends, bottoms, and tops.

C. Doors & Door Hardware:
   1. Doors: 3/4 inch thick, 7 ply A-D grade exterior hardwood plywood with no more than one veneer joint on face.
   2. Edges:
      a. Reversed shape to form continuous finger grip around sides.
      b. Filled and sanded smooth prior to finish.
      c. May be treated with hot foil transfer.
      d. May be covered with 3/8 inch by 3/4 inch reverse shaped hardwood bands.
   4. Hinges: Manufacturer's standard heavy duty with self closing feature, concealed system.

D. Drawers and Drawer Hardware:
   1. Fronts construction and finish - same as doors.
   2. Sides: minimum 11/16 inch net thickness Grade C solid lumber with sides dovetailed or mortised and tenoned into fronts.
   3. Backs: minimum 11/16 inch net thickness Grade C solid lumber with sides dovetailed or mortised and tenoned into sides.
4. Bottoms: minimum 1/4 inch softwood or hardwood exterior plywood let into front, sides, and back.
5. Drawer Parts: glued and nailed/stapled together.
6. Mount drawers on metal side rails with 75 pound loading capacity.
7. Cabinet members or guides: attached at rear to 3/4 inch solid lumber hanging rail or 1/2 inch solid lumber or plywood block which is attached to 3/4 inch solid lumber hanging rail by use of metal rear mount brackets or by continuous wraparound method.

E. Installation Cleats:
1. Minimum 3/4 inch by 3-1/2 inch net thickness S4S, Grade C, kiln dried solid lumber, dadoes to receive bottoms and tops.
2. Provide two horizontal members running full length of cabinet at top and bottom.
3. Base cabinets with drawers: side mount drawer slide brackets rigidly attached at 1/2 inch thick plywood or wood block which is rigidly attached to top cleat.

F. End Panels:
1. Exposed end panels: minimum 2-2 Grade, 1/2 inch thick 5-ply exterior hardwood plywood, selected for light uniform color.
2. End not exposed: may be 1/2 inch thick exterior softwood plywood. Grade A-D, with Grade A side to inside of cabinet.
3. Ends: dadoed minimum 1/4 inch deep to receive shelves, bottoms, and tops. Let into dado in face frame.
4. Base Cabinet End Panels: stop 3-1/2 inch above floor and supported by 3/4 inch by 3-1/2 inch pressure treated solid lumber member.

G. Shelves and Wall Cabinet Bottoms:
1. 1/2 inch thick Grade 2-2 exterior hardwood plywood or Grade A-D exterior softwood plywood with wood banded front edge to 3/4 inch net thickness solid lumber.
2. Shelves: let into dadoes of end panels and braced behind mulls.
3. Bottoms: let into (rabbet or dado, manufacturer's choice) end, cleats, and front frames.
4. Shelves and Bottoms: glued and stapled.
5. Optional Adjustable Shelves: 3/4 inch thick Grade 2-2 exterior hardwood plywood or Grade A-D exterior softwood plywood with wood banded front edge or 3/4 inch thickness solid lumber. Support shelves as necessary to comply with shelf deflection provisions of ANSI/KCMA A161.1. Shelves loaded at 15 PSF for seven days shall not deflect more than 1/16 inch per linear foot between supports, with a maximum deflection of 1/4 inch total between supports.

H. Backs:
1. Provide on cabinets (optional on sink bases).
2. Minimum 1/4 inch thick Grade 2-2 exterior hardwood plywood or Grade A-D exterior softwood plywood.
3. Securely glued and stapled to ends, 3-1/2 inch cleats and shelves of cabinet.
4. May be let into dado of ends and cleats or may be applied flush with ends and cleats.
I. Base Bottoms:
   1. 1/2 inch thick Grade 2-2 exterior hardwood plywood or Grade A-C exterior softwood plywood.
   2. Let into (rabbet/dado, manufacturer's choice) end panels, front rails, and installation cleats.
   3. Supported by 3/4 inch net thickness pressure treated solid lumber braces 24 inches on center running front to rear of cabinet and resting on finished floor.

2.3 METAL GREASE SPLASH MATERIAL

A. Stainless Steel: AISI Type 304, nonmagnetic sheets free of buckles, waves, and surface imperfections, No. 4 polished finish on exposed surfaces 24 gage, sanded edges.

2.4 WALL CABINET SOFFIT MATERIAL

A. Gypsum board or plaster: see Section 092000.

B. Wood: exposed wood soffit face to be 1/4 inch, 3-ply, birch-faced, cabinet grade plywood. Blocking to be Hemlock-Fir No. 2.

2.5 MISCELLANEOUS MATERIALS

A. Adhesives, General: Do not use adhesives that contain added urea formaldehyde.

B. Low-Emitting Materials: Adhesives shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. VOC Content for Installation Adhesives and Glues: Comply with the following limits when calculated according to 40CFR59, Subpart D (EPA Method 24).

2.6 FABRICATION

A. General: Complete fabrication to maximum extent possible before shipment to Project site.

B. Where necessary for fitting at site, provide allowance for scribing, trimming, and fitting.

C. Provide Premium grade interior woodwork unless otherwise noted, subject to OWNER approval.
2.7 SHOP FINISHING

A. Finish architectural woodwork at fabrication shop. Defer only final touchup, cleaning, and polishing until after installation.

B. Finishing Materials: Products shall comply with the testing and product requirements of the California Department of Health Services "Standard Practice for the Testing Of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

PART 3 EXECUTION

3.1 INSTALLATION

A. Condition woodwork to average prevailing humidity conditions in installation areas and examine and complete work as required, including removal of packing and backpriming before installation.

B. Quality Standard: Install woodwork to comply with AWI Standards.

C. Install woodwork level, plumb, true, and straight to a tolerance of 1/8 inch in 96 inches. Shim as required with concealed shims. (NOTE: Any grade below premium has been determined not be suitable for the public areas and therefore will not be allowed. All counter heights shall be 34” AFLL to comply with ADA requirements.)

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

E. Standing and Running Trim: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to greatest extent possible. Fill gaps, if any, between top of base and wall with plastic wood filler, sand smooth, and finish same as wood base, if finished.

F. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation.

   1. Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches o.c.

G. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop. Calk space between backsplash and wall with sealant.
1. Countertops without base cabinets for support shall be designed to conceal structural supports from view and not violate ADA minimum knee clearances.

END OF SECTION 123530
SECTION 123600
COUNTERTOPS

PART 1 - GENERAL

1.1 DESCRIPTION
A. This section specifies casework countertops with integral accessories.
B. Integral accessories include:
   1. Sinks with traps and drains.
   2. Mechanical Service fixtures.
   3. Electrical Receptacles.
   4. Hot Plates (Range)
   5. Pegboards

1.2 RELATED WORK
A. Color and patterns of plastic laminate: to be determined by the Owner per Submittal process.
B. DIVISION 22, PLUMBING.
C. DIVISION 26, ELECTRICAL.

1.3 SUBMITTALS
A. Submit in accordance with Section 013300, Shop Drawings, Product Data, and Samples.
B. Shop Drawings
   1. Show dimensions of section and method of assembly.
   2. Show details of construction at 1/2 scale.
C. Samples:
   1. 150 mm (6 inch) square samples each top.
   2. Front edge, back splash, end splash and core with surface material and booking.

1.4 APPLICABLE PUBLICATIONS
A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.
B. American Society of Mechanical Engineers (ASME):
   A112.18.1-12 .........................Plumbing Supply Fittings
   A112.1.2-12 ...........................Air Gaps in Plumbing System
   A112.19.3-08(R2004) ............Stainless Steel Plumbing Fixtures (Designed for Residential Use)
C. American Society for Testing and Materials (ASTM):
   A167-99 (R2009) ....................Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip
   A1008-10 ...............................Steel, Sheet, Cold-Rolled, Carbon, Structural, High Strength, Low Alloy
   D256-10 ...............................Pendulum Impact Resistance of Plastic
   D570-98(R2005) ....................Water Absorption of Plastics
D638-10 .................................Tensile Properties of Plastics
D785-08 .................................Rockwell Hardness of Plastics and Electrical Insulating Materials
D790-10 .................................Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
D4690-99(2005) .....................Urea-Formaldehyde Resin Adhesives
D. Federal Specifications (FS):
   A-A-1936 ...............................Adhesive, Contact, Neoprene Rubber
E. U.S. Department of Commerce, Product Standards (PS):
   PS 1-95 .................................Construction and Industrial Plywood
F. National Electrical Manufacturers Association (NEMA):
   LD 3-05 .................................High Pressure Decorative Laminates

PART 2 - PRODUCTS

2.1 MATERIALS

   1. Concealed backing sheet Type BKL.
   2. Decorative surfaces:
      a. Flat components: Type GP-HGL.
      b. Post forming: Type PF-HGP.
   3. Chemical Resistant Surfaces
      a. Flat components: Type GP-HGL.
      b. Post forming: Type PF-HGP.
      c. Resistance to reagents:
         i. Test with five 0.25 mil drops remaining on surface for 16 hours followed by
            washing off with tap water, then cleaned with liquid soap and water, dried
            with soft cotton cloth and then cleaned with naphtha.
         ii. No change in color, surface texture, and original protectability remaining from
            test results of following reagents:
               98% Acetic Acid  Butyl Alcohol  Acetone
               90% Formic Acid--  Benzine  Chloroform
               28% Ammonium Hydroxide  Xylene  Carbon Tetrachloride
               Zinc Chloride (Sat.)  Toluene  Cresol
               Sodium Carbonate (Sat.)  Gasoline  Ether
               Calcium Hypochlorite (Sat.)  Kerosene  Cottonseed Oil
               Sodium Chloride (Sat.)  Mineral Oil  40% Formaldehyde
               Methyl Alcohol  Ethyl Acetate  Trichlorethylene
               Ethyl Alcohol  Amyl Acetate  Monochlorobenzine
         iii. Superficial effects only: Slight color change, spot, or residue only with
            original protectability remaining from test results of following reagents:
               77% Sulfuric Acid  37% Hydrochloric Acid  85% Phenol
               33% Sulfuric Acid  20% Nitric Acid  Furfural
iv. Minimum height of impact resistance: 300 mm (12 inches).

B. Molded Resin:
1. Non-glare epoxy resin or furan resin compounded and cured for minimum physical properties specified:

<table>
<thead>
<tr>
<th>Property</th>
<th>Result</th>
<th>Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexural strength</td>
<td>70 MPa (10,000 psi)</td>
<td>ASTM D790</td>
</tr>
<tr>
<td>Rockwell hardness</td>
<td>105</td>
<td>ASTM D785</td>
</tr>
<tr>
<td>Water absorption, 14 hours (weight)</td>
<td>.01%</td>
<td>ASTM D570</td>
</tr>
</tbody>
</table>

2. Material of uniform mixture throughout.

C. Stainless Steel: ASTM A167, Type 304.

D. Sheet Steel: ASTM A1008, cold rolled, Class 1 finish, stretcher leveled.

E. Plywood: PS 1, Exterior type, veneer grade AC not less than five ply construction.

F. Hardwood Countertop: Solid maple, clear grade except where otherwise specified.

G. Hardboard: ANSI/AHA A135.4, Type I, tempered, fire retardant treated, smooth surface one side.

H. Adhesive
2. For wood products: ASTM D4690, unextended urea resin or unextended melamine resin, phenol resin, or resorcinol resin.
3. For Field Joints:
   i. Epoxy type, resistant to chemicals as specified for plastic laminate laboratory surfaces.
   ii. Fungi resistant: ASTM G-21, rating of 0.

I. Fasteners:
1. Metals used for welding same metal as materials joined.
2. Use studs, bolts, spaces, threaded rods with nuts or screws suitable for materials being joined with metal splice plates, channels or other supporting shape.

J. Solid Polymer Material:
1. Filled Methyl Methacrylic Polymer.
2. Performance properties required:

<table>
<thead>
<tr>
<th>Property</th>
<th>Result</th>
<th>Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elongation</td>
<td>0.3% min.</td>
<td>ASTM D638</td>
</tr>
<tr>
<td>Hardness</td>
<td>90 Rockwell M</td>
<td>ASTM D785</td>
</tr>
<tr>
<td>Gloss (60° Gordon)</td>
<td>5-20</td>
<td>NEMA LD3.1</td>
</tr>
<tr>
<td>Color stability</td>
<td>No change</td>
<td>NEMA LD3 except 200 hour</td>
</tr>
<tr>
<td>Abrasion resistance</td>
<td>No loss of pattern</td>
<td>NEMA LD3</td>
</tr>
<tr>
<td></td>
<td>Max wear depth 0.0762 mm (0.003 in) - 10000 cycles</td>
<td></td>
</tr>
</tbody>
</table>
### Property Results

<table>
<thead>
<tr>
<th>Property</th>
<th>Result</th>
<th>Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water absorption weight (5 max)</td>
<td>24 hours 0.9</td>
<td>ASTM D-570</td>
</tr>
<tr>
<td>Izod impact</td>
<td>14 N·m/m (0.25 ft-lb/in)</td>
<td>ASTM D256 (Method A)</td>
</tr>
<tr>
<td>Impact resistance</td>
<td>No fracture</td>
<td>NEMA LD-3 900 mm (36&quot;) drop 1 kg (2 lb.) ball</td>
</tr>
<tr>
<td>Boiling water surface resistance</td>
<td>No visible change</td>
<td>NEMA LD3</td>
</tr>
<tr>
<td>High temperature resistance</td>
<td>Slight surface dulling</td>
<td>NEMA LD3</td>
</tr>
</tbody>
</table>

3. Cast into sheet form and bowl form.
4. Color throughout with subtle veining through thickness.
5. Joint adhesive and sealer: Manufacturers silicone adhesive and sealant for joining methyl methacrylic polymer sheet.
6. Bio-based products will be preferred.

**K. Laminar Flow Control Device**

1. Smooth bright stainless steel or satin finish, chrome plated metal laminar flow device shall provide non-aeration, clear, coherent laminar flow that will not splash in basin. Device shall also have a flow control restrictor and have vandal resistant housing.

2. Flow Control Restrictor:
   i. Capable of restricting flow of 7.5 to 8.5 Lpm (2.0 to 2.2 gpm) for sinks provided in paragraph 2.2D.
   ii. Compensates for pressure fluctuation maintaining flow rate specified above within 10 percent between 175 and 550 kPa (25 and 80 psi).
   iii. Operates by expansion and contraction, eliminates mineral/sediment building up with self clearing action, and is capable of easy manual cleaning.

### 2.2 SINKS

**A. Molded Resin:**

1. Cast or molded in one piece with interior corners 25 mm (one inch) minimum radius.
2. Minimum thickness of sides and ends 13 mm (1/2 inch), bottom 16 mm (5/8 inch).
3. Molded resin outlet for drain and standpipe overflow.
4. Provide clamping collar permitting connection to 38 mm (1-1/2 inch) or 50 mm (2 inch) waste outlet and trap, making sealed but not permanent connection.

**B. Stainless Steel:**

1. ANSI/ASME A112.19.3, Type 304.
2. Self rim for plastic laminate or similar tops with concealed fasteners.
3. Flat rim for welded into stainless steel tops.
4. Ledge back or ledge sides with holes to receive required fixtures when mounted on countertop.
5. Apply fire resistant sound deadening material to underside.

**C. Stainless steel circular or oval shaped bowl.**
D. Sinks of Methyl Methacrylic Polymer:
   1. Minimum 19 mm (3/4 inch) thick, cast into bowl shape with overflow to drain.
   2. Provide for underhung installation to countertop.
   3. Provide openings for drain.

2.3 TRAPS AND FITTINGS

A. Material as specified in DIVISION 22, PLUMBING.
B. For Molded Resin Sinks:
   1. Chemical resisting P-traps and fittings for chemical waste service.
   2. Provide traps with cleanout plug easily removable without tools.
C. For Stainless Steel Sinks:
   1. Either cast or wrought brass or stainless steel P-traps and drain fittings; ASME A112.18.1
   2. Flat strainer, except where cup strainer or overflow standpipe specified.
      i. Provide cup strainer in cabinet type 1B.
      ii. Provide stainless steel overflow stand pipe to within 38 mm (1-1/2 inches) of sink rim.
   3. Exposed surface chromium plated finish.
D. Plaster traps:
   1. Cast iron body with porcelain enamel exterior finish.
   2. 50 mm (2 inch) female threaded side inlet and outlet.
   3. Removable galvanized cage having integral baffles and replaceable brass screens.
   4. Removable gasketed cover.
   5. Minimum overall dimensions: 350 x 350 x 400 mm high (14 x 14 x 16 inches) with 175 mm (7 inch) water seal.
E. Air Gap Fittings: ASME A112.1.2.
F. Methyl Methacrylic Polymer Sink Traps:
   1. Cast or wrought brass with flat grid strainer, off-set tail piece, adjustable 38 x 32 mm (1-1/2 x 1 1/4-inch) P trap.
   2. Chromium plated finish.

2.4 WATER FAUCETS

A. ASME A112.18.1.
   1. Cast or forged brass, compression type with replaceable seat and stem assembly or replaceable cartridge.
   2. Indexed // four-arm // lever // handles either with or without head.
   3. Gooseneck minimum clearance above countertop of 190 mm (7-1/2 inches), bent 180 degrees for vertical discharge.
   4. Swing spouts elevated to clear handles.
   5. Exposed brass surfaces chromium plated.
   6. Cast combination hot and cold fixture with one piece body for multiple outlets.
   7. Adapter type connection which will permit field conversion of swing spouts to fixed or gooseneck grouts or vice versa.
   8. Pedestals Top for Laboratory or Pharmacy:
      i. Modern design tapered to a round base, factory assembled and tested.
ii. Brass shanks, locknuts and washers for attaching to top or curbs.

B. Laminar flow control device on spouts.

C. Automatic Controlled Faucets.
   1. Infra-red photocell sensor and a solenoid valve to control water flow automatically.
   2. Breaking light beam activates water flow.
   3. Water stops when user moves away from light beam.

D. Manifold, Tube-Washing:
   1. Deck mounted
   2. Three valved outlet, plus one bleeder outlet.
   3. Vacuum breaker, and loose key stops with integral check valve.

E. Vanity or Lavatory Faucets in Methyl Methacrylic Polymer tops:
   1. Extra long center set single lever handle control.
   2. Cast or wrought copper alloy, vandal resistant.
   3. Stainless steel ball type with replaceable non-metallic seats, stainless steel lined sockets.
   4. Handle always returning to the neutral position or cartridge body construction.
   5. Provide laminar flow control device.

2.5 FIXTURE IDENTIFICATION

A. Code fixtures with full view plastic index buttons.

B. Use following colors and codes:

<table>
<thead>
<tr>
<th>SERVICE</th>
<th>COLOR</th>
<th>CODE</th>
<th>COLOR OF LETTERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cold Water</td>
<td>Dark Green</td>
<td>CW</td>
<td>White</td>
</tr>
<tr>
<td>Hot Water</td>
<td>Red</td>
<td>HW</td>
<td>White</td>
</tr>
<tr>
<td>Laboratory Air</td>
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<tr>
<td>Deionized Water</td>
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<td>Black</td>
</tr>
<tr>
<td>Oxygen</td>
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<tr>
<td>Hydrogen</td>
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</tr>
<tr>
<td>Nitrogen</td>
<td>Gray</td>
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<tr>
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<td>CHEM.SYM.</td>
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</tbody>
</table>

2.6 ELECTRICAL RECEPTACLES

A. Residential grade per electrical specifications.

B. Curb Mounted Receptacles:
   1. NEMA 5-20R duplex in galvanized steel box.
   2. Chromium plated brass or steel face plate.

C. Pedestal Mounted Receptacles:
1. NEMA 5-20R duplex installed in double faces.
2. Polished stainless steel or aluminum, or chromium plated brass pedestal.

2.7 ELECTRIC DROP-IN HOTPLATE (RANGE) UNITS
A. Built-in type units in stainless steel exposed surfaces.
B. Service 220 volts, single phase.
C. Smooth flat cooking surfaces.
D. Metal sheath type heating units having removable heating elements and drip pans, protected terminals or lead wires with protected splices for connections and means for positive grounding.
   1. No open seams or holes in metal sheath and made of material that will not scale or crack at temperatures reached in service.
   2. Resistance wire: Uniformly spaced coil of nickel chromium alloy wire insulated from sheath by dense compaction of insulating material.
   3. Terminals or lead wires suitable for rating of units.
E. Heating Units:
   1. Double units rated not less than 2600 watts per unit.
   2. Not more than 200 mm (8 inches) in diameter.
   3. Capable of bringing four quarts of cold water to boil in six minutes.
F. Separate Control Unit:
   1. Suitably attached and prewired to range unit.
   2. Separate switch for each heating unit.
      a. Commercial quality, rotatable in either direction through 360 degrees.
      b. At least three heat levels.
   3. Operating dials for switches clearly marked to indicate control positions and easily visible in ordinary light.
   4. Control unit front removable.
G. Indicating light assembly
   1. Mounted on the Control Unit Front.
   2. Red lens and high brightness neon glow type lamp with resistor suitably for 25,000 hours average life.
H. Fuses and Circuit Breakers:
   1. Easily accessible from front of cabinet.
   2. Do not locate at back of storage or where articles can be stored in the front.
I. Range and Control Units Concealed Surfaces:
   1. Made of materials suitable for the intended use.
   2. Low carbon steel galvanized or other suitable corrosion resistant finish.
   3. Provide a solid 1.5 mm (0.0598 inch) thick sheet steel barrier below the unit, located a minimum of nine inches below the unit top.

2.8 FILM VIEWER
A. Designed for flush mounting in countertop.
B. Translucent or opalescent panel 400 mm by 500 mm (16 inch by 20 inch).
C. Minimum of three 15 watt or two 20 watt fluorescent tubes in UL listed enclosure.
D. Provide "on-off" switch for fluorescent tube for front panel of cabinet.
2.9 COUNTERTOPS
A. Fabricate in largest sections practicable.
B. Fabricate with joints flush on top surface.
C. Fabricate countertops to overhang front of cabinets and end of assemblies 25 mm (one inch) except where against walls or cabinets.
D. Provide 1 mm (0.039 inch) thick metal plate connectors or fastening devices (except epoxy resin tops).
E. Join edges in a chemical resistant waterproof cement or epoxy cement, except weld metal tops.
F. Fabricate with end splashes where against walls or cabinets.
G. Splash Backs and End Splashes:
   1. Not less than 19 mm (3/4 inch) thick.
   2. Height 100 mm (4 inches) unless noted otherwise.
   3. Fabricate epoxy splash back in maximum lengths practical of the same material.
H. Drill or cutout for sinks, and penetrations.
   1. Accurately cut for size of penetration.
   2. Cutout for VL 81 photographic enlarger cabinet.
      a. Finish cutout to fit flush with vertical side of cabinet, allowing adjustable shelf to fit into cutout space of cabinet at counter top level. Finish cutout surface as an exposed edge.
      b. Provide braces under enlarger space to support not less than 45 kg (100 pounds) centered on opening side along backsplash.
I. Plastic Laminate Countertops:
   1. Fabricate plastic laminate on five-ply plywood or particleboard core 19 mm (3/4 inch) thick with plastic laminate backing sheet.
   2. Front edge over cabinets not less than 38 mm (1-1/2 inches) thick except where plastic "T" insert is used, not less than 19 mm (3/4 inch) thick.
   3. Exposed Surface and edges of decorative laminated plastic or laboratory chemical resistant surface.
      a. Use chemical resistant surface on tops 6A, 6B, and 6C.
      b. Use decorative surface tops when noted plastic laminate, for tops 10A, 10B and 10C.
J. Metal Counter Tops:
   1. Fabricate up to 3600 mm (12 feet) long in one piece, including nosing, backs and ends.
   2. When counter tops exceed 3600 mm (12 feet) in length accurately fitted field joints are acceptable.
   3. Finish thickness at edges 32 mm (1-1/4 inch).
   4. Reinforced with minimum 1.5 mm (0.0598 inch) thick hat channel stiffeners, minimum of two stiffeners for units without sinks and three stiffeners for units with sinks welded or soldered to underside of top full length, except at sink openings.
   5. Apply sound deadening material on underside.
   6. Flange edges of tops down 32 mm (1-1/4 inch) and reinforce with concealed hardwood or with a steel frame.
   7. Grind welds smooth and finished on exposed surfaces to match finish specified.
   8. Stainless Steel Counter or Sink Tops:
a. Where noted stainless steel except where specified for nourishment unit, unit kitchen, and medicine cabinet.
b. Use 1.5 mm (0.0598 inch) thick stainless steel.
c. Depth of splash backs and splash ends 25 mm (one inch) and turned down at least 13 mm (1/2 inch) at wall. Where faucets are located in splash backs, fabricate depth of splash backs 50 mm (2 inches) with provision made to receive required fixture.
d. Where sinks occur fabricate top with 5 mm (3/16 inch) marine edge and fit flush with adjacent tops of other materials.
e. Weld sink flush to counter top and finish to appear seamless.

K. Molded Resin Tops:
   1. Molded resin with drip groove cut on underside of overhanging edge.
   2. Finish thickness of top minimum 25 mm (1 inch).
   3. Joints: Epoxy Type.
   4. Secure reagent shelves to counter tops with fasteners from underside and seal seam.

L. Maple tops:
   1. Fabricate in one piece of solid laminated tongue and groove maple strips, not more than three inches in width, glued under pressure to a thickness 45 mm (1-3/4 inches).
   2. Edges and ends of clear maple wood. Make splash backs and splash ends of 19 mm (3/4 inch) thick maple and secure to counter tops with concealed metal fasteners and with contact surfaces set in waterproof glue.
   3. Round exposed edges of maple tops and backs to approximate 9 mm (3/8 inch) radius.
   4. Sand exposed surfaces smooth and even and apply two coats of boiled linseed oil. Rub in each coat and allow 48 hours to lapse between coats.

M. Pegboards:
   1. Pegboard: Fabricate of birch with black acid resisting finish and equip with polypropylene or unfinished hardwood pegs.
   2. Pegboard with Funnel and Graduate Rack: Fabricate of birch with black acid resisting finish and equip with polypropylene or unfinished hardwood pegs. Support rack on steel brackets. Provide CRS gutter and drain to sink.

N. Methyl Methacrylic Polymer Tops:
   1. Fabricate countertop of methyl methacrylic polymer cast sheet, 19 mm (3/4 inch) thick.
   2. Fabricate back splash and end splash to height shown.
   3. Fabricate skirt to depth shown.
   4. Fabricate with marine edge where sinks occur.
   5. Fabricate in one piece for full length from corner to corner up to 3600 mm (12 feet).
   6. Join pieces with adhesive sealant.
   7. Cut out countertop for lavatories, plumbing trim.
   8. Provide concealed fasteners and epoxy cement for anchorage of sinks to countertop.
O. Counter Tops for Interchangeable Furniture: Counter tops, unless otherwise shown, are to be capable of vertical adjustment of 150 mm (6 inches). Fabricate tops, except CRS, in increments of units over which they fit with maximum length not to exceed 1950 mm (78 inches). Top section shall cover as many cabinet units as possible. Horizontal joints in counter tops at service strip and across depth of counter are be watertight when in place but of a type that can be easily separated and reset when counter top is moved up or down. Fabricate CRS tops in maximum lengths practicable, with field joints welded and ground smooth to match adjacent surfaces. Securely fasten to supporting rails with heavy metal fastening devices, or with screws, through pierced slots in such rails. Fabricate vertical splash back and reagent shelf in maximum length practicable of same material as working surface, except finish thickness shall be 19 mm (3/4 inch).

PART 3 - EXECUTION

3.1 INSTALLATION

A. Before installing countertops verify that wall surfaces have been finished as specified and that mechanical and electrical service locations are as required.

B. Secure countertops to supporting rails of cabinets with metal fastening devices, or screws through pierced slots in rails.
   1. Where type, size or spacing of fastenings is not shown or specified, submit shop drawings showing proposed fastenings and method of installation.
   2. Use round head bolts or screws.
   3. Use epoxy or silicone to fasten the epoxy resin countertops to the cabinets.
   4. Use wood or sheet metal screws for wood or plastic laminate tops; minimum penetration into top 16 mm (5/8 inch), screw size No 8, or 10.

C. Rubber Moldings:
   1. Where shown install molding with butt joints in horizontal runs and mitered joints at corners where ceramic tile occurs omit molding.
   2. Fasten molding to wall and to splashbacks and splashends with adhesive.

D. Sinks
   1. Install stainless steel sink in plastic laminate tops with epoxy compound to form watertight seal under shelf rim.
      a. In laboratory and pharmacy fit stainless steel sink with overflow standpipe.
      b. Install faucets and fittings on sink ledges with watertight seals where shown.
   2. Install molded resin sinks with epoxy compound to form watertight seal with underside of molded resin top.
      a. Install sink with not less than two channel supports with threaded rods and nuts at each end, expansion bolted to molded resin top.
      b. Design support for a twice the full sink weight.
      c. Install with overflow standpipes.
   3. Install methyl methacrylic polymer sinks in manufacturers recommended adhesive sealer or epoxy compound to underside of methyl methacrylic polymer countertop.
      a. Bolt or screw to countertop to prevent separation of bowl and fracture of adhesive sealant joint.
      b. Install drain and traps to sink.

E. Faucets, Fixtures, and Outlets:
1. Seal opening between fixture and top.
2. Secure to top with manufacturers standard fittings.

F. Range Tops, Electrical Outlets, Film Viewer:
   1. Set in cutouts with manufacturers gasket sealing joint with top to prevent water leakage.
   2. Install control unit and electric outlets where shown. Seal escutcheon plate at lap if on counter or top to prevent water leakage.

3.2 PROTECTION AND CLEANING
   A. Tightly cover and protect against dirt, water, and chemical or mechanical injury.
   B. Clean at completion of work.

End Section 123600
PART 1  GENERAL

1.1 RELAT ED 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 WORK INCLUDED
A. Work under this section shall include furnishing and installing plumbing fixtures, including fixture hangers, fittings, fixture specialties, and associated components, as specified or indicated.

1.3 STANDARDS
A. Referenced Standards: Current publications of the Standards referred to by basic designation in Part 2 and Part 3 shall form a part of this specification to the extent indicated by references thereto.

1.4 SUBMITTALS
A. Submit each item specified in this Section according to the Conditions of the Contract and Division 1 Specification Sections and Section 013300.
B. Submit product information for each plumbing fixture and item of equipment, component, or specialties required for the installation of plumbing fixtures. Include construction material description, pressure and temperature classification, pipe connection details, dimensions and required clearances, and installation instructions.
C. Submittal data for all faucets (except metering or electronic type), stops, drinking fountains and refrigerated water coolers shall indicate NSF 61, Section 9 compliance.

1.5 QUALITY ASSURANCE
A. Plumbing Fixtures: Plumbing fixtures, including trim and fittings, shall be installed in accordance with the details and notes indicated and the recommendations and printed instructions of the manufacturer for each item. Electrical connections to equipment and controls shall be in accordance with the requirements of Division 16.
B. Protection: All materials shall be covered and stored to prevent damage or weathering prior to installation.
C. Quality of Materials: All materials installed shall be new, full weight, of the best quality with the same brand or manufacturer used for all similar material or equipment. Color of all fixtures shall be white, unless otherwise specified.
  1. Enamelware: Acid-resisting throughout the work, marked at factory.
D. Water Conservation and Performance Standards:
1. Plumbing fixtures and fittings shall comply with the requirements of the California Water Conservation Code.
2. New fixtures shall be labeled with either a permanent marking or removable label which states the standard the fixture meets and/or information on the maximum amount of water consumed by the fixture. Water information shall also be indicated on the packaging.

PART 2 PRODUCTS

2.1 PIPING
   A. Domestic piping, within the building to be copper or pex for hot and cold supply and PVC for waste. All piping to be installed per manufacturer recommendations and requirements and be in strict conformance with the California Plumbing Code.

2.2 TOILETS
   A. Toilets to be elongated bowl meeting ADA standard dimensions.

2.3 TUB/SHOWER COMBO AND SURROUNDS
   A. Tub/shower combos to be porcelain-enameded steel with no slip bottoms and white finish. Drain location to be per plans.
   B. Tub surround to be three piece maximum, screw to stud connection (not glue up), polycomposite, and match tub for finish color (white, typical).

2.4 FIXTURE TRIM
   A. Trim: All trim shall be brass, including faucet, strainers, stops, etc., chromium plate over nickel finish. Faucet handles shall be chromium plated forged or cast brass or may be federal specification grade zinc, chromium plate over nickel finish.
   B. Stops: Provide in each water connection to each fixture unless integral stop is specified; loose-key handle, lock shield cap, wall flange, polished chrome-plated copper tubing where exposed to view, rough finished where concealed. All stops shall be 1/2" OD compression fitting and 1/2" OD flexible riser, chrome-plated.
      1. Stops shall be chrome plated brass body type, slow compression standard operating cartridge, renewable seats and washers.
         a. Manufacturer: Chicago Faucet No. 1006, T & S Brass B-1305 or McGuire No. H2167LKC.
      2. Compression-to-Compression Stops: Angle pattern, loose key, chrome plated brass body, Teflon seats, 1/2" OD x 1/2" OD.
         a. Manufacturer: McGuire Model No. ST18LK.
      3. Partition-Type Stops: Provide 1/2" loose-key type stops with escutcheon, chrome plated for all sinks and other fixtures where angle stops cannot be used and integral stops are not specified.
         a. Manufacturer: Chicago Faucet No. 1771 or T & S Brass B-1027.
   C. Pipe Escutcheons: Chrome plated, stamped steel, hinged, split-ring escutcheon, with set screw or snap-on type. Inside diameter shall closely fit pipe outside diameter or outside of pipe insulation where pipe is insulated. Outside diameter
shall completely cover the opening in floors, walls, or ceilings. In exterior, damp, or corrosive environments, use stainless steel escutcheons.

1. Manufacturer: McGuire No. 127050, Chicago Faucet or Brass Craft CB647C.

D. Exposed Supplies: 1/2" O.D. tubing; one end to have a brazed or formed end for compression joints.

E. Traps: Traps on fixture outlets shall be 17-gauge cast brass, polished chrome-plated, adjustable, with trap extension and escutcheon, cleanout plug.

1. Manufacturer: Kohler, American Standard, Eljer, Crane or McGuire.

F. Barrier-Free Requirements: Operating controls for all plumbing fixtures designated for use by the physically handicapped shall comply with California Building Code.

G. Repair Kit: Provide one appropriate faucet manufacturer’s repair kit to be turned over to Owner at completion of work. Provide one complete faucet extra of each manufacturer’s type.

2.5 FIXTURE CAULKING COMPOUND

A. White plastic sealant, non-hardening type.

1. Manufacturer: General Electric Type SCS1202 Series, Products Research Corporation 5000 Sealant, Thiokol Rubber Caulk, or approved Dow Chemical.

2.6 UNDERSINK PROTECTIVE PIPE COVERS

A. Protection at Handicapped Lavatories: Provide in compliance with California Code. Wheelchair accessible lavatory P-trap and angle valve assemblies shall be covered with a molded, antimicrobial undersink protective pipe cover. Cover shall be white in color. Cover shall be secured with flush reusable fasteners; angle stop shall have locking access cover. A replaceable cleanout cover shall be provided to allow servicing at trap.

1. Manufacturer: Truebro "Lav Guard" or Plumberex "Pro-2000 Series."

2.7 FIXTURE SUPPORTS

A. Fixture supports are specified in Section 15100, "Domestic Water and Drainage Piping."

PART 3 EXECUTION

3.1 INSTALLATION—GENERAL

A. All materials and equipment shall be installed by specialists in accordance with manufacturer’s instructions. The installation of any materials and equipment not meeting those standards may be condemned by the Engineer/Architect and shall be removed and reinstalled at no additional cost to the Owner. Contractor is responsible for the safety and good condition of the materials and equipment installed until final acceptance by the Owner.
3.2 INSTALLATION—PLUMBING FIXTURES

A. Fixture Connections: Provide in accordance with the roughing-in details of the manufacturer. Include water, soil, waste, and vent connections for each fixture as required. Batteries of fixtures shall have rough outlets set in straight lines at equal spacing.


C. Wall-Hung Fixture Mounting: Mount all wall-hung fixtures securely on the wall with steel backup plates provided. Install screws through lavatory ears into solid backing to additionally secure lavatories. Backing shall be 3/8" x 6" or 3/8" x 8" steel plate recessed flush with stud face and extending to next stud beyond fixture on each side. Secure plate top and bottom at each stud, weld 3/8" steel stud bolts to each steel stud.

D. Wall-Hung Fixture Mounting: Lavatories and sinks drilled for concealed arms shall be furnished with floor mounted, concealed arm carriers.

E. Countertop Lavatories: The self-rimming lavatories shall be installed with an adhesive sealant under the rim during installation to countertop.

1. Rimless lavatories for installation under tile or marble countertop shall be installed using fixture manufacturer’s clamp assembly, in accordance with manufacturer’s instructions. Provide continuous mastic seal between rim of fixture and bottom of counter.

F. Sealing of Fixtures: Seal the back edge of all fixtures, which mount against walls, at the back edge of the fixture at the top and sides with a narrow, uniform width, fillet bead of plastic sealant, which will prevent accumulation of dirt in this crevice. Apply sealant only after surfaces have been completely cleaned and dry. Bond to fixture and to wall.

1. Exact Location and Height of Fixtures: Install as shown on the Engineering drawings. Where heights are not indicated, install in accordance with the manufacturer’s recommended height.

3.3 INSTALLATION—FITTINGS

A. Faucets: Install on sinks at the drillings provided for faucets. Install clamping accessories and adhesives.

B. Protection at Handicapped Lavatories: Install according to manufacturer’s recommendations. Cover shall be secured with flush reusable fasteners; angle stop shall have locking access cover Vacuum Breakers: Provide on the water supply to each fixture that has a water connection located below the rim. Install in the water line beyond the flush valve or other shutoff valve.

END OF SECTION 221000
SECTION 224200
TOILET AND MISCELLANEOUS ACCESSORIES

PART 1 GENERAL

1.1 REFERENCES


B. ASTM A366 - Cold-Rolled Carbon Steel Sheets, Commercial Quality.

1.2 SUBMITTALS

A. Submit manufacturer’s product data under provisions of Section 013300.

B. Data to illustrate each accessory at large scale and show installation method.

C. Submit manufacturer's installation instructions under provisions of Section 013300.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver accessories to site until rooms in which they are to be installed are ready to receive them.

B. Pack accessories individually in a manner to protect accessory and its finish.

1.4 PROTECTION

A. Protect adjacent or adjoining finished surfaces and work from damage during installation of work of this Section.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with requirements of the Contract Documents and provided the manufacturer meets the standards established by the specifically listed product, manufacturers offering products which maybe incorporated in the work include, but are not limited to those identified in this section or indicated on the drawings, provided substitution prior approval, in accordance with Instructions to Bidders, was given.

B. Substitutions under provisions of Section 012500.
C. Manufacturers of Toilet Accessories
   1. Bradley Corp.
   2. Bobrick

D. Manufacturer of Tackboards and Markerboards
   1. Claridge Products and Equipment, Inc

2.2 MATERIALS

A. Sheet Steel: ASTM A366, cold rolled stretcher leveled; 125 oz/sq. ft. (38 g/sq m) galvanized coating.

B. Stainless Steel Sheet: ASTM A167, commercial grade, 22 gauge (0.80 mm).

C. Stainless Steel Tubing: ASTM A269, commercial grade, seamless welded.

D. Adhesive: Epoxy type contact cement.

E. Fasteners, Screws, and Bolts: Hot dip galvanized. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

2.3 FINISHES

A. Stainless Steel: No. 4 stainless or polished finish.

2.4 FABRICATION

A. Weld and grind smooth joints of fabricated components.

B. Form exposed surfaces from one sheet of stock, free of joints.

C. Provide steel anchor plates and anchor components for installation on building finishes.

D. Form surfaces flat without distortion. Maintain flat surfaces without scratches or dents.

E. Back paint components where contact is made with building finishes to prevent electrolysis.

F. Hot dip galvanize ferrous metal anchors and fastening devices.

G. Shop assemble components and package complete with anchors and fittings.
PART 3 EXECUTION

3.1 PREPARATION

A. Deliver inserts and rough-in frames to job site at appropriate time for building-in. Provide templates and rough-in measurements as required.

B. Before starting work notify Engineer/Architect in writing of any conflicts detrimental to installation or operation of units.

C. Provide proper backing to support accessories.

3.2 INSTALLATION

A. Install fixtures, accessories and items in accordance with manufacturer's instructions.

B. Install true, plumb, and level, securely and rigidly anchored to substrate.

C. Use security type fasteners.

3.3 SCHEDULE OF ACCESSORIES

A. Locate as indicated on the drawings.

B. Surface mounted paper towel dispenser (P.T.D.)
   1. At locations under upper wall cabinets: Bradley 252
   2. At other locations: Bradley 250-15
   3. At recessed locations Bradley 229.

C. Soap Dispenser (S.D.)
   1. At wall mounted locations U.N.O.: Bradley 6542
   2. At deck mounted locations: Bradley 6324


G. Hook and Bumper (at toilet partition doors): Bradley 915.

H. Mirror: Framed, Bradley 781, 18" x 36" and 18" x 24". Framed with shelf, Bradley 7815, 42” x 36”.

I. Grab Bars: Bradley 8120 Series. Size as indicated on the drawings.

K. Feminine Napkin Vendor: Bradley 401.

L. Toilet Seat Cover Dispenser: Bradley 5831.

M. Mop Strip: Bradley 9954-36".

N. Tackboards: Claridge Series 700 Maple framed with Fabricork tack surface. Colors as selected by Engineer/Architect.
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 WORK INCLUDED
   A. Work under this section shall include furnishing all labor, materials, and equipment
      necessary for the complete installation of the air distribution system, all connected and
      ready for use.

1.3 STANDARDS
   A. Referenced Standards: Current publications of the Standards referred to by basic
      designation in Part 2 and Part 3 shall form a part of this specification to the extent
      indicated by references thereto.

1.4 SUBMITTALS
   A. Submit each item specified in this Section according to the Conditions of the Contract
      and per Section 013300.

   B. Submit product information for each item of equipment, component, or specialties
      required for each item of the air distribution system. Include construction material
      description, pressure and temperature classification, acoustical data, connection details,
      dimensions and required clearances, and installation instructions.

1.5 QUALITY ASSURANCE
   A. Single Source Responsibility: secure equipment and materials in a manner such that all
      components are the same throughout given manufacturer and quality.

PART 2 PRODUCTS

2.1 SHEET METAL MATERIALS
   A. General: Sheet metal materials specified hereinafter shall conform to the following
      material requirements.
   B. Galvanized Steel Sheets: Zinc-coated (galvanized) or zinc-iron alloy-coated
      (galvannealed) as specified, conforming ASTM A653.
   C. Galvanized Steel Hot-Dipped After Fabrication: Comply with requirements of ASTM
      A123.
E. Copper Sheets: ASTM B152, light cold-rolled temper.
F. Stainless Steel Sheets: Type 316L stainless steel, not to exceed 0.03% carbon, conforming to ASTM A240.

2.2 LOW PRESSURE DUCTWORK

G. General: This section applies to all supply ductwork from terminal units to outlet terminals, and all return air and exhaust air ductwork (except fume exhaust ducts).
H. Pressure and Seal Classification:
   1. Pressure and Seal classification shall be as defined in SMACNA 1995 HVAC/DCS.
   2. Supply duct from terminal units to outlets shall be 2" Pressure Class. Seal all transverse joints and longitudinal seams per Seal Class B.
   3. Ductwork upstream of any fire, smoke or combination fire/smoke damper conveying more than half of the total terminal airflow shall be 4" Pressure Class. Seal all transverse joints and longitudinal seams per Seal Class A.
   4. Return air and exhaust air ductwork shall be negative 2" Pressure Class, except ductwork from last volume damper to grille shall be negative 1" Pressure Class. Seal all transverse joints and longitudinal seams per Seal Class B.
   5. Exhaust air ductwork serving isolation rooms shall be negative 2" Pressure Class. Seal all transverse joints and longitudinal seams per Seal Class A.
   6. Seal all duct wall penetrations.
I. Construction: Metal gauges shall comply with SMACNA 1995 HVAC/DCS. Duct construction and reinforcements shall conform to the SMACNA 1995 HVAC/DCS including Addendum No. 1, 1997, SMACNA Duct Construction Standards and NFPA90A. Ducts shall not pulsate or vibrate when in operation. Steel sheet and strip used for duct and connectors shall be G60 coated galvanized steel of lockforming grade conforming to ASTM A653 and A294 standards.
J. Seams: Comply with SMACNA construction recommendations. Do not use standing seams for ducts other than plenums.
K. Transverse Joints: Transverse joints may be made with SMACNA T24 factory fabricated formed flanged mechanical joint, caulked or gasketed, installed in strict accordance with manufacturer's printed instruction and installation manuals.
   1. Manufacturer: Ductmate Industries, Inc. or approved.
L. Diagonal Creasing: Provide on all panels wider than 18". At Contractor's option, in place of diagonal creasing required for panels wider than 18", all such panels may have machine-formed transverse ribbed stiffening on 12" centers, provided such stiffening accomplishes stiffness and freedom from buckling or breathing, and does not lessen airtightness at seams and joints.
M. Elbows: Elbows on supply ducts; inside radius equal to maximum width of elbow. Elbows on exhaust ducts; inside radius 1/2 the duct width; 6" minimum.
N. Casing and Plenum Construction:
   2. Sheet metal for casings and plenums less than 10 feet height or width shall be 18-gauge galvanized steel. Casings and plenums 10 feet or greater width or
height shall be 16-gauge. In coil sections, humidifier sections, and outdoor intake plenums or ducts, sheet metal shall be G90 coated galvanized steel. Provide continuous 2"x2"x3/16" steel angle framing on 18" centers to support the sheet metal work. Fasten lapped type seams to framing on 4" centers or standing type seams to framing on 12" centers. Provide supplementary continuous 2"x2"x3/16" steel angle bracing on horizontal surfaces to prevent deformation under system operating and "upset" pressures. Fasten sheet metal to backup angle framing and bracing with No. 8 minimum size hardened steel sheet metal screws.

3. All casing on the suction side of the fan shall be 2" water gauge pressure classification. Casing on fan discharge shall be of the designated pressure class.

4. Seal all joints, seams, connections, and abutments to the building structure with joint sealant as specified below. Surfaces shall be suitably cleaned of oil, dust, dirt, rust, and moisture to receive sealant.

5. At sheet metal connections to building construction, use steel angles fastened to the sheet metal by sheet metal screws, attached using anchor bolts embedded in the wall or slab, with sealant under the angle, angles 2"x2"x3/16" minimum.

6. All welds on casing interiors shall be painted.

7. Close-off or safing sheets and strips shall be of G90 galvanized steel of thickness not less than that of the duct widths and shall be securely attached with all joints sealed. Close-off or safing sheets shall not be used for structural support of equipment.

8. Casings and plenums shall be constructed to withstand 133% of the rated pressure without structural failure. Wall and roof deflections at the rated pressure shall not exceed 1/8" per foot of width.

9. Pipe penetrations of casings and plenums shall be sealed to prevent air leakage and condensation movement through the seal.

10. Casings and plenums for negative pressures greater than 3" water gauge shall be constructed in accordance with SMACNA Rectangular Industrial Duct Construction Standards, 1980 Edition.

O. Joint Sealant: Fire retardant, high bonding type sealer, UL723/E84, Class I flame spread rating. Adhesive-backed cloth or metallic furnace tape will not be acceptable.

1. Manufacturer: Foster "Safetee Duct Sealant 32-17", Duct Mate Industries "Pro-Seal", or approved McGill Air Seal Corp. or Mon-Eco Industries.

P. Turning Vanes: Provide 90-degree non-adjustable, double wall galvanized steel, finned type air turning vanes at all square duct elbows. The double wall vanes shall conform to SMACNA 1995 HVAC/DCS Fig. 2-3 and 2-4, or at contractor’s option may be factory fabricated.

1. Manufacturer: Tuttle & Bailey "Ducturns," or approved.

Q. Test Ports: Provide instrument test holes with screw cap and gasket. Instrument test holes shall be attached to ducts with bolts. Seal around bolt head with duct sealant.
1. Manufacturer: Ventfabrics No. 699 or approved.

R. Stuffing Boxes: Provide airtight stuffing boxes at all penetrations of ducts, rubber grommets, Rubbercraft manufacturer, or equal.

S. Access Doors in Low Pressure Ducts:

1. Access panels and doors in ducts must be suitable for the duct pressure class used.
2. Access doors and panels in ducts shall conform to SMACNA 1995 HVAC/DCS, Fig. 2-10. Provide insulated panels and doors in insulated ducts.
3. Doors and panels shall be closed cell neoprene sponge rubber gasketed. Insulated doors shall be double wall construction and double gasketed.
4. Access doors 18" x 18" and smaller shall be equipped with zinc plated continuous hinge and two zinc-plated sash type latches. Latches shall have sponge rubber gasketing on both side of door.
5. Hinges shall be butt type fabricated from heavy-duty zinc plated steel. Latches shall be fabricated from a non-corrosive alloy of aluminum and zinc. Latches shall have lever handle and stud to accommodate door thickness with inside beveled flange to work against door frame to give compression. Latch escutcheon shall be sponge rubber gasketed.

T. Access Doors in Casings and Plenums:

1. Construct in accordance with SMACNA 1995 HVAC/DCS, Fig. 6-12 for casings containing fans, coils, filters, etc. Doors shall be double-wall insulated type and shall be equipped with three heavy duty zinc plated steel strap type T-hinges and two heavy duty zinc plated steel latches with lever handle on outside and inside.
2. Door shall be double gasketed.
3. Latches shall have lever handle and stud to accommodate door thickness with inside beveled flange to work against door frame to give compression. Latch escutcheon shall be sponge rubber gasketed.
4. Walk-in access doors in casing and plenum walls shall be minimum 20" x 72" size.

1.6 ALUMINUM DUCTWORK

A. General: Provide aluminum ductwork for high humidity applications such as clothes dryer vents or corrosive areas, where specified and or shown. Aluminum sheet material shall be alloy 3003-H14 of lock forming grade unless otherwise specified. Provide dielectric isolation between aluminum duct and steel.

B. Rectangular Ductwork: Aluminum ductwork shall be 2" pressure class and shall comply with the requirements of low pressure galvanized steel ductwork. Thickness adjustments of aluminum, including dimension adjustments and reinforcements needed to meet the construction requirement thickness of steel ducts, shall comply with SMACNA 1995 HVAC/DCS, Article 1.12.1, “Conversion of Steel Tables to Aluminum”.

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C. Round Ductwork: Construction of aluminum duct and fittings shall otherwise correspond in the same relationship as for steel duct. Conform to SMACNA 1995 HVAC/DCS, Table 3-3, “Aluminum Round Duct Gage Schedule”. Aluminum fasteners shall be used. Structural members shall be alloy 6061-T6 or galvanized steel as related in SMACNA Table 1-16 for rectangular duct. Hangers in contact with the duct shall be galvanized steel or aluminum.

D. Exhaust air ductwork shall be negative 2” Pressure Class. Seal all transverse joints and longitudinal seams per Seal Class B. Seal all joints with a positive air- and watertight sealant.

1.7 FLEXIBLE DUCT

A. General: Flexible duct, including connectors, shall comply with UL181, Class I, and NFPA 90A and shall have acoustical performance acceptable to the Engineer. Duct shall be used for connections between rigid duct and outlets. Duct shall not be more than 6’ long, containing a net 90-degree of bends for acoustical reasons, and without intermediate joints. Installed duct shall not erode, delaminate or impart loose fibers or odors into the air stream. Internal working pressure shall be 6"w.g. positive and 4"w.g. negative.

B. Materials: Flexible duct assembly shall consist of a strong and puncture resistant polymer inner liner and a high strength duct wall, mechanically locked together with a corrosive resistant galvanized helix to form a solid performing UL-181, Class 1 flexible duct, without the use of glue or adhesives.

C. Insulation and Vapor Barrier: The factory-fabricated flexible duct shall have blanket-type insulation, having a C Factor of not more than 0.23. The insulation shall be sheathed with a vapor barrier having a maximum permeability of 0.05 perm per ASTM E96, Procedure A. The vapor barrier jacket on the flexible duct shall be sealed to vapor barrier on the connecting sheet metal ducts. Joints shall be airtight slip joints sealed and secured with a clamp.

D. Clamps: 175-lb test 6/6 nylon locking draw band at each end.


E. Test reports from an independent laboratory showing that flexible ducts meet the performance specifications stated below. If manufacturer other than that specified is submitted, provide acoustical performance ratings for each size flexible duct. Acoustical performance testing shall be performed by an independent laboratory. The specified insertion loss and radiated noise reduction of flexible duct should be met when tested with a 10 foot length of straight duct at 2,500 feet per minute velocity.
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<th>G. INSERTION LOSS (dB)</th>
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TVCE HVAC 232000-6
### Manufacturers

Manufacturer: Flexmaster U.S.A., Inc. Type 8M or approved.

### 1.8 FIRE DAMPERS

A. Provide all fusible link fire dampers, each with frame and through-wall or through-floor sleeve, at locations shown on the drawings.

B. Fire Dampers in Rectangular Ducts: Factory-fabricated dampers, in all cases, not Contractor fabricated; metal curtain folding-blade type. No horizontal damper mullions or head boxes allowed across ducts. Provide lifting accessories and attachments where curtain blades exceed 40 lbs. weight. All dampers shall be UL Classified, with UL label.

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for 1-1/2 hr. fire resistance rating in accordance with UL Standard 555 and California State Fire Marshal Listing A3225.206:014. Clear opening inside duct shall be 90%.

1. Manufacturer: Air Balance, Inc. Model 119B, or approved Airstream, Ruskin, American Warming and Ventilating, Cesco, Vent Products, or Greenheck.

C. Fire Dampers in Round and Flat Oval Ducts: Provide the fire dampers for low pressure (2” w.g. maximum) duct systems. Dampers shall be factory-fabricated, metal curtain folding-blade type. No horizontal damper mullions or head boxes allowed across ducts. Damper shall be provided with collar for connection to duct and breakaway connection at housing. All dampers shall be UL Classified, with UL label for 1-1/2 hr. fire resistance rating in accordance with UL Standard 555 and California State Fire Marshal Listing A3225.206:014. Clear opening inside duct shall be 100%.

1. Manufacturer: Air Balance, Inc. Model 119B, or approved Airstream, Ruskin, American Warming and Ventilating, Cesco, Vent Products, or Greenheck.

D. Construction: Comply with construction requirements in local building code and NFPA 90A. Made of steel with replaceable UL Listed 165°F fusible link. Blades 22-gauge steel with interlocking joints.

E. Sleeves or casings shall extend through wall or slab; shall be made by Contractor if not integral with dampers as factory made; 10-gauge minimum steel; with attachment lugs or straps; anchored to wall or slab independently of ductwork; slip fit to ducts; tightly fitted and sealed with mastic as specified for sealing of joints between filters and fan; riveted on 6” centers.

F. Free Area Inside Sleeves and Within Damper Stop: 90% minimum of area of connecting duct; increase size as required, above size of connected duct, to maintain this free area.

1.9 COMBINATION FIRE-SMOKE DAMPERS

A. Provide combination fire smoke dampers in smoke partitions where shown on the drawings.

B. Dampers shall be UL Classified for use for use in fire partitions with fire resistance ratings of 1-1/2 hours in accordance with UL Standard 555. UL Classified leakage-rated smoke dampers for use in smoke control systems shall be designed for Leakage Class I, and Temperature Class 350°F in accordance with UL Standard 555S. Installation must comply with the requirements of NFPA-90A and NFPA-92A. Dampers in ducts smaller than 12" x 12" shall be Leakage Class II.

1. Manufacturer: For rectangular ducts, Ruskin Model FSD60 or approved Greenheck or National Controlled Air.

2. Manufacturer: For round ducts, Ruskin Model FSDR25 or approved Greenheck or National Controlled Air.

C. Combination Fire Smoke Damper Construction:

1. Frame shall be a minimum of 16-gauge roll-formed galvanized steel hat shaped channel, reinforced at corners. Structurally equivalent to 13-gage U-channel frame.

2. The blades shall be opposed action, horizontal type, airfoil shaped single piece, double skin construction with minimum 14 gauge equivalent thickness, galvanized steel, maximum blade width of 6 inches.
3. Bearings shall be self-lubricating stainless steel sleeve turning in an extruded hole in the frame. Galvanized bearings are not acceptable.
4. Blade edge seals shall be silicone fiberglass material to maintain smoke leakage rating to a minimum of 450°F and galvanized steel for flame seal to 1900°F. Seal shall be mechanically locked to blade edge Adhesive or clip fastened seals not acceptable.
5. Jamb seals shall be stainless steel flexible metal, compression type.
6. Linkage shall be concealed in frame.
7. Axles shall be minimum ½” diameter plated steel, hex-shaped, mechanically attached to blade.
8. Manufacturer shall provide factory-assembled sleeve, silicone caulked to maintain leakage rating. Sleeve shall be 20-gauge for dampers through 84” wide. Minimum length shall be 17”.
9. Dampers shall have not less than 90% free area.
10. Dampers shall be provided with pre-punched mounting angles that are factory matched to the damper and shipped on the damper.

D. Electric Actuators: Appropriate electric actuators, two-position, 120 VAC, for tie in to smoke detection system shall be installed by the damper manufacturer at time of damper fabrication. Damper and actuator shall be supplied as a single entity that meets all applicable UL555 and UL555S qualifications for both dampers and actuators. Damper and actuator assembly shall be factory cycled 10 times to assure operation. Wiring from the damper motor to circuit in fire alarm control panel shall be by controls contractor, Section 15900.

E. Coordinate fire smoke damper electrical connection voltages with the electrical contractor prior to ordering.

F. Heat Closure: The fire/smoke damper shall include a heat-actuated release device to permit controlled closure through the actuator and shall be manually resettable after release.

G. Electric Controlled Closure: The fire/smoke damper shall include an EFL heat-actuated release device to permit controlled closure through the actuator and shall be automatic remote resettable after test, smoke detection, or power failure conditions.


1. Close (in a controlled manner) and lock damper during test, smoke detection, power failure, or fire conditions through actuator closure spring. At no time shall actuator disengage from damper blades.
2. Allow damper to be automatically and remotely reset after test or power failure conditions. After exposure to high temperature or fire, inspect damper before reset to ensure proper operation.
3. Controlled closing and locking of damper in 7 to 15 seconds to allow duct pressure to equalize. Instantaneous closure is not acceptable.
4. Release temperature shall be 165°F (212°F).

I. Blade Positioner Indicator: Each damper shall be equipped with and end switch package that includes two position indicator switches linked directly to the damper to remotely indicate damper blade position.

1. Manufacturer: Ruskin SP100.
J. Duct Smoke Detector: The fire/smoke damper shall be provided with a photoelectronic type smoke detector mounted on the outside of the sleeve with a sensing tube that traverses the air stream. Detector shall be factory-mounted for a single-point electrical service connection.

1. Manufacturer: Ruskin Model DSDF.

1.10 VOLUME DAMPERS AND QUADRANTS, LOW PRESSURE DUCTS

A. General: Provide dampers and quadrants in ductwork as required to balance the systems to produce the air quantities shown.

B. Dampers are not shown generally. Provide a damper in the duct to each supply and exhaust opening, except ducts at outlet of any terminal unit which serves a single diffuser; also in each branch duct where the pressure loss is lower than other branch ducts leading from the same trunk duct; elsewhere as shown.

C. Location of Dampers: At a point where the duct is accessible, if possible; axis of the blade the long dimension, as far from the outlet as possible.

D. Acoustic Performance: Dampers shall be free from any sharp edges that would produce excessive turbulence, which would prevent obtaining the acoustic performance in the rooms served, as specified hereinbefore.

E. Edges of Blades: Both leading and leaving edges hemmed; side edges flanged 1/2"; placed so air strikes the smooth face.

F. Damper Blades: For ducts smaller than 10" maximum cross-section, 24-gauge; 11" to 30", 22-gauge; larger than 30", 20-gauge; in ducts wider than 12", multiple blade, maximum blade width 12", arranged so that adjacent blades rotate in alternate directions; where length exceeds 30", use a 3/8" square rod stem fitted in a crease in the blade.

G. Quadrants, in General:

1. Maximum Dimension of Blades 10" or Less: Quadrant with dial regulator and locking nuts, round end spring-in bearing, and square end damper bearing.
   a. Manufacturer: Duro-Dyne Series KS or approved Ventfabrics.

2. Maximum Dimension of Blades 11" to 20": Quadrant with dial regulator and locking nut, round end spring-in bearing, and square end bearing.
   a. Manufacturer: Duro-Dyne Series KSR or approved Ventfabrics.

3. Maximum Dimension of Blades over 20": Locking quadrant and 1/2" square rod with damper bearings.
   a. Manufacturer: Duro-Dyne Series KS-12 "Shaft-Loc" or approved Ventfabrics.

H. Quadrants for Dampers in Ducts Concealed Behind Walls and Above Non-Removable Ceilings: Damper regulator shall be cast into a box for flush mounting in ceilings. Cover telescopes into base to allow for expansion. Cover shall be secured by two screws to facilitate removal for adjustment of the damper. The regulator shall be made to accommodate 3/8" and 1/2" square rod. The cover shall be prime coated for field painting or chrome plated as approved by Engineer.

   1. Manufacturer: Ventfabrics No. 666, or Young Regulator No. 301.

I. Damper Positions: Contractor shall set and lock all dampers in the "Full Open" position prior to balancing work. See additional requirements specified in Section 15950, "Testing, Adjusting, and Balancing".
1.11 BACKDRAFT DAMPERS:

A. Backdraft Dampers:

1. Provide backdraft dampers at all fans exhausting to atmosphere that are not specified to have automatic dampers and elsewhere as shown.
2. Backdraft dampers shall be adjustable, counterbalanced low leakage type backdraft damper with extruded vinyl seals.
3. Frame shall be 0.125" thick extruded aluminum with 0.070" thick aluminum blades, molded synthetic bearings; 1/2" tie bar linkage, mill finish assembly.
4. Counterbalances shall be on rear of blades for weather resistance.
5. Damper shall withstand 3" water gauge pressure differential with 17.5 cfm/sf leakage measured on 24" wide damper.
6. Access panel shall be provided in ductwork as required to access and adjust counterbalances.
7. Backdraft Dampers in Fume Exhaust Fans: Heavy-gauge Type 316L stainless steel.
8. Manufacturer: Ruskin Model CBD6 or approved American Warming & Ventilating, Air Balance, Inc., Cesco, Greenheck, Pacific Air Products, or Vent Products, Inc.
9. The composite panel assembly shall have minimum absorption coefficients when tested in accordance with ASTM C423-90a.

1.12 ROOF DRYER VENT CAP

A. General: Provide aluminum or galvanized steel dryer vent cap suitable to roof top installation. Vent cap shall include mounting curb and flashing. Vent cap shall not have a bird or bug screen.

1.13 CEILING SUPPLY DIFFUSERS

A. General: Diffusers shall be sizes and mounting types shown on drawings and as scheduled.
B. Square Face Modular Core Adjustable Diffusers:

1. 1, 2, 3, or 4-way adjustable discharge pattern, steel construction, square or rectangular neck.
2. Back pan shall be one-piece stamped heavy gauge steel. Diffuser neck shall have 1-inch minimum depth to facilitate duct connection.
3. Diffuser core shall consist of fixed louver directional modules, which can be easily repositioned without tools in the field for 1, 2, 3, or 4-way discharge. Each module shall be easily removable to adjust the dampers in neck of the diffuser.
4. Manufacturer: Titus Model MCD, Anemostat RMD, Krueger 1240, Price MCD or approved Metalaire.

1.14 GRILLES AND REGISTERS

A. General:
1. Grilles and registers shall be sizes and mounting types shown on drawings and as scheduled.

B. Steel High-Throw Supply Grilles:
1. Grilles shall be single deflection type. Deflection blades shall be parallel to the long dimension of the grille or register.
2. Grilles shall be steel construction with a 1-1/4" wide border on all sides. Screw holes shall be countersunk. Corners shall be welded with full penetration resistance welds.
3. Deflection blades shall be contoured, spaced on 3/4" centers, with steel friction pivots on both ends to allow individual blade adjustment without loosening or rattling. Plastic blade pivots are not acceptable.
4. Manufacturer:
   a. Single deflection, blades parallel to long dimension: Titus Model 271RL or approved Carnes, Krueger, or Metalaire.

C. Steel Return and Exhaust Grilles:
1. Grilles shall have fixed deflection blades shall be parallel to the long dimension of the grille or register.
2. Grilles shall be steel construction with a 1-1/4" wide border on all sides, having a minimum thickness of 20-gauge. Screw holes shall be countersunk. Corners shall be welded with full penetration resistance welds with a reinforcing steel patch for extra strength.
3. Blades shall have a formed curvature, laboratory tested and certified for performance. Blades shall be 20-gauge minimum construction. Fixed deflection angle shall be 35° as indicated or specified.
4. Where indicated, opposed blade dampers shall be provided, constructed of heavy gauge steel. Damper shall be operable from the face of the grille.
5. Borders of grilles shall be suitable for installation surface and materials. Border type shall be surface mount, snap-in, lay-in, spline, or channel frame type as indicated or required by Engineerural drawings. Verify border requirements.
6. Manufacturer:
   a. 35° Deflection, 3/4" Spacing, Blades Parallel to Long Dimension: Titus Model 350RL, or approved Metalaire, Anemostat, or Price.

D. Perforated Return Grilles:
1. Return diffusers shall be flush square or rectangular face, steel, or aluminum construction as selected.
2. Grilles shall have a perforated face with 3/16" diameter holes on 1/4" staggered centers and no less than 51% free area.
3. The return panels shall be provided in the sizes and mounting type as indicated.
4. Manufacturer:
   a. Steel Return Panels: Titus Model 8R or 8F or approved Metalaire.

1.15 DIFFUSER ACCESSORIES
A. Equalizing Grids: Provide for each diffuser; with individually adjustable blades, installed with top flush with bottom of supply duct, beaded edge facing air stream, blades at 90° angle to the air stream.

1. Manufacturer:
   a. Grids for round neck: Titus Model EG, Krueger RSG15, Anemostat ED, Carnes KXYA, or Price EQ.
   b. Grids for square or rectangular necks: Titus Model EGS or EGL, Krueger SSG, Anemostat DED, Carnes KXEA, or Price EGL.

B. Volume Extractors: Volume extractors shall be gang operated parallel vanes, fully adjustable from open to closed. The vane shall be type that minimizes pressure and turbulence and shall provide uniform air distribution across the stub duct or diffuser neck.

1. Manufacturer:
   a. Volume extractors with vanes at 1" spacing: Titus Model AG-45, Krueger EX8, Anemostat DT, Carnes NA, or Price AE1.

C. Volume Dampers:

1. Opposed Blade Dampers for Round Necks: Gang operated opposed blades, for round necks, in multiple sets of blades, easily adjustable from face of diffuser.
   a. Manufacturer: Titus Model AG-75, Krueger R10, Carnes KXRA, or Price VCR7.

2. Butterfly Dampers for Round Necks:
   a. Manufacturer: Titus Model AG-85, Krueger R12, or Price VCR8.

3. Opposed Blade Steel Dampers for Square or Rectangular Necks:

4. Opposed Blade Aluminum Dampers for Square or Rectangular Necks:
   a. Manufacturer: Titus Model AG-35-AA.

5. Opposed blade steel dampers for square neck louvered or perforated face diffusers:
   a. Manufacturer: Titus Model AG-95, Krueger OBD, Anemostat DOB, Carnes KXLA, or Price VC8E.

6. Opposed blade aluminum dampers for square neck louvered or perforated face diffusers:
   a. Manufacturer: Titus Model AG-95-AA.

D. Turning Vanes:

1. Fixed turning vanes shall be provided at square or rectangular neck diffusers. Fixed turning vanes shall deflect the air in a curved path with minimum pressure drop. Vanes shall provide uniform air across the stub duct or diffuser neck. Vanes shall be capable of manual adjustment and shall lock into position at the desired angle with adjusting wires under screw heads.

2. Manufacturer: Titus Model TV, or approved.
E. Blanked-Off Sections: Blank off quadrants of the diffuser neck where shown and wherever else required to prevent downdrafts from adjacent light fixtures, columns, walls, etc. Provide at locations as required by the air balancing technicians. Blank-off material shall be galvanized sheet metal, painted black.

1.16 AIR FILTERS

A. Disposable Type Air Filters:

1. General: Provide the air filters, complete with filter cartridges and holding frames. Filter banks shall be field erected, size and arrangement as shown on the drawings. Filters shall be rated in resistance to airflow, arrestance, efficiency and dust-holding capacity. Each filter shall be provided with an identification plate, visibly mounted after construction showing serial number, model number and all other data necessary for ordering renewable media.

2. Filter Media: Nonwoven cotton fabric type, reinforced by a woven scrim backing. Synthetic media material (polyester) is not acceptable. The filter media shall have an average efficiency of 25% to 30% on ASHRAE Test Standard 52.1-92. Media shall have an average synthetic dust arrestance of 90-93% in accordance with ASHRAE Test Standard 52.1-92. Filters shall be UL Class 2.

3. Effective Filter Media (2" Thick): The effective filter media for the 2" thick filters shall be not less than 3.3 sq. ft. of media per 1.0 sq. ft. of filter face area and shall contain not less than 10 pleats per linear foot. Initial resistance at 500 fpm approach velocity shall not exceed 0.28" w.g.

4. Effective Filter Media (1" Thick): The effective filter media for the 1" thick filters shall be not less than 2.5 sq. ft. of media per 1.0 sq. ft. of filter face area and shall contain not less than 16 pleats per linear foot. Initial resistance at 500 fpm approach velocity shall not exceed 0.36" w.g.

5. Media Support: Media support shall consist of a welded wire grid, effective open area of not less than 96%. Grid shall be bonded to filter media for rigidity.

6. Enclosing Frame: Frame enclosing the air filter shall be constructed of rigid, heavy-duty beverage board with diagonal support members bonded to the air entering and an exit side of each pleat, to ensure pleat stability. The inside periphery of the enclosing frame shall be bonded to the filter pack so as to eliminate air bypass.

7. Holding Frames: Holding frames, Flanders or Farr Type 8, factory fabricated of 16-gauge galvanized steel, equipped with gaskets and four spring-type positive sealing fasteners. Fasteners shall be capable of being attached or removed without the use of tools.

8. Manufacturer: Farr Company Type 30/30, Flanders Airpure, approved American Air Filter.

1.17 LOUVERS

A. General: Provide the fixed louvers in exterior walls not connected to ductwork at locations shown on the drawings. Provide caulking for weatherproof installation.
B. Construction and Type: Louver blades and frames, aluminum extrusions, 0.081" minimum thickness. Blades shall be accurately fitted and firmly secured to frame. Screens, installed on the interior side, extruded aluminum "U" frame with 1/2" mesh 0.063" diameter aluminum wire. Provide medium bronze anodized type finish as per Engineerural.

C. Performance Criteria: Stationary louvers shall pass 975 fpm free area velocity with less than .18" of water gauge pressure drop and shall carry less than .02 oz. of water per square foot during a 15 minute period when tested in accordance with AMCA Standard 500, test criteria, based on 48" square sample. Louvers shall bear AMCA Certified Ratings seal for both air performance and water penetration.

D. Manufacturer: Ruskin ELF375DX, American Warming and Ventilating Co., AWV Model LE-31, Louvers and Dampers Model IEL-6-304, Airolite Model K6776, or Construction Specialties Model A6157.

PART 2 EXECUTION

2.1 INSTALLATION—DUCTS

A. General: The installation of the air ducts shall conform to NFPA 90A and SMACNA 1995 HVAC Duct Construction Standards. Mounting and supporting of ducts, equipment, accessories and appurtenances shall be provided, including but not limited to structural supports, hangers, vibration isolators, stands, clamps and brackets, access doors and dampers.

B. Installation of Ductwork: Elbows, vaned elbows, take-offs, branch connections, transitions, splitters, duct volume dampers, flexible connectors, and access doors shall conform to SMACNA. Ductwork shall be installed so that its operation shall be free of chatter and vibration. Ductwork shall be airtight so that no dust marks from air leaks will show at connections or outlets. Electric isolation shall be provided between dissimilar metals for the purpose of minimizing galvanic corrosion.

C. Field Changes to Ductwork: Changes such as those required to suit the size of factory-fabricated equipment actually furnished shall be designed to minimize losses in pressure and performance due to sudden expansion and contraction. Transitions shall be used in field changes as well as modifications to connecting ducts.

D. Offsets in Ductwork: All offsets necessary in ductwork are not shown on the drawings. Provide all offsets required without additional cost to the Owner. Offset angles to be as small as possible.

E. Routing of Ductwork: Route ductwork above suspended ceilings to avoid contact with all support and framing for the ceiling suspension system.

1. Route ducts to avoid passing through transformer vaults and electrical equipment spaces and enclosures.

F. Duct Sizes: Sizes shown refer to clear dimensions inside acoustical lining.

G. Install ducts with a clearance of 1 inch plus allowance for insulation thickness.

H. Paint interiors of ducts that do not have duct liner, for 24 inches upstream and of registers and grilles. Apply one coat of flat black latex finish coat over a compatible galvanized-steel primer. Paint materials and application requirements are specified in Division 9 painting Sections.
I. Joint Sealing: Seal the longitudinal and transverse joints of all supply, exhaust and recirculated air ducts to meet requirements of SMACNA, Seal Class specified in Part 2 of this Section.

J. Duct Connections:
   1. Connections to Diffusers: The duct connecting to the diffuser shall be the same size as diffuser neck, tightly fitted to the diffuser neck.
   2. Connections to Variable Volume and Constant Volume Terminals: Size of individual branch duct connections to terminals shall be the same size as inlet of the units, except no branch duct shall be smaller than 6" diameter, unless otherwise indicated. Duct connection at the unit inlet shall be straight, without offsets for a minimum length of five duct diameters.
   3. Connections to Canopy-Type Hoods: Make up the pocket slip transverse seams, with longitudinal seams only on top of horizontal ducts. Use fire-retardant waterproof mastic in closing all seams in the sides and bottom, to make watertight. Pitch duct back to hood.
   4. Coil Installation in Ducts: Provide sheet metal closures all around the coils, within the ducts; seal with fire-retardant waterproof mastic for airtight closure.
   5. Branch Connections to Terminal Units: Size of individual branch duct connections to reheat units shall be the same size as inlet of the units, except no branch duct shall be smaller than 6" diameter, unless otherwise indicated.

K. Flashings: Where ducts pass through exterior building walls and roofs, flashings shall be provided and shall be made waterproofed. Unless otherwise indicated, flashing shall conform to Division 7.

2.2 HANGERS FOR DUCTWORK

A. General: Provide hangers, supports and anchor bolts for all sheet metal ducts and equipment. Comply with the requirements of SMACNA and Uniform Mechanical Code. Duct sizes referred to in following paragraphs refer to maximum cross-section dimension at location of hangers.

B. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural steel fasteners appropriate for construction materials to which hangers are being attached.
   1. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches thick.
   2. Exception: Do not use powder-actuated concrete fasteners for lightweight-concrete or for slabs less than 4 inches thick.

C. Horizontal Round Ducts:
   1. Ducts 10" and Smaller: 1" wide strap, same gage as duct, secured to duct and extended to slab.
   2. Ducts 11" Through 20": 1" wide strap, same gage as duct, tied to 1" galvanized steel band around duct and extended to slab.
   3. Ducts over 20": Use trapeze-type supports.
   4. Spacing: 10'-0" center maximum; additional hangers at equipment.

D. Horizontal Rectangular Ducts:
1. Ducts 24" and Smaller: 1" wide 18-gauge strap secured to top side and bottom of duct and extended to slab.
2. Ducts 25" Through 30": 1" wide by 1/8" strap, secured to top side and bottom of duct and extended to slab.
3. Ducts over 30": Use trapeze-type supports.
4. Spacing: 10'-0" center maximum; additional hangers at equipment.

E. Trapeze-Type Supports for Horizontal Ducts:
   1. Ducts 30" and Smaller: 1-1/2" x 1-1/2" x 1/8" horizontal support angles. Hangers to be 1/4" round rod or 1" x 1" x 1/8" angle.
   2. Ducts 30" Through 42": 2" x 2" x 1/8" horizontal support angles. Hangers to be 1/4" round rod or 1" x 1" x 1/8" angle.
   3. Ducts 42" Through 54": 2" x 2" x 1/8" horizontal support angles. Hangers to be 5/16" round rod or 1" x 1" x 1/8" angle.
   4. Ducts 55" Through 78": 2" x 2" x 1/8" horizontal support angles. Hangers to be 3/8" round rod or 1" x 1" x 1/8" angle.
   5. Ducts over 78": Obtain A/E approval for duct supports.
   6. Spacing: 8'-0" center maximum; additional hangers at equipment.

F. Install ducts with hangers and braces designed to withstand, without damage to equipment, seismic force required by applicable building codes. Refer to

G. Hangers Installed in Corrosive Atmospheres: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc chromate primer after installation.

H. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws, compatible with duct materials.

I. Spring-Type Vibration Isolators: Provide in each hanger, for discharge ductwork from each air handler or supply fan, for a distance of 50 feet. Hangers shall be Mason Type HS.

J. Attachment of Hangers: As specified in Section 15050, "Basic Materials and Methods".

K. Non-Metallic Flexible Ducts:
   1. Provide 2" wide sheet metal or "Saddle-Strap" non-metallic strap hangers maximum 4 feet on center.
   2. Maximum permissible sag is 1/2" per foot of spacing.
   3. Hangers shall be adequately attached to the building structure. Do not attach hangers to piping, ducts or conduit.

L. Support of Constant Volume and Variable Volume Units: Rod hangers to inserts in slab; minimum four per unit.

2.3 INSTALLATION—DUCT ACCESSORIES

A. General: Turning vanes, extractors, splitters, duct volume dampers, flexible connectors, access panels and doors, and test holes shall conform to SMACNA 1995 Duct Construction Standards.

B. Access Panels and Doors: Provide access panels or doors at each fire damper, control damper, combination smoke/fire damper, air balancing damper, wherever equipment is installed for servicing and maintenance, at duct-mounted detectors, at upstream and downstream side of duct-mounted coils, elsewhere as shown. Installation shall be tight fitting, hinged with latch, sized as required for access, in compliance with SMACNA.
Unless otherwise indicated, doors shall swing so that fan pressure or suction holds the door closed.

C. Access Handholes: Provide in ducts as necessary to reach fire dampers and to replace fusible links; minimum size 6"x12"; 12"x16" minimum where necessary to partly enter duct to reset damper and to reach and replace fusible link. Gasketed; attached by sheet metal screws, spacing 6" on centers maximum.

D. Instrument Test Holes: Provide in ductwork and plenums or casings at inlet and discharge side of fans, filters, coils, pressure reducing dampers, terminal reheat boxes, variable air volume boxes and elsewhere as required for static pressure readings. Each test hole shall be fitted with an instrument adapter. Provide one such test hole for ducts up to 24", two for ducts 25" to 40", three for ducts 41" and larger; uniformly spaced. Provide additional locations as directed by persons performing balancing work and approved by Engineer before installation. Omit test holes adjacent to air measuring devices.

2.4 INSTALLATION—COMBINATION FIRE/SMOKE DAMPERS

A. Inspect areas to receive dampers. Notify A/E of conditions that would adversely affect the installation or subsequent utilization of the dampers. Do not proceed with installation until unsatisfactory conditions are corrected.

B. Install dampers at locations indicated on the drawings and in accordance with manufacturer's UL approved installation instructions.

C. Dampers must be accessible to allow inspection, adjustment, and replacement of components. The installing contractor shall furnish any access doors in ductwork or plenums required to provide this access. The general contractor shall furnish any access doors required in walls, ceilings, or other general building construction.

D. The combination fire/smoke dampers are specified to have not less than 90% free area. Provide suitable duct transitions to accommodate damper collar size. Duct transitions shall comply with SMACNA 1995 HVAC/DCS.

E. Install dampers square and free from racking, with blades running horizontally.

F. Do not compress or stretch damper frame into duct or opening.

G. Handle damper using sleeve or frame. Do not lift damper using blades, actuator, or jackshaft.

H. Install bracing for multiple section assemblies to support assembly weight and to hold against system pressure. Install bracing as needed.

I. Contractor shall locate dampers on "as-built" drawings.

2.5 INSTALLATION—MOTORIZED DAMPERS

A. Install all motorized dampers furnished by control contractor. At installation at building wall openings, provide a perimeter steel angle or channel support frame, bolted to the damper assembly frame and bolted to the building surface with compressible glass fiber to make a tight, rigid connection. Dampers in ductwork and in plenums shall be provided with sheet metal closures all around the dampers frame, including mullions. Seal perimeter of damper frame closures with fire-retardant mastic for airtight closure. Construction and airtightness must be suitable for duct pressure class used. Multiple damper sections shall be bolted together and reinforced at joints with steel angles or
channel mullions. Shop drawings for all motorized damper installations shall be submitted for approval.

2.6 INSTALLATION OF SOUND LINER IN DUCTS

A. General: Material shall be installed in strict accordance with the manufacturer's recommendations.

B. Fiberglass Liner:

1. Edge Treatment: The edges of all acoustical lining shall be sealed with two coats of approved fire-retardant sealer before securing to the duct. Entire coated surface shall be thoroughly cleaned with a vacuum cleaner to remove all particles of glass fiber from the coated surface. Extreme care shall be taken not to crush or damage the coated surface. Any damaged lining shall be replaced.

2. Method of Fastening: Install in strict accordance with manufacturer's recommendations. Material shall be cemented to the duct using Benjamin Foster Fire Retardant Adhesive. Lining on vertical or upper horizontal surfaces shall be fastened in addition to cementing; using one stove bolt or metal clip with larger washer for each 2 square feet of area. Cut bolt or clip pin flush with face of insulation.

2.7 INSTALLATION—DIFFUSERS AND GRILLES

A. Diffusers and Grilles: Install in accordance with the details and notes indicated and the recommendations and printed instructions of the manufacturer for each item.

B. Sizes: Diffuser and grille sizes marked on the drawings refer to the neck size.

C. Exhaust Grilles in Rooms with Showers: As specified for exhaust grilles in general, except all aluminum construction.

D. Frames and Borders:

1. Diffusers and grilles shall have border or margins for tight fit to ceilings for optimum ceiling appearance, designed to cover ceiling openings and minimize dirt development on ceiling. All diffusers and grilles shall be provided with duct rings secured to diffuser or grille outer shell with concealed fasteners.

2. Diffusers and Grilles in Plaster Ceilings: Provide plaster rings as required for diffuser or grille installation.

3. Square Diffusers and Grilles for Exposed "Tee" Grid Ceilings: Square diffusers and grilles that fit well within the framing grid shall be flanged. Where dimension corresponds to the grid dimension, diffuser or grille shall be the same pattern as specified above except margins shall be 5/8" wide with outside dimensions for "lay-in" installation in the standard tee spacing required by the Engineerural drawings. Large diffuser or grille size shown on the mechanical drawings in T & T grid ceilings are nominal outside dimensions rather than the normal "listed" diffuser frame size. Diffusers and grilles are shown in their approximate desired location, but exact location must be compatible with the ceiling system, lighting fixtures, speakers, etc. Coordinate the diffuser and grille locations with the ceiling system subcontractor during preparation of the reflected ceiling plans and prior to the submission of the reflected ceiling plans to the Engineer for approval. No
extra payment will be allowed if diffuser connections or duct arrangements must be altered from that shown on the drawings to connect the diffusers and grilles in their final approved location.

E. Structural Supports: When very large diffusers are installed, sufficient structural support shall be provided to prevent sagging or distortion of the unit. Provide restraining cables to prevent diffuser from being dislodged from the ceiling.

F. Where certain diffuser housings are provided with earthquake tabs, the diffuser shall be secured to the structure.

2.8 INSTALLATION—AIR FILTERS

A. Spare Filters: Two complete sets of spare shall be provided for use during the construction and testing and balancing period. A complete set of new filters shall be installed after testing and balancing.

2.9 TESTING

A. Air Supply and Distribution Systems: The air supply and distribution system and its components shall be given an operational test, duration not less than four hours.

B. Leakage Testing of Ductwork: Perform the following field tests and inspections according to SMACNA "HVAC Air Duct Leakage Test Manual" and prepare test reports:
   1. Disassemble, reassemble, and seal segments of systems to accommodate leakage testing and for compliance with test requirements.
   2. Conduct tests at static pressures equal to maximum design pressure of system or section being tested. If pressure classes are not indicated, test entire system at maximum system design pressure. Do not pressurize systems above maximum design operating pressure. Give seven days advance notice for testing.
   3. Maximum Allowable Leakage: Comply with requirements for Leakage Class 3 for round ducts. Leakage Class 12 for rectangular ducts in pressure classes lower than and equal to 2-inch w.g. (500 Pa) (both positive and negative pressures), and Leakage Class 6 for pressure classes from 2-inch to 10-inch w.g. (500 to 2500 Pa).
   4. Remake leaking joints and retest until leakage is equal to or less than minimum allowable.

C. Combination Fire Smoke Damper Tests: After installation, all combination fire smoke dampers shall be tested to prove correct installation and that damper blades move freely within the confines of the damper frame and do not slip on their shafts. Contractor shall submit a signed statement certifying all dampers to be operational.

2.10 DUCT CLEANING – NEW SYSTEMS

A. General: Prior to air balancing, thoroughly clean all ductwork in all systems from exterior louvers to room outlets, including plenums, fans, coils, variable volume terminals, constant volume terminals, air handlers, etc.

B. Mark position of dampers and air-directional mechanical devices before cleaning, and perform cleaning before balancing.

C. Use service openings, as required, for physical and mechanical entry and for inspection.
1. Create other openings to comply with duct standards.
2. Disconnect flexible ducts as needed for cleaning and inspection.
3. Remove and reinstall ceiling sections to gain access during the cleaning process.

D. Vent vacuuming systems to the outside. Include filtration to contain debris removed from HVAC systems, and locate exhaust down wind and away from air intakes and other points of entry into building.

E. Clean the following metal duct systems by removing surface contaminants and deposits:
   1. Air outlets and inlets (diffusers, grilles, and diffusers).
   2. Supply, return, and exhaust fans including fan housings plenums (except ceiling supply and return plenums), scrolls, blades or vanes, shafts, baffles, dampers, and drive assemblies.
   3. Air-handling unit internal surfaces and components including mixing box, coil section. Condensate drain pans, humidifiers, filters and filter sections, and condensate collectors and drains.
   5. Return-air ducts, dampers, and actuators except in ceiling plenums and mechanical equipment rooms.

F. Mechanical Cleaning Methodology:
   1. Clean metal duct systems using mechanical cleaning methods that extract contaminants from within duct systems and remove contaminants from building.
   2. Use vacuum-collection devices that are operated continuously during cleaning. Connect vacuum device to downstream end of duct sections so areas being cleaned are under negative pressure.
   3. Use mechanical agitation to dislodge debris adhered to interior duct surfaces without damaging integrity of metal ducts or duct accessories.
   4. Clean coils and coil drain pans according to NADCA 1992. Keep drain pan operational. Rinse coils with clean water to remove latent residues and cleaning materials; comb and straighten fins.

G. Cleanliness Verification:
   1. Visually inspect metal ducts for contaminants.
   2. Where contaminants are discovered, re-clean and re-inspect ducts.

2.11 ELECTRICAL WORK

A. General: Electric motor-driven equipment specified in this section shall be provided complete with motors and controls. Electric equipment and wiring shall comply with requirements of NFPA 70 and Division 16, "Electrical Work".

B. Starters: Motor starters and disconnects, unless otherwise specified or indicated shall be furnished and installed by Division 16 Contractor.

2.12 COMMISSIONING

A. Notify the Commissioning Agent one week prior to start up of equipment.
B. Submit to the Commissioning Agent a Verification of Completion form with the pre-functional check off sheet for each component when it is ready for functional testing.
C. Assist the Commissioning Agent as required to perform the functional testing on the system components and the system as a whole.

END OF SECTION 232000
PART 1   GENERAL

1.1 OUTLINE OF WORK

A. Scope: The work under this division includes furnishing all materials, equipment, labor, supervision, tools and items necessary for the construction, installation, connection, testing and operation of all electrical work for this project as shown on the Electrical Drawings and/or defined in Division 16 of the specifications.

B. Contract Requirements: Comply with the requirements of the General Conditions, the Supplementary Conditions, and Division 1 as they apply to the work in this section. Comply with the requirements of the other specification divisions that have additional requirements for this work as referenced under Division 16 sections.

C. Related Work Described Elsewhere: Where other divisions require electrical materials or installations under this division of the specifications, comply with all applicable requirements herein. Provide all electrical materials and installation work required to connect, test and operate equipment described in other divisions of these specifications as shown on the Electrical Drawings or specified hereinafter. Electrical installations required by other divisions but not shown on the Electrical Drawings or specifically called out in this division of the specifications shall be provided by the trade requiring the electrical work.

D. Itemized Schedule of Costs: Furnish a contract cost breakdown by specification section to the Project Coordinator with a copy to the A/E to allow evaluation of partial payment requests. Refer to Division 1 for requirements.

E. Warranty: The Contractor shall guarantee all work installed under this specification and make good, repair or replace at his own expense, any defective work, materials or parts within the warranty period, if, in the opinion of the Project Coordinator, said defect is due to imperfection in material, design or workmanship. The warranty period shall be in accordance with Division 1 but not less than one year. Lamps are not warranted but all shall be operating at time of final acceptance. Warranty shall be submitted in writing as required in Division 1.

1.2 REGULATIONS

A. Codes and Ordinances: Comply with all applicable codes, ordinances and regulations including the National Electrical Code, National Electrical Safety Code, WISHA, NFPA, and all other national, state and local codes and ordinances. Notify the Project Coordinator of any non-compliance in contract documents to applicable codes and regulations prior to installation of the work. Changes in the work after initial installation due to requirements of code enforcing agencies shall be at no additional cost to the Owner.

B. Permits: Provide and pay for all permits and fees required for this project. In addition to paying for all permits and fees, the Contractor shall be responsible for contacting the various Approving Authorities, arranging for review of shop drawings where appropriate, scheduling inspections in a timely manner, and making necessary corrections as required by the Approving Authorities.
C. Approving Authority: It is the Contractor's responsibility to ascertain and contact the appropriate "Approving Authorities" for this project. Approving Authorities will include, but not be limited to the local Fire Marshal and the local authority having jurisdiction.

D. Certificate of Inspection: Obtain a Certificate of Electrical Inspection from the local inspecting authority indicating final acceptance. Submit to the Owner upon completion of the project as part of project closeout.

E. Safety Measures to be Taken: The Project Coordinator has not been retained or compensated to provide design and construction review services relating to the Contractor's safety precautions or to means, methods, techniques, sequences or procedures required for the Contractor to perform his work. The Contractor will be solely and completely responsible for conditions of the job site, including safety of all persons and property during performance of the work. This requirement will apply continuously and not be limited to normal working hours. The duty of the Project Coordinator and Engineer to conduct construction observations of the Contractor's performance is not intended to include review of the adequacy of the Contractor's safety measures, in, on or near the construction site. It shall be the Contractor's responsibility to comply with "Safety and Health Regulations for Construction," Volume 36, No. 75, Part II of the Federal Register by the U.S. Department of Labor. Contractor shall be responsible for providing all such safety measures and shall consult with the state or federal safety inspector for interpretation whenever in doubt as to whether safe conditions do or do not exist or whether he is or is not in compliance with state or federal regulations.

1.3 DRAWINGS AND SPECIFICATIONS

A. Intent: The Electrical Drawings and specifications are intended to include all labor and materials necessary to provide a complete and operating facility. Any materials shown and called for on the drawings but not mentioned in the specifications, or vice versa, which are necessary for the proper completion of the installation or operation of the equipment, shall be furnished the same as if specifically called for in both. By submitting a bid, the Contractor is acknowledging that he has made a thorough examination of the contract documents, existing site conditions, and has determined that these documents and conditions do sufficiently describe the scope of construction work required under this contract. Any questions regarding interpretation of the contract documents shall be made in writing in a timely manner prior to the bid date to allow reasonable time for resolution of the questions.

B. Diagrammatic Drawings: The Electrical Drawings are diagrammatic and do not show exact or complete raceway and wiring configurations, routing, rating or the necessary number and types of raceway fittings, junction boxes and pull boxes. Provide all labor and materials required to execute the work specified herein or described on the Electrical Drawings.

C. Any minor changes (less that 6'-6" horizontal or vertical) in the location of the raceways, outlets, boxes, devices, wiring, etc., from those shown on the drawings shall be made without extra charge, where coordination requires or if so directed by the Project Coordinator prior to rough-in.

1.4 SUBMITTALS AND SHOP DRAWINGS

A. Submittals, General: All equipment must be submitted for review prior to installation. Provide submittals in accordance with Division 1. The remaining instructions in this
paragraph are intended to supplement and amplify the requirements of Division 1. Bind submitals in three-ring binder. Open catalog sheets will not be accepted. Shop drawings shall consist of one reproducible drawing and a maximum of four blueprint sets. Index to the applicable specification section with a transmittal letter bound as the first sheet. Provide an index with each section of equipment indicating exact catalog numbers of products provided. In addition, identify the specific products by catalog number within the submittal documents. Submitals will not be accepted unless they conform to these requirements.

B. Shop Drawings: Provide shop drawings, descriptive bulletins, data sheets, diagrams, catalog cuts or other additional information as required for all specified materials.

C. Submittal Format: Submitals must be sent in complete "sets," including all specified material. Submission of individual materials will not be accepted.

D. Review: The review of a manufacturer's name or product by the Project Coordinator does not relieve the Contractor of the responsibility for providing materials and equipment which comply in all details with the requirements of the contract documents. Contractor shall be solely responsible for submitting materials at such a time to allow a minimum of two weeks for Engineer's review.

E. It is the Contractor's responsibility to thoroughly review vendor-assembled shop drawings, catalog cuts, etc. to ensure that these documents are complete and comply with the specifications. If this coordination effort is not done, the Project Coordinator reserves the right to reject the complete submital without review. To ensure compliance with the Project Coordinator's review comments and communication of these comments through the Contractor and supplier to the manufacturer, all corrections to shop drawings shall be done by the manufacturer and resubmitted as requested by the Project Coordinator. "Local" mark-ups of the manufacturer's shop drawings will not be accepted.

1.5 OPERATIONS AND MAINTENANCE MANUALS

A. Provide operations and maintenance manuals for all electrical equipment installed on this project in accordance with Division 1.

B. Items described shall include, but not be limited to, the equipment listed under "Shop Drawings" in this division of the specifications. Provide table of contents at front of manual indicating general content of each section. Provide index for each section of the manual with complete equipment catalog item or identification.

C. The information and diagrams included must be on the specific equipment installed for this project. General "product line" information is not acceptable. The equipment model and catalog numbers with appropriate prefixes and suffixes must be clearly indicated on the data sheets. Manuals shall contain shop drawings, schematic and wiring diagrams (showing all external connections), parts lists, operating and maintenance information. Any modifications to equipment in the field shall be updated on the drawings, diagrams, etc., to reflect the "as-built" conditions.

D. Binding: Bind with three-screw post-type binder with heavy-duty hardboard cover and cloth backing. Imprint edge of volume with name of the building, year of completion and the words "Electrical Equipment." Front of manual shall be imprinted with the words "Electrical Equipment" the name of the project, the name of the Owner, year completed, name of the Engineer and Contractor. All printing in gold lettering. If the thickness of the manual exceeds approximately 2", provide separate volumes, each approximately 2" thick with each volume imprinted as described above and with the addition of the volume number. The back
edge shall be imprinted with the name of the project, name of the Owner and year of completion.

E. One preliminary copy shall be submitted to the Engineer for review 30 days prior to completion of the project. Preliminary copy shall include proposed wording for cover and back edge of the manual. Submit final bound copies for distribution as required by Division 1.

1.6 RECORD DRAWINGS

A. Maintained on Site: A record shall be made during the progress of the project indicating the work as actually installed. Corrections and changes shall be kept up to date at all times on a separate set of record drawings kept at the job site for review by the Project Coordinator. Mark-ups may be schematic as related to interior raceway systems, however, all raceways shall be shown in proper relationship with junction boxes, panelboards, devices, and equipment. Raceways installed below grade shall be shown with both horizontal and vertical dimensions at an accuracy of ±6 inches.

B. Project Closeout: Provide one set of prints indicating work as revised, detailed and actually installed, and submit to the Project Coordinator as part of the Project Closeout documentation. Panel schedules and fixture/equipment schedules shall also be updated.

C. Additional Record Drawings: Refer to Section 16700, Special Systems, for additional record drawing requirements. AutoCAD production requirements also apply to all signal and communications system drawings.

1.7 ABBREVIATIONS AND DEFINITIONS

A. Provide: To furnish and install.
B. Wiring: Raceway, conductors and connections.
C. Exposed: Visible from occupied areas.
D. Install: To set in position and make fully operational.
E. Furnish: Purchase and deliver to the job site.
F. Required: As required by code, authority having jurisdiction or contract documents for the system and/or installation to be fully operational.

PART 2 PRODUCTS

2.1 STANDARD OF QUALITY

A. General: Whenever any material or equipment is specified by patent or proprietary name or by the name of the manufacturer, such specification shall establish the standard of quality in that particular field of manufacture. The Project Coordinator shall be the sole and final judge as to quality and acceptability of substitutions, no exceptions.

B. Substitutions:

1. Unless otherwise noted on the drawings or other sections of the specifications, the Contractor may offer material or equipment with equal or better qualities than those specified. Reference is made particularly to Instructions to Bidders related to prior approval requirements.
2. When the substitute equipment or material necessitates revisions to the plans or involves other trades, the Contractor shall include drawings and details showing all such changes, and coordinate and assume any liability and costs from the affected trades. Also, if a change required engineering or mechanical services or other equipment modifications, these services shall be billable to the Contractor.

2.2 PRODUCT LISTING OR LABELING
A. All electrical equipment shall have Underwriters' Laboratories, Inc., or other approved testing facility label whenever published standards exist. Equipment in compliance with UL standards but not bearing their label is not acceptable. If the manufacturer cannot arrange for labeling of an assembled unit at the factory, the necessary inspection and acceptance by the testing facility shall be performed in the field at no additional cost to the Owner, and be acceptable to the authority having jurisdiction.

PART 3 EXECUTION

3.1 GENERAL
A. All materials shall be new, free from defects and arrive at the job site in original unopened containers.

3.2 MATERIAL STORAGE
A. Make all necessary provisions for storing materials and equipment at site so as to insure the quality and fitness of the items to be incorporated in the work. Equipment shall be stored to prevent damage and corrosion.

3.3 WORKMANSHIP AND COORDINATION
A. General: Workmanship shall be the best quality as recognized by the electrical construction industry to the reasonable satisfaction of the Owner and Contractor. Remove and replace lesser quality work as directed at no additional cost to the Owner. The Project Coordinator, or his designated representative, shall be the judge of the required quality of workmanship.
B. Work of Other Trades: The Electrical Drawings do not show complete details of the building construction. Refer to the Project Architectural, Structural, Civil Landscape and Mechanical Drawings for those details which may affect the execution of this work. Specific locations of construction features shall be obtained from the reference drawings, field measurements, or the trade providing the material or equipment. No extra payments will be allowed for failure to obtain this information.
C. The Contractor will not be paid for work requiring reinstallation due to lack of coordination prior to installation i.e., removing, replacing, relocating, cutting, patching or finishing. Special attention is called to the following items and all conflicts shall be coordinated prior to installation:
   1. Light switches will be located on the "strike" side of the door.
   2. All electrical outlets, lighting fixtures, signal and communications devices, and other electrical devices and equipment are installed to avoid conflict with grilles, pipes, sprinkler heads, ducts and other mechanical equipment.
3. Electrical outlets, lighting fixtures, signal and communications devices and equipment are to be installed in proper relation to cabinets, counters, doors and other Project Coordinatorural appurtenances.

4. Electrical characteristics (HP, KVA, voltage, phase, fusing, overload protection) of actual equipment furnished under other divisions being different from that shown on the electrical drawings.

D. Cooperation: Plan and execute work in cooperation with all other trades and utility companies. Every reasonable effort shall be made to provide all concerned with timely notice of work affecting other trades, and to prevent conflicts or interference as to space requirements, dimensions, openings, block-outs, sleeving or other matters which will cause delays or necessitate work-around methods.

E. General Construction:

1. Cutting and Patching: Provide all cutting, demolition and patching required for the installation of the electrical work on this project. Patching shall be accomplished by utilizing the general construction trades normally providing materials and labor needed for restoration of floor, ceiling or walls. Penetrations through existing structural walls, ceiling or floor slabs shall be core drilled. Spillage from core drilling shall be contained by diking, vacuuming and covering with protective plastic sheeting as required. In no case shall structural members be penetrated without prior approval of the Project Coordinator. After installation of raceways, provide approved fire sealing materials to close spaces around raceways.

2. Sleeves and openings required through floors and walls for electrical work shall be the responsibility of the Contractor. This work shall be carefully coordinated with the General Contractor and other trades involved. All openings around conduits in sleeves shall be sealed with a material of equal fire rating as the material penetrated.

3. Painting: Touch up electrical equipment with factory finished surfaces as required using factory furnished paint. Coordinate field painting requirements with the Project Coordinator prior to final trim and cover installation. Do not paint screw heads, hinges, nameplates, hardware, etc. All surface-mounted raceways in finished areas will be painted as directed under the "Painting" division of the specifications. Coordinate timing of installation to minimize conflicts with painting requirements.

4. Cleaning: Promptly remove waste material and rubbish resulting from electrical work. Prior to energizing equipment, remove all chipping materials, construction dirt and debris, vacuum and wipe-down all internal areas. At completion of the project, clean all equipment and fixtures installed under this Contract.

3.4 MISCELLANEOUS

A. Equipment Anchorage, Support and Bracing:

1. General: Provide complete seismic anchorage and bracing for the lateral and vertical support of conduit and electrical equipment, as required by the Uniform Building Code.

2. Conduit Crossing Structural Separations: Conduit that crosses structural or seismic separations between building units shall be installed with flexible connections, suitable to accommodate longitudinal and transverse displacements. Secure raceways each side of joint and provide minimum of 36" length flexible conduit between building units.
B. Phase Relationship: Maintain consistent phase relationship and rotation throughout the project. Check and identify proper rotation of equipment prior to energizing said equipment.

C. Housekeeping Pads: Coordinate size and location of housekeeping pads for all floor-mounted electrical equipment. Pads shall be 4 inches thick (nominal) x 2 inches larger than plan view dimensions of equipment. Provide 1-inch x 1-inch chamfer at top edges of pads.

3.5 CONSTRUCTION OBSERVATION AND FINAL ACCEPTANCE

A. Site Review: On-site meetings or reviews of construction by the Project Coordinator, Engineer or Contractor shall not be construed as acceptance by these parties as related to quantities, rough-in locations, and compliance with code enforcing authorities unless specific exceptions have been brought to the attention of the Project Coordinator or Engineer and have been accepted in writing.

B. Testing: The Contractor shall test all wiring and all electrical equipment to verify absence of grounds and short circuits and verify proper operation, rotation, and phase relationship. Contractor will be responsible for scheduling of tests and demonstrations at times mutually acceptable to the Owner. All equipment shall be demonstrated to operate in accordance with the requirements of this specification and the manufacturer's recommendations. Operate every device manually and automatically in accordance with its purpose. Tests shall be performed in the presence of the Owner or his designated representative. All instruments and personnel required to conduct the test shall be provided by the Contractor. Any test not witnessed by the Owner shall be waived by written document. All such documents must become the property of the Owner upon completion of construction.

C. Instruction for Owner's Personnel:

1. Scope: Following initial operation of all electrical equipment and prior to acceptance of the electrical work, conduct demonstrations of equipment operation and instruction periods for the Owner's representatives.

2. Initial Instruction Periods: Shall include preliminary discussion and presentation of information from maintenance manuals with appropriate references to drawings, followed by tours of equipment spaces explaining maintenance requirements, access methods, servicing and maintenance procedures, settings and available system and equipment adjustments.

3. Final Instruction Periods: 30 days after the initial instruction, a second instruction period shall be scheduled. The format and duration of the instruction periods shall be identical to the initial instruction periods.

4. Contractor's representatives, in general, who conduct these instructions and demonstrations shall be qualified foremen or superintendents acquainted with this project and from the trade involved. For major equipment, the representative shall be the manufacturer's representatives with operating experience and substantial design experience on this project. Their qualifications shall be submitted to the Project Coordinator and Engineer before conducting the instruction period.

5. Minimum Duration of Instruction Periods:
   a. Electrical Distribution System: 8 Hours
   b. Special Systems: 4 Hours each
   c. Refer to other section of the specification for additional testing requirements.
6. Scheduling of Instruction Periods: Provide notice of Contractor's readiness to conduct such instruction and demonstration periods to the Owner at least two weeks prior to each instruction period and reach agreement on the date of each instruction period.

D. Completion of Work: When requesting final inspection, provide ten day notice. Submit written certifications that the work has been fully completed in strict accordance with the plans and specifications.

E. Final Documentation: See specifications Section 017800, "Closeout Submittals." All manuals, test results, and acceptances by the inspecting authorities shall be included in this final documentation.

3.6 FINAL ACCEPTANCE

A. The Electrical Contractor shall submit to the Project Coordinator a Project Closeout Form properly filled out prior to the time final acceptance of the electrical work is requested. At this time also submit copies of final inspection certificates and receipts for loose materials (spare wiring devices, fuses, etc.) turned over to the Owner.

END OF SECTION 260500
SECTION 311100
CLEARING & GRUBBING

PART 1 GENERAL

1.1 Description

A. This section includes protection of facilities, clearing site of incidental paving, surface debris, water treatment equipment, grass, trees, and other plant life in preparation for site excavation work and general development.

PART 2 MEASUREMENT

A. Payment for this item shall be on a lump sum basis per bid schedule 004100.

PART 3 PRODUCTS (not used)

PART 4 EXECUTION

4.1 Protection

A. Locate, identify, and protect existing facilities (remaining) from damage.

B. Identify and protect trees, plant growth, and features designated to remain as final landscaping.

C. Protect benchmarks from damage or displacement.

4.2 Clearing

A. Clear only those areas required for access to site and execution of Work.

4.3 Removal

A. Remove paving, brush, trees, and other debris as required and dispose of off-site in strict accordance with applicable laws and regulations.

END OF SECTION 311100
SECTION 312200
GRADING

PART 1: GENERAL

1.1 DESCRIPTION
A. This Section includes regulatory requirements, protection, site grading, excavation, backfilling, compaction, quality control, and restoration.

1.2 MEASUREMENT
A. Site Grading: Paid as a Lump Sum as included in the Bid Schedule Section 004100 including all work as described in Section 011000.

1.3 REFERENCES
A. ASTM D698 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 lb (2.5 Kg) Rammer and 12 inch (300 mm) Drop.
B. ASTM D1556 - Test Method for Density of Soil in Place by the Sand-Cone Method.
C. ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb (4.5 Kg) Rammer and 18 inch (450 mm) Drop.
D. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
E. ASTM D3017 - Test Methods for Moisture Content of Soil and Soil-Aggregate Mixtures.

1.4 SUBMITTAL REQUIREMENTS
A. In accordance with the requirements of Section 6705 of the Labor Code of the State of California, submit a detailed plan to the Engineer before excavation, showing the design of shoring, bracing, sloping, or other provisions to be made for worker protection from the hazard of caving ground during the excavation of any trench or trenches 5 feet or more in depth.
B. Plan must be submitted and approved by the Owner and Engineer prior to start of work.

1.5 DEFINITIONS
A. Utility: Any buried pipe, duct, conduit, or cable.
B. Structure: Foundation, manhole, septic tank, cleanout, catch basin, vault, or culvert.
C. Solid Rock: Large continuous masses of igneous, metamorphic, or sedimentary rock, which in the opinion of the Engineer cannot be excavated without drilling and blasting. Soil that is capable of being excavated with rippers is not considered solid rock.
D. Loose Rock: Boulders and other detached stones, with a minimum volume of 1 cubic yard.
1.6 FIELD MEASUREMENTS
A. Verify that survey benchmarks, control points, and intended elevations are as shown on drawings.

1.7 PROTECTION
A. Barricade open excavations.
B. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
C. Provide safe conditions for workers and passers-by.

PART 2: PRODUCTS (not used)

PART 3: EXECUTION

3.1 PREPARATION
A. Notify Underground Service Alert (800) 227-2600 in Northern California prior to excavation. Comply with their notice requirements.
B. Identify required lines, levels, contours, and datum locations.
C. Protect plant life, lawns, rock outcropping, and other features remaining as final landscaping.
D. Protect benchmarks, existing structures, fences, and paving from excavating equipment and vehicular traffic.
E. Maintain and protect utilities and structures to remain.

3.2 EXCAVATION
A. Use open cut method on all excavation unless otherwise shown on the drawings, required by permit, or approved in writing by the Engineer.
B. Stockpile excavated material on site. Any material not utilized for construction purposes may be spread onsite or removed from the site as designated by the Engineer.

3.3 CLASSIFICATION OF EXCAVATION
A. All excavation with equipment commonly used in the industry is classified as common excavation (except for drilling and blasting).

3.10 FIELD QUALITY CONTROL
A. The Owner, at its discretion, may acquire the services of a certified soils testing laboratory to perform baseline Modified Proctor density tests in accordance with Cal 216 or latest revision:
   1. Tests may be performed at locations approved by the Engineer.
2. Test results from tests prior to construction will be made available to the contractor.
3. Testing is at the Owner’s expense.
   B. Compaction testing will be determined at the Engineer's discretion.
   C. If work does not meet specified requirements, remove, replace, and retest. All re-testing is at the contractor’s expense. Compaction tests shall be used as the basis for determination of acceptability of work performed under this contract.

3.11 PROTECTION OF FINISHED WORK

   A. If vehicular traffic has altered finished work, reshape and re-compact.

   END OF SECTION 312200
PART 1: GENERAL

1.1 DESCRIPTION

A. This Section includes requirements for excavation, backfilling, compaction, quality control, and restoration.

1.2 MEASUREMENT

A. Excavation and Fill: Cost to be per Cubic Yard per Bid Schedule Section 004100. Includes all labor material and equipment necessary for the excavation and fill to the lines and grades shown on the project plans for construction. Fill shall be compacted per this section. Measurement shall be made by weight tickets or performing field surveys after initial site grading and after fill is complete, and shall be measured by the in-place volume or by other methods agreed upon between the Contractor and the Engineer. No allowance will be made for shrink/swell of fill material during excavation or transport. No separate payment will be made for fill materials utilizing onsite soils.

B. Trenching & Backfilling: Cost to be included in other items. Includes excavating trenches and backfilling for all pipe and utilities in the project area.

1.3 REFERENCES

A. ASTM D698 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 lb (2.5 Kg) Rammer and 12 inch (300 mm) Drop.

B. ASTM D1556 - Test Method for Density of Soil in Place by the Sand-Cone Method.

C. ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb (4.5 Kg) Rammer and 18 inch (450 mm) Drop.

D. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

E. ASTM D3017 - Test Methods for Moisture Content of Soil and Soil-Aggregate Mixtures.


1.4 SUBMITTAL REQUIREMENTS

A. In accordance with the requirements of Section 6705 of the Labor Code of the State of California, submit a detailed plan to the Engineer before excavation, showing the design of shoring, bracing, sloping, or other provisions to be made for worker protection from the hazard of caving ground during the excavation of any trench or trenches 5 feet or more in depth.

B. Submit the plan to the Engineer prior to start of excavation.

1.5 DEFINITIONS
A. Utility: Any buried pipe, duct, conduit, or cable.
B. Structure: Foundation, manhole, septic tank, cleanout, catch basin, vault, or culvert.
C. Solid Rock: Large continuous masses of igneous, metamorphic, or sedimentary rock, which in the opinion of the Engineer cannot be excavated without drilling and blasting. Soil that is capable of being excavated with rippers is not considered solid rock.
D. Loose Rock: Boulders and other detached stones, with a minimum volume of 1 cubic yard.

1.6 FIELD MEASUREMENTS

A. Verify that survey benchmarks, control points, and intended elevations are as shown on drawings.

1.7 PROTECTION

A. Barricade open excavations.
B. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
C. Provide safe conditions for workers and passers-by.

PART 2: PRODUCTS

2.1 IMPORTED PIPE EMBEDMENT

A. Use crushed stone or gravel that is free of shale, clay, friable material, and debris. Grade in accordance with ASTM C136, within the following limits:

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Percent Passing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 in</td>
<td>100</td>
</tr>
<tr>
<td>3/4 in</td>
<td>90 to 100</td>
</tr>
<tr>
<td>3/8 in</td>
<td>20 to 55</td>
</tr>
<tr>
<td>No. 4</td>
<td>0 to 10</td>
</tr>
<tr>
<td>No. 8</td>
<td>0 to 5</td>
</tr>
</tbody>
</table>

2.2 IMPORTED STRUCTURAL FILL

A. Use imported soil (if required) that has angular fragments and a low expansion index (less than 30 per ASTM D 4829). Use imported fill that complies with the requirements of Caltrans Class 2 Aggregate Sub-base:

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Percent Passing (Contract Compliance)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 in (75mm)</td>
<td>100</td>
</tr>
<tr>
<td>1½ in (63mm)</td>
<td>87 to 100</td>
</tr>
<tr>
<td>No. 4 (4.75mm)</td>
<td>45 to 100</td>
</tr>
<tr>
<td>No. 200 (.075mm)</td>
<td>0 to 34</td>
</tr>
</tbody>
</table>
PART 3: EXECUTION

3.1 PREPARATION

A. Notify Underground Service Alert (800) 227-2600 in Northern California prior to excavation. Comply with their notice requirements.
B. Identify required lines, levels, contours, and datum locations.
C. Protect plant life, lawns, rock outcropping, and other features remaining as final landscaping.
D. Protect benchmarks, existing structures, fences, and paving from excavating equipment and vehicular traffic.
E. Maintain and protect utilities and structures to remain.

3.2 EXCAVATION

A. Use open cut method on all excavation unless otherwise shown on the drawings, required by permit, or approved in writing by the Engineer.
B. Stockpile excavated material on site. Any material not utilized for construction purposes may be spread onsite or removed from the site as designated by the Engineer.

3.3 CLASSIFICATION OF EXCAVATION

A. All excavation with equipment commonly used in the industry is classified as common excavation (except for drilling and blasting).

3.4 TRENCH EXCAVATION

A. Cut trenches sufficiently wide to enable installation and inspection. Remove water or materials that interfere with work. When groundwater is encountered the Contractor must submit a dewatering plan to the Engineer for approval.
B. Maintain trench sides as vertical as possible--between 12 inches and 24 inches wider than the outside diameter of the pipe barrel--below pipe level.
C. Excavate trench width above the pipe as wide as necessary for shoring, sheeting, and installation.
D. Center trench excavation on pipe alignment for a minimum clearance of 6 inches on each side of the pipe.
E. Hand trim for bell and spigot pipe joints. Remove loose matter.
F. Restore over-excavated areas. If the trench bottom is over-excavated below the intended grade, fill over-excavation with imported pipe embedment and compact to density equivalent to the in situ material.
G. Remove lumped subsoil, boulders, and rock up to ½ yd³ (measured by volume).
H. Excavate for additional trench depth when soil prevents adequate pipe support. Refill addition with imported pipe embedment. Remove large rock, boulders, and large stones to provide 3 inches of soil cushion on all sides of the pipe and pipe accessories.
I. Length of trench that may be left open at any one time is 100 yards. Do not leave trench open over night.
J. Stockpile excavated material in designated area on site, and remove excess material from site.

3.5 STRUCTURE EXCAVATION

A. Excavate for structures down to the levels indicated on the drawings or as directed by the Engineer. Excavate as large as necessary to accommodate the work forms. When necessary over-excavate to remove unsuitable soil and replace with engineered fill. Comply with all safety regulations.
B. Excavate a sufficient distance from walls and footings to provide forming except where concrete for walls or footings is directly against excavated surfaces.
C. Do not excavate below depths indicated in the drawings. Restore over-excavated areas to proper elevation by filling with imported structural fill. Do not interfere with 45 degree bearing splay of foundations.
D. Hand-trim the bottom of the excavation to prevent disturbing the soil below the required depth.

3.6 BACKFILLING

A. Use care to prevent disturbance or damage to utilities or structures in trench.
B. Maintain optimum moisture content to attain required compaction density.
C. Remove surplus fill materials from site.
D. Leave fill material stockpile areas free of excess fill materials.

3.7 TRENCH BACKFILLING

A. Use excavated soil as embedment unless Engineer determines it unsuitable. Unsuitable material is defined as incapable of being compacted to specified density with optimum moisture content, solid or loose rock, lump material larger than 1 inch, organic matter, or debris.
B. Use excavated soil as final backfill unless the Engineer determines it unsuitable. Unsuitable final backfill material is solid or loose rock larger than 6 inches or lumps larger than 3 inches. Do not use organic matter or debris.
C. Backfill pipe embedment material in uniform layers on all sides of the pipe in lifts not to exceed 6 inches.
D. Use the following methods when placing final backfill material unless otherwise required by permits or authority.

<table>
<thead>
<tr>
<th>Compact</th>
<th>Not to Exceed (In loose measure)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roadways</td>
<td>6 inches thick</td>
</tr>
<tr>
<td>Rights-of-way and outside roadway</td>
<td>12 inches thick</td>
</tr>
<tr>
<td>Unimproved surfaces</td>
<td>24 inches thick</td>
</tr>
</tbody>
</table>

3.8 STRUCTURE BACKFILLING

A. Place structure fill material in uniform layers on all sides of the structure 6 inches thick.
B. Do not fill structure material until the structure footing or other portions of the structure have been inspected.

C. Use excavated soil as final backfill material unless Engineer determines it unsuitable. Unsuitable final backfill material is solid or loose rock larger than 6 inches or lumps larger than 3 inches. Do not use organic matter or debris.

3.9 COMPACTION

A. Compact final backfill to the percentage of maximum density determined by Cal 216 unless otherwise specified by the Owner.

<table>
<thead>
<tr>
<th>Location</th>
<th>Bedding</th>
<th>Haunching</th>
<th>Initial Backfill</th>
<th>Final Backfill</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roadways, Improved Surfaces</td>
<td>95</td>
<td>95</td>
<td>95</td>
<td>95</td>
</tr>
<tr>
<td>Roadway Rights-of-Way Outside of Roadway Prism</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>90</td>
</tr>
<tr>
<td>Unimproved Surfaces, Fields, Etc.</td>
<td>90</td>
<td>90</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>Backfill Around Structures</td>
<td>95</td>
<td>95</td>
<td>95</td>
<td>95</td>
</tr>
</tbody>
</table>

3.10 FIELD QUALITY CONTROL

A. The Owner, at its discretion, may acquire the services of a certified soils testing laboratory to perform baseline Modified Proctor density tests in accordance with Cal 216 or latest revision:
   1. Tests may be performed at locations approved by the Engineer.
   2. Test results from tests prior to construction will be made available to the contractor.
   3. Testing is at the Owner’s expense.

B. Compaction testing will be determined at the Engineer's discretion.

C. If work does not meet specified requirements, remove, replace, and retest. All re-testing is at the contractor’s expense. Compaction tests shall be used as the basis for determination of acceptability of work performed under this contract.

3.11 PROTECTION OF FINISHED WORK

A. If vehicular traffic has altered finished work, reshape and re-compact.

END OF SECTION 312300
SECTION 320513
TOPSOIL

PART 1 - GENERAL

1.1 Summary

A. The Work under this Section includes providing all labor, materials, tools, and equipment necessary for satisfactorily furnishing and placing topsoil.

1.2 Payment

A. Payment for this item is per Cubic Yard as specified under Section 004100.

1.3 Submittals

A. Submit material sample for testing and analysis and or submit test data for material including textural analysis, gradation, organic matter content, and ph rating.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Topsoil furnished by the Contractor shall consist of a natural friable surface soil without admixtures of undesirable subsoil, refuse, or foreign materials. It shall be reasonably free from roots, hard clay, coarse gravel, stones larger than one inch in any dimension, noxious weeds, tall grass, brush, sticks, stubble or other material which would be detrimental to the proper development of vegetative growth. Topsoil shall be obtained from naturally well-drained sites where topsoil occurs at least 4 inches deep. Topsoil shall not be obtained from bogs or marshes.

B. Topsoil shall conform to the following grading:

<table>
<thead>
<tr>
<th>Sieve Sizes</th>
<th>Percentage Passing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-inch</td>
<td>100%</td>
</tr>
<tr>
<td>1/2 inch</td>
<td>95% - 100%</td>
</tr>
<tr>
<td>No.4</td>
<td>75% - 100%</td>
</tr>
<tr>
<td>No.10</td>
<td>60% - 100%</td>
</tr>
<tr>
<td>No.200</td>
<td>10% - 60%</td>
</tr>
</tbody>
</table>

C. Topsoil shall contain not less than 3%, or more that 20% organic matter, by weight as determined by loss-on-ignition of oven-dried samples in accordance with ASTM D5268. Organic material shall be decomposed and free of wood.

D. The Engineer shall be notified on the location from which the Contractor proposes to procure topsoil at least fourteen (14) calendar days prior to delivery of topsoil to the Project from that location. The topsoil and its source must be inspected/tested by the Engineer and approved for use before beginning any procurement, hauling, or work directly including topsoil.
E. Topsoil sources lacking organic matter may be used if, prior to delivery to the Project, sufficient organic matter in the form of pulverized peat moss or rich organic soil from other sources is thoroughly mixed with the topsoil to provide a product meeting the above requirements.

F. Organic material for incorporation into topsoil, if required, shall be partially decomposed fibrous or cellular stems and leaves of any of several species of Sphagnum mosses, or rotted manure. Organic material may require chopping or shredding to insure thorough mixing.

G. All topsoil shall be fertilized as follows: the application rates of the fertilizer per 1,000 square feet of ground area of topsoil furnished by the Contractor shall be determined by the Engineer, based on soil analysis tests so that the total natural and applied chemical constituents are as follows:
   a. Nitrogen 1.0 lb. minimum - 1.5 lb. maximum per 500 cubic feet
   b. Phosphoric Acid 1.0 lb. minimum - 2.0 lb. maximum per 500 cubic feet
   c. Potassium 1.0 lb. minimum - 2.0 lb. maximum per 500 cubic feet

PART 3 - EXECUTION

3.1 CONSTRUCTION

A. All areas beyond sidewalks and roadway shoulders that are disturbed during construction which are not scheduled to be covered with pavement, concrete, or base course, shall be graded to a neat, uniform gradeline and appearance, as determined by the Engineer, and covered with a neat uniform, six inch minimum thickness of topsoil, unless otherwise shown on the Drawings, or directed by the Engineer.

B. The topsoil shall be evenly spread on the designated areas to a depth, which, after settlement and compaction, shall be six inches, unless otherwise directed by the Engineer. Spreading shall not be done when the ground or topsoil is frozen, excessively wet, or otherwise in a condition detrimental to the work, as determined by the Engineer. Roadway surfaces shall be kept clean during hauling and spreading operations.

C. After spreading has been completed, large clods, stones larger that one-inch in any dimension, roots stumps, and other litter shall be collected and removed.

D. The final grading of the topsoil prior to seeding shall be to a tolerance that will not permit ponding of water in excess of one inch in depth.

E. The Contractor shall provide labor personnel experienced with landscaping work that involves fine grading of topsoil for residential and commercial lawns.

F. The Engineer will determine the location of those areas requiring finish grading and the time required to bring the graded topsoil to the desirable finish appearance.

G. The Contractor shall remove and dispose of all excess materials resulting from finish grading of the topsoil. The work required to remove and dispose of this excess material from piles placed adjacent to the work will be considered incidental to other work under the contract.

END OF SECTION 320513
SECTION 321123
AGGREGATE BASE

PART 1  GENERAL

1.1  SECTION INCLUDES

B. Aggregate base course

1.2  MEASUREMENT

A. Aggregate Base: Paid by the Ton. Includes subgrade preparation, supply of aggregate base, preparation and compaction of aggregate base, and testing.

1.3  REFERENCES


1.4  QUALITY ASSURANCE

A. Perform Work in accordance with State of California, Department of Transportation, Standard Specifications, current addition.

B. Obtain materials from same source throughout the life of the project.

1.5  SUBMITTALS

A. Contractor must submit mix design to the Engineer for approval prior to placement of material in the field.

PART 2  PRODUCTS

2.1  MATERIALS

A. Aggregate for Base: Course: 1-1/2''- crushed rock or 3/4''- washed
In accordance with State of California, Department of Transportation, Standard Specifications 2010, Section 26.

PART 3  EXECUTION

3.1  PLACING AGGREGATE BASE

A. Install Work in accordance with State of California, Department of Transportation, Standard Specifications current edition.

3.7  PROTECTION

A. Immediately after placement, protect aggregate base from mechanical injury.

END OF SECTION 321123
 SECTION 321600  
CURBS, GUTTERS, SIDEWALKS & DRIVEWAYS  
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. Related Sections include the following:  
   a. Division 03: Concrete.  
   b. Division 31: Earthwork.  
   c. Division 32: Exterior Improvements.  
   d. Division 33: Utilities  

1.3 DEFINITIONS  
A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, and ground granulated blast-furnace slag.  

1.4 SUBMITTALS  
A. Product Data: For each type of manufactured material and product indicated.  
B. Design Mixtures: For each concrete pavement mixture. Include alternate mixture designs when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.  

1.5 QUALITY ASSURANCE  
A. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products who complies with ASTM C 94/C 94M requirements for production facilities and equipment.  
   a. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."  

1.6 PROJECT CONDITIONS  
A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities and general public access.
PART 2 - PRODUCTS

2.1 FORMS

A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces.
   a. Use flexible or curved forms for curves with a radius 100 feet (30.5 m) or less.
B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

2.2 STEEL REINFORCEMENT

A. Reinforcement to meet requirements and products specified in Caltrans Standard Specifications Section 52.

2.3 CONCRETE MATERIALS

A. Cementitious Material: Shall be as defined in Caltrans Standard Specifications Section 40.
B. Normal-Weight Aggregates: Shall be 3/4” maximum size aggregate in mixes for Curb and Gutter.
C. Water: ASTM C 94/C 94M.
E. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.

2.4 CURING MATERIALS

A. Curing materials to meet requirements and products specified in Caltrans Standard Specifications.

2.5 RELATED MATERIALS

B. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
C. A.D.A. Detectable Warning Panels
   a. The detectable warning panels shall be either lightweight concrete paver panels or vitrified polymer composite (VPC) panels as described below:
      i. LIGHTWEIGHT CONCRETE PANEL: The detectable warning panels shall be lightweight concrete paver panel, having a minimum size of 1’ x 2’ and be at least ¾” thick. The concrete panels shall be capable of reaching 10,000 psi and be reinforced with high tensile stainless steel pre-
stressed tendons. The panel shall include a waterproofing admixture and surface treated with a penetrating silane sealer for resistance and decreased water absorption. The panel shall be safety yellow color throughout the panel.

ii. VITRIFIED POLYMER COMPOSITE PANEL: Vitrified Polymer Composite (VPC) Cast in Place Detectable/Tactile Warning Surface Tiles shall be an epoxy polymer composition with an ultra violet stabilized coating employing aluminum oxide particles in the truncated domes. The tiles shall be panels having a minimum size of 2’ x 2’ and shall have a minimum face thickness of 3/16” with a minimum embedment depth of 1-1/4”. The panels shall have a minimum tensile strength of 18,000 psi and a minimum flexural strength of 25,000 psi. Panel shall be “Federal Yellow”. Panels shall be “Armor-Tile” as manufactured by Engineered Plastics, Inc. or as approved by the Engineer.

iii. STAINLESS STEEL PANEL: The detectable warning panel shall be manufactured of stainless steel and coated with a factory applied durable, skid resistant surface powder coating. The coating shall be UV stable. Panel shall be ADA compliant, safety yellow in color and manufactured by MetaDome, LLC or as approved by the Engineer.

b. TRUNCATED DOME CONFIGURATION: The detectable warning panel shall consist of surface of truncated domes aligned in a square grid pattern.
   i. Dome Size – Truncated domes in a detectable warning surface shall have a nominal diameter of 0.9 inches, a top diameter of 50% of the base diameter minimum to 65% of the base diameter maximum, and a height of 0.2 inches.

   ii. Dome Spacing – Truncated domes in a detectable warning surface shall have a center-to-center spacing of nominal 2.35 inches.

   iii. Size – Detectable warning surfaces shall extend twenty-four (24) inches in the direction of travel and the full width of the curb ramp landing.

c. The detectable warning surface shall be located so that the nearest edge is 8” minimum from the face of the curb.

d. The panel will be installed according to the manufacturer’s recommendations. All cost for labor, material, and equipment shall be included in the price bid for “Detectable Warning Panels”.

2.6 CONCRETE MIXTURES

A. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete determined by either laboratory trial mixes or field experience.

   a. Use a qualified independent testing agency for preparing and reporting proposed concrete mixture designs for the trial batch method.

B. Proportion mixtures to provide normal-weight concrete with the following properties:

   a. Compressive Strength (28 Days): 2500 psi

   b. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.45.

   c. Slump Limit: 3 inches, plus or minus 1 inch.
C. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content as follows:
   a. Air Content: 6-1/2 percent plus or minus 1.5 percent for Curb and Gutter
   b. Air Content: 6 1/2 percent plus or minus 1.5 percent for sidewalks and driveways

D. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

E. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.

F. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement according to ACI 301 requirements as follows:
   a. Fly Ash or Pozzolan: 20 percent.

2.7 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Furnish batch certificates for each batch discharged and used in the Work.
   a. When air temperature is between 85 deg F and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine exposed sub-grades and sub-base surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.

B. Proof-roll prepared base surface below concrete pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding.
   a. Completely proof-roll base in one direction and repeat in perpendicular direction. Limit vehicle speed to 3 mph.
   b. Proof-roll with a loaded 10-wheel tandem-axle dump truck weighing not less than 15 tons.
   c. Base with soft spots and areas of pumping or rutting exceeding depth of 1 inch or as determined by the Engineer require correction according to requirements in Division 31.
   d. In areas that rut less than 1 inch the ruts shall be filled with base material, compacted and brought to grade.

C. Proceed with concrete pavement operations only after nonconforming conditions have been corrected and subgrade is ready to receive pavement.

3.2 PREPARATION

A. Remove loose material from compacted sub-base surface immediately before placing concrete.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

TVCE Curbs, Gutters, Sidewalks, & Driveways 321600-4
A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for pavement to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.

B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

### 3.4 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.

C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.

### 3.5 JOINTS

A. General: Form construction, isolation, and contraction joints and tool edgings true to line with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline, unless otherwise indicated.

   a. When joining existing pavement, place transverse joints to align with previously placed joints, unless otherwise indicated.

B. Construction Joints: Set construction joints at side and end terminations of pavement and at locations where pavement operations are stopped for more than one-half hour unless pavement terminates at isolation joints.

   a. Continue steel reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of pavement strips, unless otherwise indicated.

C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated.

   a. Locate expansion joints at intervals of 50 feet (15.25 m), unless otherwise indicated.

   b. Extend joint fillers full width and depth of joint.

   c. Terminate joint filler not less than 1/2 inch (13 mm) or more than 1 inch (25 mm) below finished surface if joint sealant is indicated.

   d. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.

   e. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.

   f. Protect top edge of joint filler during concrete placement with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.
D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows to match jointing of existing adjacent concrete pavement:
   a. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a ¼-inch (6mm) radius. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover marks on concrete surfaces.
   b. Sawed Joints: Form contraction joints with saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch (3-mm-) wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.
E. Edging: Tool edges of pavement, gutters, curbs, and joints in concrete after initial floating with an edging tool to a 1/4-inch (6-mm) radius. Repeat tooling of edges after applying surface finishes. Eliminate tool marks on concrete surfaces.

3.6 CONCRETE PLACEMENT

A. Inspection: Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast in. Notify other trades to permit installation of their work.
B. Remove snow, ice, or frost from sub-base surface and reinforcement before placing concrete. Do not place concrete on frozen surfaces.
C. Moisten sub-base to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.
D. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.
E. Do not add water to concrete during delivery or at Project site.
F. Do not add water to fresh concrete after testing.
G. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.
H. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.
   a. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement, dowels, and joint devices.
I. Place concrete in two operations; strike off initial pour for entire width of placement and to the required depth below finish surface. Lay welded wire fabric or fabricated bar mats immediately in final position. Place top layer of concrete, strike off, and screed.
   a. Remove and replace concrete that has been placed for more than 15 minutes without being covered by top layer, or use bonding agent if approved by Architect.
J. Screed pavement surfaces with a straightedge and strike off.
K. Commence initial floating using bull floats or darbies to impart an open textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

L. Curbs and Gutters: When automatic machine placement is used for curb and gutter placement, submit revised mix design and laboratory test results that meet or exceed requirements. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing as specified for formed concrete. If results are not approved, remove and replace with formed concrete.

M. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
   a. When air temperature has fallen to or is expected to fall below 40 deg F (4.4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C) and not more than 80 deg F (27 deg C) at point of placement.
   b. Do not use frozen materials or materials containing ice or snow.
   c. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mix designs.

N. Hot-Weather Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:
   a. Cool ingredients before mixing to maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
   b. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
   c. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.7 FLOAT FINISHING

A. General: Do not add water to concrete surfaces during finishing operations.

B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats, or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.
   a. Medium-to-Fine-Textured Broom Finish: Draw a soft bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.

3.8 CONCRETE PROTECTION AND CURING

A. Refer to Caltrans Standard Specifications for Concrete Protection and Curing.
3.9 A.D.A. CURB RAMP CONSTRUCTION

A. Sidewalk curb approach ramps shall be constructed to current A.D.A. standards as detailed in the plans.
B. Surface Texture: A.D.A. surface texture requirements shall be met with the installation of the A.D.A. compliant detectable warning panels inserted in the sidewalk approach ramps as indicated in the details.
C. Ramp Coloring: Curb ramp shall be Safety or Federal Yellow to meet A.D.A. contrast requirements and expansion material shall be used adjacent to the curb and gutter section.
D. Slope
   a. New construction
      i. Maximum slope shall be 1 foot vertical to 12 feet horizontal. Maximum rise for any run shall be thirty (30) inches or less.
   b. Reconstruction
      i. Curb ramps reconstructed where space limitations prevent the use of 1:12 slopes may have the following:
         1. Slopes between 10 and 12 to 1 are allowed a maximum rise of 6 inches.
         2. Slopes between 8 and 10 to 1 are allowed for a maximum rise of 3 inches.
         3. Slopes greater than 8 horizontal to 1 vertical are not allowed.
   c. Side slope
      i. When curb ramps are located where pedestrians must walk across the ramp, the ramp shall have flared sides with a maximum slope of 1-foot vertical to 10 feet horizontal.

3.10 PAVEMENT TOLERANCES

A. Comply with tolerances of ACI 117 and as follows:
   a. Elevation: 1/4 inch (6 mm).
   b. Thickness: Plus 3/8 inch (10 mm), minus 1/4 inch (6 mm).
   c. Surface: Gap below 10-foot- (3-m-) long, unleveled straightedge not to exceed 1/4 inch (6 mm).
   d. Joint Spacing: 3 inches (75 mm).
   e. Contraction Joint Depth: Plus ¼ inch (6 mm), no minus.
   f. Joint Width: Plus 1/8 inch (3 mm), no minus.

3.11 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
   a. Testing Frequency: Obtain at least 1 composite sample for each 100 cu. yd. (76 cu. m) or fraction thereof of each concrete mix placed each day.
i. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

b. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.

c. Air Content: ASTM C 231, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.

d. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.

e. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.

f. Compressive-Strength Tests: ASTM C 39/C 39M; test 1 specimen at 7 days and 2 specimens at 28 days.

i. A compressive-strength test shall be the average compressive strength from 2 specimens obtained from same composite sample and tested at 28 days.

C. Strength of each concrete mix will be satisfactory if average of any 3 consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).

D. Test results shall be reported in writing to Architect, Engineer, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.

F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.

G. Remove and replace concrete pavement where test results indicate that it does not comply with specified requirements.

H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.12 REPAIRS AND PROTECTION

A. Remove and replace concrete pavement that is broken, damaged, or defective or that does not comply with requirements in this Section.
B. Drill test cores, where directed by Architect, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with portland cement concrete bonded to pavement with epoxy adhesive.
C. Protect concrete from damage. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.
D. Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 321600
PART 1 GENERAL

1.1 SECTION INCLUDES

A. Pipe, fittings, hardware, appurtenances for domestic water mains, service lines, and typical fire suppression.

1.2 MEASUREMENT AND PAYMENT

A. Water Main: paid per Section 004100 per Linear Foot actually installed and field verified. Work includes all labor, materials, and equipment necessary to install main water lines from existing water facilities to new locations as described and depicted in the plan sets.

B. Service Lines: paid per Section 004100 per Linear Foot actually installed and field verified. Work includes all labor, materials, and equipment necessary to install water service facilities including connection to new mains, installation of meters and pressure regulating valves, pipeline, hose bibs, control valves, and stub-outs for future connection to buildings. Measurement and payment for water services shall be per service as per the bid schedule.

1.3 RELATED SECTIONS

A. Division 31.

B. Section 033000: Concrete.

1.4 REFERENCES

A. ASTM D2239 - Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Controlled Outside Diameter.

B. ASTM D2466 – Poly (VinylChloride) (PVC) Plastic Pipe (SDR-PR)

C. AWWA B300 - Standard for Hypochlorites.

D. AWWA B301 - Standard for Liquid Chlorine.

E. AWWA C651 - Standards for Disinfecting Water Mains.

1.5 SUBMITTALS

A. Product and manufacturer data.

B. Test Reports: Indicate results compared to specified requirements.

1.6 PROJECT RECORD DOCUMENTS

A. Disinfection report:

1. Type and form of disinfectant used.

TVCE WATER SERVICE 331100-1
2. Date and time of disinfectant injection start and time of completion.
3. Test locations.
4. Initial and 24 hour disinfectant residuals in ppm for each outlet tested.
5. Date and time of flushing start and completion.
6. Disinfectant residual after flushing in ppm for each outlet tested.

B. Bacteriological report:
1. Date issued, project name, and testing laboratory name, address, and telephone number.
2. Time and date of water sample collection.
3. Name of person collecting samples.
4. Test locations.
5. Initial and 24 hour disinfectant residuals in ppm for each outlet tested.
6. Coliform bacteria test results for each outlet tested.
7. Certification that water conforms, or fails to conform, to bacterial standards of EPA.
8. Copies of all reports shall be supplied to the Engineer within 48 hours of test completion.

1.7 QUALITY ASSURANCE

A. Perform work in accordance with AWWA C651.
B. Submit name of EPA certified laboratory.
C. Submit bacteriologist's signature and authority associated with testing.

PART 2 PRODUCTS

2.1 WATER PIPE

A. Polyethylene Pipe: ASTM D2239, IPS size, for 200 PSI pressure rating.
B. Joints: Non-Flare Compression equal to Ford Pack Joints.
C. PVC Pressure Pipe, Schedule 40: ASTM D1785, IPS size, for 200 PSI pressure rating.
D. Fittings: PVC, Schedule 40, ASTM D2466

2.2 CURB STOPS - UP TO 2 inch

A. Manufacturer: McDonald Model 6104 - 33 (substitutions permitted).
B. Brass body, TFE coated brass ball supported by two Buna-N-Seats, IPS ends, 300 PSI rating.

2.3 SADDLES

A. Manufacturers:
   1. Ford Model S70 and S90
   2. James Jones Co., Model J995 and J996
2.4 CORPORATION STOPS

A. Manufacturers:
   1. Ford FB1101
   2. James Jones Co., Model J1936

2.5 COPPERSETTERS

A. Manufacturers:
   1. Ford Model VH72
   2. Substitutions: Will be permitted.

2.6 CURB BOXES

A. Manufacturer: McDonald, Minneapolis Pattern - with foot piece, 5½-inch (substitutions permitted).

2.7 WATER METERS

A. Manufacturer: Sensus SR-EB11 (substitutions permitted per approval).

2.8 WATER BOXES

A. Christy Model B9 Box with B9G Lid marked “WATER” (substitutions permitted).

2.9 DISINFECTION CHEMICALS

A. Chemicals: AWWA B300, Hypochlorite, and AWWA B301, Liquid Chlorine.

PART 3 EXECUTION

3.1 INSTALLATION - WATER SERVICE LINE

A. Coordinate with the public utility for connection of new water facilities to existing water distribution system. Public utility to make connection of new facilities to existing facilities. Contractor to install all other components of the new water system.
B. Excavate pipe trench according to Section 312300. Hand trim trench where necessary.
C. Establish elevations of buried piping for minimum of 36 inches of cover.
D. Connect the service line to the house plumbing with fittings or adapters manufactured for the conditions encountered to provide a strong, durable, watertight connection. Provide a gate valve and hose bib with vacuum breaker.
E. Set water meter and box in accordance with the drawings and the requirements of the public utility.
F. Backfill and compact according to Section 312300.
3.2 DISINFECTION AND BACTERIOLOGICAL TESTING

A. Examination
   1. Verify that piping system has been cleaned, inspected, and pressure tested.
   2. Perform scheduling and disinfecting activity with start-up, testing, adjusting, and demonstration procedures, including coordination with related systems.

B. Execution
   1. Provide and attach required equipment to perform the work of this Section.
   2. Inject treatment disinfectant into piping system.
   3. Maintain disinfectant in system for 24 hours.
   4. Flush, circulate, and clean until required cleanliness is achieved; use domestic water.

C. Pressure Test for Water Main
   1. Notify Inspector forty-eight (48) hours prior to pressure testing.
   2. Provide required equipment to perform pressure test. Pressure gages used in testing shall be graduated in no more than 5 PSI increments.
   3. Pressure test PVC pipe 2-inches or greater in diameter for 2 hours based on the test section working pressure at the lowest point of elevation.

<table>
<thead>
<tr>
<th>AVERAGE WORKING PRESSURE OF TEST SECTION</th>
<th>TEST PRESSURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 65 psi</td>
<td>100 psi</td>
</tr>
<tr>
<td>65 to 95 psi</td>
<td>140 psi</td>
</tr>
<tr>
<td>Greater than 95 psi</td>
<td>195 psi</td>
</tr>
</tbody>
</table>

4. Leakage rates are total leakage allowed for a two hour test per 50 pipe joints as follows:

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>100 psi</th>
<th>140 psi</th>
<th>195 psi</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 inch</td>
<td>0.27 gal</td>
<td>0.32 gal</td>
<td>0.38 gal</td>
</tr>
<tr>
<td>4 inch</td>
<td>0.54 gal</td>
<td>0.64 gal</td>
<td>0.75 gal</td>
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<tr>
<td>6 inch</td>
<td>0.81 gal</td>
<td>0.96 gal</td>
<td>1.13 gal</td>
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<tr>
<td>8 inch</td>
<td>1.08 gal</td>
<td>1.28 gal</td>
<td>1.51 gal</td>
</tr>
</tbody>
</table>

5. Repair leaks and retest if leakage is above acceptable rates.
6. Leakage rates shall be adjusted proportionally for pipeline lengths greater than or less than 50 pipe joints.
7. The number of pipe joints being tested shall be calculated as the length of pipeline being tested divided by the standard pipe length used on the job, with no allowances for joints caused by the use of couplings or for joints at fittings.

END OF SECTION 331000
SECTION 333000
SANITARY SEWERAGE UTILITIES

PART 1 – GENERAL

1.1 WORK INCLUDED

A. Work may include installation of equipment and incidentals required for sanitary sewer system improvements, including sewer mains, laterals, manholes, flushing inlets, grease traps and interceptors, and pumping facilities in accordance with the requirements of the Contract Documents.
B. Any and all work to be performed on the Collection System shall be inspected and approved by the Engineer.

1.2 REFERENCE STANDARDS

A. ASTM C 900 “All Standard Applicable for SDR35, SDR26, SDR21 AND ASTM C 900 Pipe and Fittings”
C. ASTM D 3034 "All Standards Applicable for SDR35, SDR26, SDR21 Pipe and Fittings".
E. ASTM D 3350 "Standard Specification for Polyethylene Plastic Pipe and Fitting".
F. ASTM D 3965 "Standard Specification for ABS DWV Schedule 40 Foam Core Pipe and fittings"
G. ASTM F585 Standard Practice for Insertion of Flexible Polyethylene Pipe into Existing Sewers.
H. ASTM F 679 "All Standards Applicable for SDR35, SDR26, SDR21 Pipe and Fittings".

1.3 QUALITY ASSURANCE

A. All materials and equipment furnished under this Section shall be:
   a. From a manufacturer who has been regularly engaged in the design and manufacture of the materials and equipment for at least five (5) years; and
   b. Approved by the Engineer before installation. The Engineer shall verify that the quality is equal to the materials and equipment made by those manufacturers specifically named herein, if an alternate product manufacturer is proposed.
B. To validate that specified final elevations have been provided, the Contractor shall provide to the Owner applicable grade certificates. No separate payment will be made for providing such certification. All costs therefore shall be included in the various work item(s) requiring certification.
1.4 SUBMITTALS

A. Shop Drawings: Submit data to show that the product conforms to the specification requirements.
B. Materials List: Submit a list of all materials proposed to be used on the project, showing manufacturer's name, product trade name, type, grade, and weight. Materials list shall be submitted and approved before any installation occurs.
C. Manufacturer’s Warranty: Submit manufacturer’s warranty on the product and a certificate showing compliance with applicable ASTM Standards.

PART 2 – PRODUCTS

2.1 GENERAL

A. Pipe sizes for pipes other than High Density Polyethylene (HDPE) are nominal inside diameter (ID) unless otherwise noted. Pipe sizes for HDPE pipes are specified by outer diameter (OD).
B. All materials delivered to the job site shall be new, free from defects, and shall show manufacturer’s name, trade name, type, grade, weights, and other identifying data.
C. Acceptance of materials shall be subject to strength and quality testing, in addition to inspection of the completed product. Acceptance of installed piping systems shall be based on inspection and testing as specified hereinafter.

2.2 SEWER MAINS

A. Gravity sewer mains shall have a minimum of eight inch (8”) pipe diameter.
B. Pipe materials for gravity sewer mains shall be either High Density Polyethylene (HDPE) SDR 17 or Poly-Vinyl Chloride (PVC) SDR 26. Owner may require specific pipe material to be used based on location or application.
C. In general, HDPE pipe shall be used in areas with dense vegetation where there is likelihood for root intrusion. HDPE pipe shall not be installed in areas with minimal slope.
D. In areas of close proximity to earthquake fault lines, HDPE pipe shall be used unless other pipe materials are recommended by a registered geologist and approved by the Engineer.
E. PVC SDR 26 pipes shall have push-on rubber gasket joints unless otherwise specified and shall at a minimum conform to ASTM D 3034 or ASTM F 679. Rubber gaskets shall be factory installed and conform to ASTM F 477. Pipe joints shall conform to ASTM D 3212. Pipe shall be made of PVC plastic having a cell classification of 12454 or 12364 as defined in ASTM D 1784
F. Gravity HDPE SDR 17 pipe joints shall be butt-fused.
G. Forced main shall be HDPE SDR 11 pipe and joined by electro-fusion couplings.
H. Repairs to all HDPE must be done with electro-fusion couplings.
I. All HDPE pipes to be used shall not be black or any dark color on the interior, or orange, red, magenta, or blue color on the exterior of the pipe.
J. All pipe, fittings, gaskets, joint lubricants and cements/solvents, shall be supplied by the manufacturer, or per manufacturer's specification.

K. Sewer laterals shall have a minimum of four inch (4") diameter and be made of SDR26 PVC pipe, SDR17 HDPE pipe, or ABS Schedule 40. Lateral connections to PVC mains shall be made using a saddle tee or saddle wye. Lateral connection to HDPE mains shall be heat-fused saddle tee.

L. Pipe shall be installed in accordance with ASTM D 2321 and the manufacturer's specifications. Bedding material shall provide adequate and uniform support under the pipe.

2.3 MANHOLES

A. Pre-Cast Concrete Manholes
   a. Pre-cast manhole sections shall be manufactured in accordance with ASTM C 478, "Precast Reinforced Concrete Manhole Sections." Manholes shall be leak free structures. Structures constructed with precast sections shall be constructed using a single manufacturers products and/or with products as may be recommended by the precast section manufacturer.
   b. Manhole Sizes

<table>
<thead>
<tr>
<th>Pipe Diameter</th>
<th>Manhole Diameter</th>
<th>Cover Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>21 inch and smaller</td>
<td>48 inch</td>
<td>24 inch</td>
</tr>
<tr>
<td>24 inch and 27 inch</td>
<td>60 inch</td>
<td>24 inch</td>
</tr>
<tr>
<td>30, 33 and 36 inch</td>
<td>72 inch</td>
<td>24 inch</td>
</tr>
</tbody>
</table>

B. Manhole Cones
   a. Manhole Cones shall be CONCENTRIC.

C. Manhole Bases
   a. Manhole bases shall be cast-in-place in accordance with Owner Standard Drawing unless specified otherwise. Concrete for manhole base shall be 6-sack with a 4,000 psi rating. Top of base channel shall be six inches (6") above the crown of pipe.

D. Manhole Inlet
   a. For manholes with more than one inlet, the invert of the smaller inlet shall be at or above the centerline of the larger pipe. Channel for the side entry shall be properly shaped to provide minimum turbulence in the manhole.

E. Ladder Rungs
   a. Manhole ladder rungs shall be installed for all manholes deeper than four feet (4’). Rungs shall be made of one-half inch (½”) diameter grade 60 steel with Copolymer Polypropylene coating. Steps are to be cast in place during manufacturing of pre-cast barrels and cones.

F. Joint Sealer
   a. Joints in precast manhole sections shall be made of "Ram-Nek" preformed flexible plastic joint sealant or neoprene gaskets.

G. Work on Existing Manholes
   a. When work is performed on existing manholes, plywood shall be used to cover entire channel and a drop cloth shall be used to cover the entire base. This precaution shall be taken to prevent debris from entering the Collection System.
2.4 MANHOLE FRAMES AND COVERS

A. Manhole frames and covers shall conform to applicable Owner Standard Drawing. Non-pressure type manhole frames and covers shall be Phoenix Iron Works P-1090 or D&L Supply A-1024, or equal.
B. Pressure type manhole frames and covers shall be Phoenix Iron Works P-1002 (bolt-down), or equal. Both manhole frames and covers shall meet all requirements of ASTM A 159, "Automotive Gray Iron Castings."
C. Manhole covers shall be labeled “Sanitary Sewer”.
D. Manhole covers shall have at least one pick hole and one edge pry hole.
E. Adjustment rings shall NOT be used on any sewer manhole. Frames must be raised.
F. Anchor bolts shall be fabricated as specified by the equipment manufacturer and, unless otherwise indicated, shall be stainless steel. Cone shall be drilled to accept three-fourths inch (¾") stainless steel inserts. Manhole rim is to be bolted down prior to the pouring of the concrete cap.

2.5 SEWER CLEANOUTS

A. Two-way directional cleanout
   a. Two-way directional cleanout shall be located within 3 feet behind property line and two feet (2’) minimum from the face of the building. Cleanout shall incorporate a cleanout body with threaded cap.
B. Riser Pipe
   a. Cleanout risers shall be the same material that is being used for the lateral and shall extend to within six inches from the underside of the cleanout lid.
   b. Risers for cleanouts shall be continuous pipes (no joints) of the same material as the cleanout.
C. Concrete Boxes and Covers
   a. Cleanout shall be enclosed in concrete box with lid labelled “SEWER” at ground level to be set at minimum 3 inches above Pop-Up Cap. Cast iron lids are required in driveways and areas accessed by vehicles.

2.6 BACKWATER VALVE

A. Backwater valve shall be of the no-hub type, with bolted cover and furnished with a brass flap, and shall be of the Tyler #8270 4-inch model or approved equal conforming to the California Plumbing Code.
B. Backwater valves are to be installed on all sewer laterals with less than 2% grade or when the lowest fixture in a building is lower than the rim of the next downstream manhole. The owner shall place backwater valve in an appropriately sized vault to allow for routine maintenance.

2.7 TRAPS/ INTERCEPTORS/ SEPARATORS

A. When in the judgment of the Engineer waste pretreatment is required, an approved type of grease trap and/or grease interceptor and/or separator complying with the current
provisions of the California Plumbing Code shall be provided. The calculations, along with the manufacturer’s engineered drawings, shall be submitted for review, and will be approved on a case-by-case basis. An effluent sampling box is required on all interceptors and separators.

2.8 PIPE BEDDING

A. Unless otherwise specified, pipe bedding for gravity sewer and force main shall be ¾” drain rock.

2.9 BACKFILL MATERIALS

A. Unless otherwise specified, trench backfill material and backfill requirements shall be as provided under Owner Technical Specifications Section 312300 “Excavation and Backfill”.
B. The minimum depth of cover for any public sewer shall be three feet (3’). Should it be impossible to obtain the specified minimum cover, the sewer pipe shall be either encased in concrete, have a six-inch (6”) concrete cap, be made of ductile iron material, or backfilled with 2 sack cement slurry, as approved by the Engineer.

2.10 MINOR CONCRETE

A. Concrete for minor structures such as pipe encasements, pipe supports, replacement and repair of curb and gutter, sidewalks, and other concrete work, when designated as minor concrete on the plans, shall conform to the provisions of Section 321600 ”Curb, Gutter, and Sidewalks” of the Technical Specifications.

PART 3 – EXECUTION

3.1 TRENCH EXCAVATION

A. Trench excavation and backfill shall be in accordance with Section 312300 ”Trenching and Backfilling” of the Owner’s Technical Specifications, or as noted in the contract documents and plans.

3.2 SEPARATION OF WATER MAINS AND SEWER MAINS

A. The minimum clear distances between the sewer pipe bell or flange and other utility pipes, ducts, and/or structures shall be as follows for sewer pipe four inches (4”) and greater:
   a. Thirty inches (30") for adjacent or parallel utilities.
   b. Sixty inches (60") for high-risk utilities.
   c. Twelve inches (12") for perpendicular or crossing utilities.
3.3 PIPE INSTALLATION

A. Pipe and appurtenances shall be installed in accordance with the best practice, and in conformance with the applicable requirements of ASTM D 2321 Standard Practice for Underground Installation of Flexible Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications” and these specifications. Pipe laying shall start at the low end of each section and proceed upgrade. All bell and spigot pipes shall be laid with the bell end upgrade. Excavate bell holes for each pipe joint. All pipes shall be laid on a bed prepared by handwork, dug true to line and grade, to furnish a true and firm bearing for the pipe throughout its entire length. Adjustment of pipes to line and grade shall be made by scraping away or filling in and tamping material under the body of the pipe throughout its entire length, not by blocking or wedging.

B. After each pipe has been brought to grade, aligned, and placed in final position, initial backfill is to be placed.

C. Mandatory use of shoring at designated locations shall not relieve the Contractor of the responsibility to install shoring at other locations required by the Engineer or where necessary for safety of workers or the general public.

D. Shoring shall be withdrawn only after backfill above pipe has proceeded to a height equal to or greater than three-quarters (3/4) of the excavation depth. Bottom cross bracing and wailers may be left in place upon removal of the sheathing. Backfill shall be brought to the level of the cross-braces before these are removed. Shoring shall be cut above the pipe and left in place only when so required on the plans.

E. The Contractor is solely responsible for installing and extracting the shoring in a manner that will not disturb the line, grade, backfill compaction, or operation of the utility being installed or adjacent utilities and facilities.

F. Place pipe that is to be bedded in concrete cradle or encased in concrete in proper position on temporary supports. When necessary, rigidly anchor or weight the pipe to prevent flotation as concrete is placed. Place concrete for cradles, arches or encasement uniformly on each side of the pipe and deposit at approximately its final position. Concrete placed beneath the pipe shall be sufficiently workable so that the entire space beneath the pipe can be filled without excessive vibration.

G. At the end of each workday, all open ends of pipe installed shall be plugged to the satisfaction of the Engineer.

3.4 CONNECTIONS TO EXISTING MANHOLES

A. Pipe connections to existing manholes shall be done under the direction of the Engineer and other applicable requirements specified for new manholes, including all necessary concrete work, cutting, and shaping of channel.

B. All PVC pipe entering or leaving a manhole shall have a rubber sealing gasket as supplied by the pipe manufacturer, firmly seated perpendicular to the pipe axis, around the pipe exterior and cast into the structure base or near the wall center as a water stop. Water stop may also consist of a manhole coupling with rubber sealing rings cast into the structure base.
C. Existing flow shall be maintained through a bypass. A bypass plan shall be submitted and the Contractor shall be solely responsible for maintaining the bypass and shall be liable for any fines levied by any agency as a result of any spill or overflow.

3.5 CONNECTIONS TO EXISTING PIPE

A. The Contractor shall provide fittings or adapters required to connect new pipe to existing pipe. Detail drawings of such fittings or adapters and the method of connection shall be submitted to the Engineer for approval.
B. Pipelines shall be connected to existing mains as indicated on the drawing. Each connection shall be made at a time and in a manner that will result in the least interruption of service.

3.6 LATERAL SEWER CONNECTIONS TO MAIN SEWERS

A. Lateral sewer size shall be four inches (4") for single-family units and six inches (6") minimum for commercial or industrial buildings and multiple family units. Six inch (6") and larger connections to main sewers are to be made at a manhole. In some circumstances, a new manhole may need to be installed at the applicant's expense.
B. Connections to existing PVC, HDPE and vitrified clay pipe main sewer shall be made by the following methods:
   a. Core a neat trim opening in the upper portion of the PVC main sewer and install a special drilled fitting (i.e., "Tap-Tite") to complete the side sewer connection.
   b. Core a neat trim opening in the upper portion of the PVC main sewer and install a saddle tee or wye using the stainless steel straps and gasket provided by the manufacturer.
   c. Lateral connection to HDPE mains shall be heat-fused saddle tee.
C. Connection to ductile pipe mains shall be made using a Romac style "CB" sewer saddle or an approved equal.

3.7 MANHOLES

A. Manhole Bases
   a. Manhole bases shall be “Cast-In-Place” unless specified otherwise. Manhole bases shall be poured against a minimum of twelve inches (12") of three-quarter inch (¾") drain rock, over undisturbed material, and excavated to the dimensions shown on the plans. The Contractor shall not deviate from plan dimensions, notwithstanding over-excavation or other detrimental field conditions, unless approved by the Engineer. A forming ring shall be used to form a level joint groove in fresh concrete of the manhole base to receive the precast barrel section of the manhole. The metal forming ring shall be removed after the concrete has sufficiently set to eliminate any slump in the joint groove.
   b. Manhole bedding shall be twelve inches (12") of ¾-inch drain rock and shall be placed under manhole base to be cast-in-place and shall be compacted to a relative compaction of ninety-five percent (95%) per Cal 216.
c. Manhole Channels: Where sewer lines ingress and egress manholes, construction shall conform to the Owner Standard Drawings. Pipe shall be used to form the channel. After the base concrete has set, the channel shall be shaped to the final required configuration. Perpendicular channel sides shall not be allowed. All channels shall be approved by the Engineer.

d. Work on Existing Manholes: When work is to be performed above the flow channel of existing manholes, plywood shall be used to cover the entire channel and a drop cloth shall be used to cover the entire base and prevent any debris from entering the flow-channel. Noncompliance will result in the suspension of that portion of the Contractor’s work for the day until the precautionary measures are put in place. No contract time extensions will be granted due to said suspension of work. This precaution shall be taken to prevent debris from entering or obstructing the flow to the Collection System.

e. Work on Existing Manholes: Sanitary sewer connections to existing manholes shall be core-drilled and made using a flexible rubber seal/waterstop. Saw cutting and hammer through taps are prohibited.

f. All connections shall provide for a watertight seal between the pipe and the manhole. The connector shall be the sole element relied upon to assure a flexible water tight seal of the pipe to the manhole.

g. When connecting new pipe to existing manholes, a channel and bench walls shall be installed.

h. The pipe up to the structures shall not project beyond the inside wall of the structure and in no case shall the socket of a vitrified clay pipe be built into the wall of a structure.

i. Flexible connection at manhole tie-in shall be in accordance with applicable Owner Standard Drawings.

B. Joints in pre-cast manhole sections shall be filled using "Ram-Nek" or approved equal in the joint space between matching parts. After placement of the subsequent section, excess sealant squeezed from joint shall be removed and the joint area troweled smooth. Special precautions shall be taken to ensure that the entire joint space is filled with sealant. Apply mortar to all joints. Apply concrete sealant “XYPEX Concentrate” 2 coats to manhole base and 1 coat to inside and outside of barrels.

3.8 ADJUSTING EXISTING FRAMES AND COVERS TO GRADE

A. General

a. Before any work is performed on existing manholes, plywood shall be used to cover entire channel and a drop cloth be used to cover the entire base. This precaution shall be taken to prevent debris from entering the Collection System. Existing frames, covers, or adjustment rings removed during adjustments may be reinstalled only if the materials are undamaged and only if approved in advance by the Engineer. All Owner manholes shall be raised to grade within ten (10) calendar days after street resurfacing. Manholes shall be raised flush with the finished grade of the new road surface. The maximum allowable tolerance shall be one-fourth inch (¼”) measured with a straightedge. Manhole frame and cover
shall be shimmed. The void between the top of manhole cone or ring and the cover frame shall be filled with cement mortar.

B. Downward Adjustments
   a. Downward adjustments can be made by removal of grade rings, mortar, concrete or brick. At no time shall the cone be modified in any way.

C. Manhole Surface Block
   a. Manhole surface blocks (collars) are required on all manholes. A block is to be poured around each adjusted frame. The block is to be eighteen inches (18”) wide as measured from the outside edge of the cover and twelve inches (12”) thick. Concrete is to be poured no more than two inches (2”) from final grade and rough finished to accept asphalt overlay. Frame is then to be grouted to grade to grade rings and cone.

3.9 PUMPING FACILITIES

A. Sewer Lift Stations
   a. New lift stations for the conveyance of sewage by multiple dwellings in new developments will be reviewed and approved on a case-by-case basis. All materials shall be consistent and compatible with stations currently in use by the Owner.

3.10 LATERALS – CLEANOUTS

A. Unless otherwise noted on the plans, all sanitary sewer laterals shall terminate in a cleanout. As a minimum, one two-way cleanout adjacent to the building shall be provided. When the distance from this cleanout to the main exceeds fifty feet (50’) or there is a change of lateral direction, an additional two-way cleanout must be provided in consultation with the Engineer and prior to installation. All cleanouts shall be within the applicant’s property. At no time shall cleanouts in the Owner’s right of way be allowed.

B. Location of all laterals shall be permanently marked by imprinting or carefully chiseling the letter "S" four inches (4”) in height on the top of the curb above the lateral.

3.11 CLEANING SANITARY SEWERS

A. Contractor shall flush and clean all sewer mains by means of pneumatic, sewer cleaning balls or porcupine. The balls or porcupine shall be of the appropriate size to fit the sewer pipe being cleaned. Hydro-flushing or water jet cleaning, operations shall be conducted by experienced personnel. A vacuum/flushing truck shall be used for all hydro-flushing operations.

B. Each section of the sewer line shall be thoroughly cleaned before proceeding to the next section. Where sewer balls will not pass, flexible sewer rods or jet flusher may be used to clear the obstruction. Where obstructions cannot be cleared by sewer rodding, the obstructions shall be removed by excavation at the Contractor's expense. The Contractor shall remove all debris from the sewer lines by installing screens at all downstream manholes, or by using other methods acceptable to the Engineer.
C. The Engineer shall be present for all cleaning operations. The Contractor shall provide written notice to the Engineer twenty-four (24) hours prior to any cleaning operations.
D. Contractor shall use recycled water for sanitary sewer flushing and cleaning operations.

3.12 RECONSTRUCTION OF EXISTING STRUCTURES

A. General: The Contractor, when removing existing structures located on live systems, shall take precautions to ensure that no foreign material enters into the existing sewer lines. Care shall be taken and proper methods employed to prevent dirt, rock, concrete, brick, wood, etc., from entering into the live lines. During the period of time in which the Contractor is working on a live sewer system, Owner maintenance crews shall have continuous access to the structure. All work on the structure shall be complete within 3 days after the original structure is removed.
B. Structure Adjustments and Repair: When work is performed on existing manholes, plywood shall be used to cover entire channel and a drop cloth be used to cover the entire base. This precaution shall be taken to prevent debris from entering the Collection System. This precaution shall remain in place during all work, and when work is complete, shall be removed along with all debris.
C. Reuse of Material: Existing precast material, adjustment rings, frames and covers removed in adjustments and/or repairs may be reinstalled only when such undamaged items are permitted by the Engineer.

3.13 TESTING SANITARY SEWERS

A. Sanitary sewer systems, including laterals and sanitary sewers, shall be tested for tightness, alignment, cleanliness, and compliance with these Standards after completion of all backfilling and prior to request for final inspection. Contractor shall notify the Engineer at least five (5) working days in advance of proposed testing dates. Tests of gravity sewers shall be made from end of pipe or manhole to manhole unless grades are flat enough to permit testing of two or more sections at one time. All testing shall be performed under the presence of the Engineer. No payment will be made nor will any permit be signed off without the successful completion of all phases of testing.
B. The Contractor shall take all necessary precautions to prevent any joint from drawing ground water while the pipeline and its appurtenances are being tested. Contractor shall, at own expense, correct any excess leakage and repair any damage to the pipe, structures, and appurtenances resulting from or caused by this test. Where the actual leakage exceeds the allowable leakage, the Contractor shall discover the cause and remedy it before the test is accepted. If the leakage is less than that allowed and leaks are observed, such leaks shall be repaired at the Engineer’s direction.
   a. Main Sewers: Main sewers shall be tested after they have been inspected and cleared of obstructions and following backfill, but prior to repaving. Each section of sewer shall be tested between successive manholes by closing the lower end of the sewer to be tested and the inlet sewer of the upper manhole with stoppers.
   b. At the Contractor's option, either the hydrostatic or the air test may be used. The Engineer shall require video inspection be performed on newly constructed sewer mains and laterals. The Contractor shall pay for all associated testing costs.
c. In the event that any portion of the new sewer main or lateral are found to be deficient during any phase of the testing, repairs shall be made within a reasonable time frame and in conformance with these specifications. All repairs shall be retested and shall be re-televised at the Contractor’s expense.

d. Hydrostatic Test:
   i. Fill the pipe and manhole with water to a point four feet (4’) below the ground surface of the upper manhole, but in no case less than four feet (4’) above the pipe invert. If ground water is present, the water surface in the upper manhole shall be at least four feet (4’) above the level of the ground water. The line shall be filled at least one (1) hour prior to testing and shall be tested at least two (2) hours, maintaining the head specified above with measured additions of water. The sum of these additions shall be the leakage for the test period.
   ii. The maximum allowable head of water above any portion of sewer being tested shall be fifteen feet (15’). Where the difference in elevation between successive manholes exceeds fifteen feet (15’), a “Test Tee” shall be installed between manholes, and testing shall be carried on between the tee and the manhole.
   iii. The allowable leakage shall not exceed one-tenth gallon (0.1) per minute per inch diameter per one thousand feet (1,000’) of main line sewer being tested for a two (2) hour duration test.

e. Mandrel Testing of PVC Sewer Main:
   i. The Contractor shall pull a mandrel through each segment of installed PVC sewer main to test the amount of deflection incurred during installation. This test shall be done after the pipe trench has been backfilled and compacted to the level of the pavement subgrade in paved areas or to the ground surface in unpaved areas. The Engineer shall observe mandrel testing. The Contractor shall give at least five (5) working days notice to the Engineer before commencing mandrel testing.
   ii. Mandrels shall be full circle, solid or rigid odd numbered (nine leg minimum) steel cylinders with pulling rings at each end and approved by the Engineer. The circular cross section of the mandrel shall have a diameter no smaller than ninety-five percent (95%) of the average inside diameter of the pipeline being tested. The length of the mandrel shall be no less than two times the full cross section diameter. A separate pull line shall be attached to each pull ring to facilitate removal of the mandrel if an obstruction is encountered.
   iii. Mandrels shall be pulled through the pipeline by hand without the aid of mechanical pulling devices. Any deficiencies found by mandrel testing shall be corrected by the Contractor, at the Contractor’s expense. Deficiencies shall be repaired by excavating the pipe at least to the pipe spring line. Pipe bedding and backfill shall be re-compacted after the repair. Internal rounding or vibration to correct deflection shall not be permitted. After repair and re-compaction of the pipe bedding and trench backfill material, the pipe shall be retested using the mandrel. Any pipe failing two mandrel tests shall be replaced.
iv. PVC Sewer Mandrel Sizes:

<table>
<thead>
<tr>
<th>Pipe Size (inches)</th>
<th>Mandrel O.D. (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>5.619</td>
</tr>
<tr>
<td>8</td>
<td>7.524</td>
</tr>
<tr>
<td>10</td>
<td>9.405</td>
</tr>
<tr>
<td>12</td>
<td>11.191</td>
</tr>
<tr>
<td>15</td>
<td>13.849</td>
</tr>
<tr>
<td>18</td>
<td>16.924</td>
</tr>
<tr>
<td>21</td>
<td>19.952</td>
</tr>
<tr>
<td>Over 21</td>
<td>Follow Manufacturer’s Spec.</td>
</tr>
</tbody>
</table>

f. 6. Air Test:

i. Air test shall be applied to each length between adjacent manholes, and the procedure shall be as follows:

1. Pressurize the test section to approximately four (4.0) psig. After this pressure is reached, allow pressure to stabilize. The pressure will normally drop as the air temperature stabilizes. This will usually take two (2) to five (5) minutes, depending on the pipe size. The pressure should be reduced to three and five-tenths (3.5) psig before starting the test. Start the test when the pressure is at three and five-tenths (3.5 psig). If the pressure drops below two and five-tenths (2.5) psig in less than the time given in the following table, the section of pipe shall not have passed the test:

<table>
<thead>
<tr>
<th>Size</th>
<th>Minimum Time per 100 ft. Test Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>4”</td>
<td>1 min. 53 sec</td>
</tr>
<tr>
<td>6”</td>
<td>2 min. 50 sec</td>
</tr>
<tr>
<td>8”</td>
<td>3 min. 47 sec</td>
</tr>
<tr>
<td>10”</td>
<td>4 min. 43 sec</td>
</tr>
<tr>
<td>12”</td>
<td>5 min. 40 sec</td>
</tr>
<tr>
<td>15”</td>
<td>7 min. 05 sec</td>
</tr>
<tr>
<td>18”</td>
<td>8 min. 30 sec.</td>
</tr>
<tr>
<td>21”</td>
<td>9 min. 55 sec.</td>
</tr>
<tr>
<td>24”</td>
<td>11 min. 20 sec.</td>
</tr>
<tr>
<td>27”</td>
<td>12 min. 45 sec.</td>
</tr>
</tbody>
</table>

2. b. When the prevailing groundwater is above the line being tested, air pressure shall be increased forty-three hundredths (0.43) psig for each foot the water table is above the invert of the line.

3. The pressure gauge used shall be supplied by the Contractor, shall have minimum divisions of one-tenth pound per square inch gauge (0.10 psig), and shall have an accuracy at least of four-hundredths of a pound per square inch gauge (0.04 psig). The gauge shall have been calibrated within forty-five (45) calendar days of the air test and the calibration tag shall be affixed to the gauge.

4. The gauge assembly shall be equipped with three-quarter inch (3/4") IPT nipple and isolation valve to allow the Engineer to install a second gauge.

5. The Owner may test pressure gauges for accuracy.
g. Video Inspection
   i. All sewer main repairs, sewer lateral, and cleanout installations shall be televised in conformance with Paragraph 3.16 Closed Circuit Television Inspection of Sewer Lines below. All televising shall be performed at the Contractor’s expense. No sags greater than one-quarter inches (1/4”) shall be allowed.

3.14 CLOSED CIRCUIT TELEVISION INSPECTION OF SEWER LINES

A. Intent
   a. It is the intent of this Specification to provide for the inspection of pipelines utilizing closed-circuit television techniques to identify the location and extent of sewer line defects to allow for a determination of rehabilitation needs, to document pre-rehabilitation line condition, and/or to document post-rehabilitation line condition and/or new construction.

B. Scope of Work
   a. Prior to performing closed circuit television inspection activities, Contractor shall thoroughly clean the sewer line(s) designated to be televised.
   b. All new sewer mains, sewer laterals, and cleanouts shall be video inspected in accordance with item “D” below. Cleanouts and laterals shall be videoed upon completion of installation. Video shall include the vertical portion of the cleanout.

C. Safety
   a. Contractor shall be solely responsible for safety during the performance of all work. Contractor shall not enter into any sewer segment where hazardous conditions may exist until such time as the source of those conditions is identified and eliminated. Contractor shall perform all work in accordance with the latest OSHA confined space entry regulations. Contractor shall coordinate his work with the Engineer. The Engineer presence shall be requested at least five (5) working days in advance.
   b. Contractor shall be responsible for any damage to public or private property resulting from his/her televising activities and shall repair or otherwise make whole such damage at no cost to the Owner.

D. Equipment
   a. Television inspection equipment shall have an accurate footage counter that displays on a remote monitor the exact distance of the camera from the centerline of the starting manhole. The camera shall be of the remotely operated pan and tilt type. The rotating camera and lighthead configuration shall provide 240 degrees of pan and tilt angle measuring centerline to centerline and 70 degree lens viewing angle.
   b. The camera shall be color and shall provide a minimum of 1280H x 720W pixels for a total of 921,600 pixels at 30 frames per second resolution. Geometrical distortion of the image shall not exceed one percent (1%).
   c. The color camera shall be equipped with the necessary circuitry to allow for the remote adjustment of the optical focus and iris from the power control unit at the viewing station.

E. Execution
a. Inspection of pipelines shall be performed by experienced personnel trained in locating breaks, obstacles, and service connections by closed circuit television inspection techniques. The interior of the pipeline shall be carefully inspected to determine the location and extent of all pipeline defects. The location of any conditions which may result in a limitation of rehabilitation techniques that could be used and/or prevent proper installation of designated rehabilitation materials in the pipelines shall be noted so that these conditions can be considered and, if necessary, corrected prior to actual rehabilitation.

b. Contractor shall internally inspect, via closed circuit television inspection, the sewer segments as required. Generally, inspection shall be completed one sewer line section at a time. Access for televising purposes shall only be via existing manholes. Should access to a particular sewer section be difficult and adjacent sections require television inspection, Contractor may be allowed to complete inspection in multiple sewer line sections. When multiple sewer line sections are inspected using one setup, Contractor shall zero the camera’s footage metering device at each subsequent sewer manhole to establish uniform starting location of Station 0+00 for each line section televised.

c. At all defects and service connections, the camera shall be stopped and the pan and tilt features shall be used to obtain a clear picture. Where possible, the camera shall be panned to view up each lateral or point of connection.

d. Contractor shall record these inspections on high quality DVD and on a Contractor’s log. DVD shall include a visual and audio narrative noting:
   i. Date, time of day, and depth of flow.
   ii. Sewer segment number. Segment numbers shall be designated by the Engineer.
   iii. Upstream manhole number.
   iv. Downstream manhole number.
   v. Type of sewer (e.g. sanitary, storm, combined).
   vi. Size of sewer.
   vii. Sewer materials of construction.
   viii. Closest street address and street name on which sewer is located.
   ix. Beginning and ending tape counter numbers for each run (manhole to next manhole) of sewer inspected.
   x. Direction of movement of camera, heading, and direction of flow.
   xi. Locations of service connections into sewer by clock position and with counter distance in feet from beginning manhole’s centerline.
   xii. Location (start and end counter distances in feet from the beginning manhole’s centerline) and description of obstructions, structural defects, missing pieces of pipe, longitudinal and/or circumferential cracking, joint deterioration including open and/or offset joints, ovality, leakage or evidence thereof, corrosion, erosion, break-in connections, protruding connections, mineral deposits, roots, previous repairs, grease/fats/oil deposits on pipe walls, sags, and other abnormalities with respect to the sewer’s condition with counter distance in feet from the beginning manhole’s centerline.

e. Contractor’s Log
i. The Contractor’s log shall contain the same information as above.
f. If during television operation television camera will not pass safely through entire sewer line section being investigated, Contractor shall, at no additional cost to the Owner, set up equipment so that inspection can be performed from opposite (downstream) manhole. Where an obstruction is encountered and a reverse set up is required, the distance shall be entered into the log and verbally noted on the video from which manhole the measurements are being made. If under the reverse set-up the camera again fails to pass through the entire sewer line section, inspection shall be considered complete. All obstructions in the sewer segment that prohibit passage of the television camera shall be immediately reported to the Engineer by Contractor referencing location and nature of the obstruction. No rehabilitation work shall proceed until Contractor receives direction from the Owner regarding removal of the obstruction.
g. Should Contractor’s televising equipment become lodged in any sewer line, it shall be removed by Contractor at his expense. This shall include, if necessary, excavation and repair of the sewer, underground utility repairs, backfilling and surface restoration. Contractor shall re-televise any line segment in which his equipment became lodged after said equipment has been removed to demonstrate to the Owner that no damage exists as a result of his televising operations.

F. Bypass Pumping/Flow Control
   a. When required, Bypass Pumping shall be in accordance with Owner Standard Specifications “Section 33 31 50 Bypass Pumping”.

G. Acceptance
   a. Contractor shall present on DVD a continuous image in complete conformance with these Specifications of not less than ninety percent (90%) of the internal pipe surface at all times, including sags in sewer lines. The video inspection shall be accompanied by a complete log. Maximum acceptable speed of camera through sewer shall be thirty feet (30’) per minute. Lighting system shall be adequate for quality color picture at least five feet (5’) in front of the camera’s lens. Contractor shall re-clean and televise any segment for which video tape does not present a clear image of at least 90% of the internal pipe surface at all times, and/or is accompanied by an incomplete log.

H. Measurement and Payment
   a. Payment for closed-circuit television inspection work which is not required as part of a construction contract for sewer line rehabilitation shall be made on an actual televised lineal footage basis per diameter of sewer televised, and shall include the cost of all items necessary to complete the closed circuit television inspection, including any bypass pumping/flow control which may be required.
   b. No direct payment shall be made for closed-circuit television inspection services required as part of a construction contract for sewer line rehabilitation. Payment for television inspection shall be included in the contract bid prices for the related sewer rehabilitation items.
   c. Payment for closed-circuit television inspection work which is part of a new development to be accepted by the Owner shall be the responsibility of the developer and shall include the cost of all items necessary to complete the closed-
circuit television inspection including any bypass pumping/flow control which may be required.

3.15 SANITARY SEWER PLUGS

A. All ends of sanitary sewers provided for future connection shall be plugged with "Polycap" stoppers providing the same joint characteristics as specified for the sanitary sewer main or lateral.

3.16 ABANDONMENT OF SANITARY PIPES AND MANHOLES

A. Sanitary Sewer Facilities shall be abandoned as follows:
   a. Sewers, Sanitary Sewers, and Force Mains
      i. Sewers, sanitary sewers, or force mains to be abandoned shall be plugged with mortar and an eight inch (8") thick concrete brick wall. The Owner of San Bruno Technical Specifications 33 30 00 - 25 Sanitary Sewerage Utilities facility being abandoned shall be filled with sand or concrete slurry and plugged. No timber bulkheads shall be allowed.
   b. Laterals
      i. Numerous existing buildings use common or shared laterals. The Contractor shall determine if the lateral is common/shared prior to abandonment. The requirements to abandon laterals are as follows:
         1. If the lateral serves one building and is NOT part of a common/shared lateral: The downstream end of the lateral shall be sealed with a manufactured watertight cap/stopper made specifically for the purpose of sealing/capping the end of a sanitary sewer. The cap/stopper shall be installed per manufacturer’s recommendation and in such a way to prevent any source of water from entering the sanitary sewer system. Any device or material that may slide into the lateral and potentially cause a blockage or obstruction in the mainline sewer will not be allowed. The cap/stopper shall be installed on a defect free portion of the lateral immediately before the wye connection to the Owner main. If defects are found in the wye connection, the Contractor shall excavate toward the main and the wye shall be removed and replaced with a new portion of equally sized pipe. The remaining portion of the lateral from the point of termination to structure shall be sealed at both ends with a manufactured watertight cap/stopper made specifically for the purpose of sealing/capping the end of a sanitary sewer. The cap/stopper shall be installed on a defect free portion of the lateral. If defects are found then the Contractor shall excavate the lateral until a defect free portion of the lateral is located.
         2. If the lateral serves more than one building and IS part of a common/shared lateral: If at least one service from the common lateral is intended to remain, the connecting fitting for the laterals
shall be removed and replaced with a new section of straight pipe or an elbow of sufficient angle to provide a smooth transition between the existing portions of the lateral. Elbow shall be a manufactured fitting and shall be installed per manufacturer’s recommendation to assure a watertight seal.

c. Manholes
   i. Manholes to be abandoned shall have their cones removed, backfilled and compacted to ninety-five percent (95%) relative compaction. Frames and covers not to be reused shall be delivered to the Owner as directed by the Engineer.

3.17 REPAIR/RESTORATION OF PROPERTY

A. Any repair or restoration work resulting from Contractor's activity shall be completed within twenty-four (24) hours. Contractor may use the sod saved from the existing lawn or use new sod/seed to match existing lawn. Any concrete or other repair shall match existing. Contractor shall maintain the new planting for a minimum thirty (30) day period.

3.18 CONSTRUCTION PROCEDURES, CONNECTIONS AND SYSTEM RE-ROUTING

A. Construction involving expansion and/or modification of the existing Collection System shall be performed in a manner resulting in the minimum possible interruption during construction.
B. Prior to the start of any construction, the Contractor shall submit a schedule of all planned flow disruptions required for completion of project and shall indicate anticipated date, work to be performed, and estimated duration of work.
C. Prior to any disruption of flow, all labor, materials, fittings, supports, equipment and tools needed for the scheduled work, as well as possible emergency work, shall be on the site.
D. All connections involving flow disruption of Owner's existing facilities shall be done in the presence of the Engineer. The Contractor shall complete the connection work without interruption.
E. Planned Flow Disruption
   a. Flow disruptions are subject to the following constraints:
      i. Flow disruptions will not be performed on a Monday, Friday or on the first workday following a Owner holiday. (It is preferred that flow disruptions also not be performed on the day preceding a Owner holiday, if possible.)
      ii. Under special circumstances, and only upon approval by the Owner, flow disruptions may be scheduled on a weekend or during non-working hours.
      iii. No more than two flow disruptions of the Collection System will be performed on any two consecutive workdays. This includes all disruptions, whether scheduled by the Owner, the Contractor or other parties.
iv. The Engineer must receive the flow disruption request in writing from the Contractor at least six (6) calendar days prior to the anticipated date of the disruption of flow. A bypass plan must be submitted.

v. The Owner will review the request to ensure that the Contractor will have all materials available and complies with all provisions of the Owner's procedures, including the submission of required information and scheduling requirements.

vi. All excavations required to make the connection must be completed and approved at least twelve (12) hours prior to the scheduled flow disruption.

vii. If the flow disruption is cancelled or cannot be performed, the Contractor will notify the Engineer at least twenty-four (24) hours in advance of the requested disruption date.

3.19 AS-BUILT DRAWINGS

A. As-built drawings for all projects shall be updated daily and shall be made available to the Owner. Location of all pipes, manholes and other sewer system appurtenances, as specified by the contract documents, shall be verified by a licensed surveyor and shall be incorporated into the as-built records at the expense of the Contractor. At the completion of the project, the as-built drawings shall be submitted to the Owner together with an electronic copy of the as-builts in a form acceptable to the Engineer and compatible with the Owner’s Standards. Final payment to the Contractor for the project will not be made until the as-built drawings are submitted, verified and accepted.

PART 4 - MEASUREMENT AND PAYMENT

4.0 WORK INCLUDED

A. The work shall include furnishing of all labor, materials, equipment, and incidentals required for sanitary sewer system improvements. Work items shall include but not be limited to construction and replacement of sewer mains, laterals, and manholes, abandonment and plugging of existing main sanitary sewers, verification of rim and invert elevations, as built drawings, use of approved confined space equipment, trench shoring per OSHA requirements, and compliance with San Francisco Bay Area Sanitary Sewer Overflow Monitoring and Reporting Program requirements.

B. The above prices and payments shall include full compensation for furnishing all labor, materials, tools, equipment, confined space equipment and use thereof, testing, inspections, including probing and locating other utilities, excavation, backfill, aggregate base, pavement restoration, sidewalk restoration, sheeting and shoring, ditching, diking, pumping, bailing, draining, furnishing and maintaining services and equipment for traffic safety and dewatering, and incidental work for properly and safely constructing, replacing, or upgrading sewers, complete in place and fully functional, as shown on the plans and as specified in these specifications. Unless otherwise specified in the Special Provisions, no separate payment will be made for bends, wyes, tees and other fittings. All associated costs therefore shall be included in the unit price for pipe requiring the fitting.
4.1 SEWER MAINS

A. The lengths of the various types and sizes of sewer pipes will be measured and paid for by the linear foot of horizontal length actually installed. Pipe lengths between manholes will be measured and paid only between interior faces of manholes.

4.2 LATERALS

A. Laterals will be determined and paid for per linear foot installed in place for the different sizes of laterals or as specified in the Special Provisions. Laterals designated for transfer from an existing sewer main to a new sewer main will be paid as units.

4.3 MANHOLES

A. Manholes, including frames and covers, will be measured and paid for as unit price each. Existing manhole covers shall be salvaged and delivered to the Owner as directed by Owner Staff.

END OF SECTION 333000
## SUBSTITUTION REQUEST
(After the Bidding/Negotiating Phase)

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Differences between proposed substitution and specified product:

- Point-by-point comparative data attached — REQUIRED BY A/E

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Similar Installation:

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Proposed substitution affects other parts of Work:  No  Yes; explain

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<th>Savings to Owner for accepting substitution:</th>
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Proposed substitution changes Contract Time:  No  Yes  [Add]  [Deduct]  _______ days.

Supporting Data Attached:  Drawings  Product Data  Samples  Tests  Reports  _______
SUBSTITUTION REQUEST
(After the Bidding/Negotiating Phase — Continued)

The Undersigned certifies:
- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: __________________________

Signed by: ____________________________

Firm: ________________________________

Address: _______________________________

Telephone: ____________________________

Attachments: □

A/E’S REVIEW AND ACTION

☐ Substitution approved - Make submittals in accordance with Specification Section 01 25 00 Substitution Procedures.
☐ Substitution approved as noted - Make submittals in accordance with Specification Section 01 25 00 Substitution Procedures.
☐ Substitution rejected - Use specified materials.
☐ Substitution Request received too late - Use specified materials.

Signed by: ____________________________ Date: __________________

Additional Comments: □ Contractor □ Subcontractor □ Supplier □ Manufacturer □ A/E

□ Other: ________________________________
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No progress payments shall be made to the contractor unless a schedule of amounts for contract payments in accordance with the construction contract is received.

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. This agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless that collection displays a valid OMB control number.

Construction practices and HUD administrative requirements establish the need that HAs maintain certain records or submit certain documents in conjunction with the oversight of the award of construction contracts for the construction of new low-income housing developments or modernization of existing developments. These forms are used by HAs to provide information on the construction progress schedule and schedule of amounts for contract payments. Responses to the collection of information are required to obtain a benefit or to retain a benefit. The information requested does not lend itself to confidentiality.

### Project Name and Location

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To the best of my knowledge, all the information stated herein, as well as any information provided in the accompaniment herewith, is true and accurate.

**Warning:** HUD will prosecute false claims and statements. Conviction may result in criminal and/or civil penalties. (18 U.S.C. 1001, 1010, 1012; 31 U.S.C. 3729, 3802)
Instructions for Preparation of form HUD-51000

1. A separate breakdown is required for each project and prime contract instructions for preparation are given below.

a. **Heading.** Enter all identifying information required for both forms.

b. **Columns 1 and 2.** In column 1, enter the item numbers starting with No. 1, and in column 2 enter each principal division of work incorporated in the contract work.

   (1) **Master List.** The Master list contains the basic items into which any construction contract may be subdivided for the purpose of preparing the Construction Progress Schedule and the Periodical Estimates for Partial Payments. Only those items shall be selected which apply to the particular contract. To ensure uniformity, no change shall be made in the item numbers. Generally, about 25 to 40 major items appear in a contract.

   (2) **Items Subdivided.** In the Contractor’s breakdown, against which all periodical estimates will be checked prior to payment, each major item must be subdivided into sub-items pertinent to the project involved and in agreement with the Contractor’s intended basis for requesting monthly payments.

c. **Column 3.** Enter the total quantity for each sub-item of each principal division of work listed in the breakdown.

d. **Column 4.** Enter the appropriate unit of measure for each sub-item of work opposite the quantities described in column 3, such as “sq. ft.,” “cu. yd.,” “tons,” “lb.,” “lumber per M/MB,” “brickwork per M,” etc., applicable to the particular sub-item. Items shown on “lump sum” or equivalent basis will be paid for only on completion of the whole item and not on a percentage of completion basis.

e. **Column 5.** Enter the unit price, in place, of each sub-item of work.

f. **Column 6.** Enter the amount of each sub-item obtained by multiplying the quantities in column 3 by the corresponding unit prices in column 5.

g. **Column 7.** Enter the amount of principal item only, obtained by adding the amounts of all sub-items of each principal division of work listed in column 6. Continue with the breakdown on form HUD-51000.

h. The “Schedule of Amounts for Contract Payments” shall be signed and dated in the space provided at the bottom of each sheet of the form by the individual who prepared the breakdown for the Contractor.

2. The minimum number of copies required for each submission for approval is an original and two copies. When approved, one fully approved copy will be returned to the Contractor.

---

### Master List of Items

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Division of Work</th>
<th>Item No.</th>
<th>Division of Work</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Bond</td>
<td>Rough Carpentry</td>
<td>20</td>
<td>19</td>
</tr>
<tr>
<td>2 General Conditions</td>
<td>Metal Bucks</td>
<td>21</td>
<td>Elevator Enclosures—Metal</td>
</tr>
<tr>
<td>3 Demolition &amp; Clearing</td>
<td>Caulking</td>
<td>22</td>
<td>Incinerators—Masonry &amp; Parts</td>
</tr>
<tr>
<td>Structures</td>
<td>Weatherstripping</td>
<td>23</td>
<td>(Other)</td>
</tr>
<tr>
<td>4 General Excavation</td>
<td>Lath &amp; Plastering-Drywall</td>
<td>24</td>
<td>(Other)</td>
</tr>
<tr>
<td>5 Footing Excavation</td>
<td>Stucco</td>
<td>25</td>
<td>(Other)</td>
</tr>
<tr>
<td>6 Backfill</td>
<td>Finish Carpenter</td>
<td>26</td>
<td>(Other)</td>
</tr>
<tr>
<td>7 Foundation Piles &amp; Caissons</td>
<td>Finish Hardware</td>
<td>27</td>
<td>(Other)</td>
</tr>
<tr>
<td>8 Concrete Foundations</td>
<td>Glass &amp; Glazing</td>
<td>28</td>
<td>(Other)</td>
</tr>
<tr>
<td>9 Concrete Superstructures</td>
<td>Metal Doors</td>
<td>29</td>
<td>(Other)</td>
</tr>
<tr>
<td>10 Replacing Steel</td>
<td>Metal Base &amp; Trim</td>
<td>30</td>
<td>(Other)</td>
</tr>
<tr>
<td>11 Waterproofing &amp; Dampproofing</td>
<td>Toilet Partitions</td>
<td>31</td>
<td>(Other)</td>
</tr>
<tr>
<td>12 Spandrel Waterproofing</td>
<td>Floors</td>
<td>32</td>
<td>(Other)</td>
</tr>
<tr>
<td>13 Structural Steel</td>
<td>Painting &amp; Decorating</td>
<td>33</td>
<td>(Other)</td>
</tr>
<tr>
<td>14 Masonry</td>
<td>Screens</td>
<td>34</td>
<td>(Other)</td>
</tr>
<tr>
<td>15 Stonework</td>
<td>Plumbing</td>
<td>35</td>
<td>(Other)</td>
</tr>
<tr>
<td>16 Miscellaneous &amp; Ornamental Metal</td>
<td>Heating</td>
<td>36</td>
<td>(Other)</td>
</tr>
<tr>
<td>17 Metal Windows</td>
<td>Ventilating System</td>
<td>37</td>
<td>(Other)</td>
</tr>
<tr>
<td>18 Roofing</td>
<td>Electrical</td>
<td>38</td>
<td>(Other)</td>
</tr>
<tr>
<td>19 Sheet Metal</td>
<td>Elevators</td>
<td>39</td>
<td>(Other)</td>
</tr>
<tr>
<td>20 Rough Carpentry</td>
<td>Retaining Walls</td>
<td>44</td>
<td>(Other)</td>
</tr>
<tr>
<td>21 Metal Bucks</td>
<td>Storm Sewers</td>
<td>45</td>
<td>(Other)</td>
</tr>
<tr>
<td>22 Caulking</td>
<td>Sanitary Sewers</td>
<td>46</td>
<td>(Other)</td>
</tr>
<tr>
<td>23 Weatherstripping</td>
<td>Water Distribution System</td>
<td>47</td>
<td>(Other)</td>
</tr>
<tr>
<td>24 Lath &amp; Plastering-Drywall</td>
<td>Gas Distribution System</td>
<td>48</td>
<td>(Other)</td>
</tr>
<tr>
<td>25 Stucco</td>
<td>Electrical Distribution System</td>
<td>49</td>
<td>(Other)</td>
</tr>
<tr>
<td>26 Finish Carpenter</td>
<td>Street &amp; Yard Lighting</td>
<td>50</td>
<td>(Other)</td>
</tr>
<tr>
<td>27 Finish Hardware</td>
<td>Fire &amp; Police Alarm System</td>
<td>51</td>
<td>(Other)</td>
</tr>
<tr>
<td>28 Glass &amp; Glazing</td>
<td>Fire Protection System</td>
<td>52</td>
<td>(Other)</td>
</tr>
<tr>
<td>29 Metal Doors</td>
<td>Street Work</td>
<td>53</td>
<td>(Other)</td>
</tr>
<tr>
<td>30 Metal Base &amp; Trim</td>
<td>Yard Work</td>
<td>54</td>
<td>(Other)</td>
</tr>
<tr>
<td>31 Toilet Partitions</td>
<td>(Other)</td>
<td>55</td>
<td>(Other)</td>
</tr>
<tr>
<td>32 Floors</td>
<td>(Other)</td>
<td>56</td>
<td>(Other)</td>
</tr>
<tr>
<td>33 Painting &amp; Decorating</td>
<td>(Other)</td>
<td>57</td>
<td>(Other)</td>
</tr>
<tr>
<td>34 Screens</td>
<td>Equipment</td>
<td>58</td>
<td>(Other)</td>
</tr>
<tr>
<td>35 Plumbing</td>
<td>Shades &amp; Drapery Rods</td>
<td>59</td>
<td>(Other)</td>
</tr>
<tr>
<td>36 Heating</td>
<td>Ranges</td>
<td>58</td>
<td>(Other)</td>
</tr>
<tr>
<td>37 Ventilating System</td>
<td>Refrigerators</td>
<td>59</td>
<td>(Other)</td>
</tr>
<tr>
<td>38 Electrical</td>
<td>Kitchen Cabinets &amp; Work Tables</td>
<td>60</td>
<td>(Other)</td>
</tr>
<tr>
<td>39 Elevators</td>
<td>Laundry Equipment</td>
<td>61</td>
<td>(Other)</td>
</tr>
<tr>
<td>40 Elevator Enclosures—Metal</td>
<td>(Other)</td>
<td>62</td>
<td>(Other)</td>
</tr>
<tr>
<td>41 Incinerators—Masonry &amp; Parts</td>
<td>Punch List</td>
<td>63</td>
<td>(Other)</td>
</tr>
<tr>
<td>42 (Other)</td>
<td>12</td>
<td>64</td>
<td>(Other)</td>
</tr>
<tr>
<td>43 (Other)</td>
<td>Lawns &amp; Planting</td>
<td>64</td>
<td>(Other)</td>
</tr>
</tbody>
</table>

1 General Conditions should be 3% to 5% of contract amount.
2 Punch List should be approximately 1/2 of 1% or $30 per dwelling unit, whichever is greater.

Previous editions are obsolete
Submit original and one copy to the Public Housing Agency. Complete instructions are on the back of this form.

Public reporting burden for this collection of information is estimated to average 3.5 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. This agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless that collection displays a valid OMB control number.

This information is collected under the authority of Section 6(c) of the U.S Housing Act of 1937 and HUD regulations. HAs are responsible for contract administration to ensure that the work for project development is done in accordance with State laws and HUD requirements. The contractor/subcontractor reports provide details and summaries on payments, change orders, and schedule of materials stored for the project. The information will be used to ensure that the total development costs, identified in the ACC, are kept as low as possible and consistent with HUD construction requirements. Responses to the collection are necessary to obtain a benefit. The information requested does not lend itself to confidentiality.

<table>
<thead>
<tr>
<th>Name of Public Housing Agency</th>
<th>Periodic Estimate Number</th>
<th>Period From (mm/dd/yyyy) To (mm/dd/yyyy)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location of Project</td>
<td>Project Number</td>
<td></td>
</tr>
<tr>
<td>Name of Contractor</td>
<td>Contract Number</td>
<td></td>
</tr>
<tr>
<td>Item Number (1)</td>
<td>Description of Item (2)</td>
<td>Completed to Date (3)</td>
</tr>
</tbody>
</table>

Value of Contract Work Completed to Date (Transfer this total to line 5 on back of this sheet)
Instructions

Heads. Enter all identifying data required. Periodic estimates must be numbered in sequence beginning with the number 1.

Columns 1 and 2. The "Item Number" and "Description of Item" must correspond to the number and descriptive title assigned to each principal division of work in the "Schedule of Amounts for Contract Payments", form HUD-51000.

Column 3. Enter the accumulated value of each principal division of work completed as of the closing date of the periodic estimate. Enter the total in the space provided.

Certifications. The certification of the contractor includes the analysis of amounts used to determine the net balance due. In the first paragraph, enter the name of the Public Housing Agency, the contractor, and the date of the contract. Enter the calculations used in arriving at the "Balance Due This Payment" on lines 1 through 16.

Enter the contractor's name and signature in the certification following line 16. The latter portion of this certification relating to payment of legal rates of wages, is required by the contract before any payment may be made. However, if the contractor does not choose to certify on behalf of his/her subcontractors to wage payments made by them, he/she may modify the language to cover only himself/herself and attach a list of all subcontractors who employed labor on the site during the period covered by the Periodic Estimate, together with the individual certifications of each.

---

<table>
<thead>
<tr>
<th>Certification of the Contractor or Duly Authorized Representative</th>
</tr>
</thead>
<tbody>
<tr>
<td>According to the best of my knowledge and belief, I certify that all items and amounts shown on the other side of this form are correct; that all work has been performed and material supplied in full accordance with the items and conditions of the contract between the (name of owner) and (contractor) dated (mm/dd/yyyy) and duly authorized deviations, substitutions, alterations, and additions; that the following is a true and correct statement of the Contract Account up to and including the last day of the period covered by this estimate, and that no part of the &quot;Balance Due This Payment&quot; has been received.</td>
</tr>
</tbody>
</table>

1. Original Contract Amount $ __________

2. Additions (Total from Col. 3, form HUD-51002) $ __________

3. Deductions (Total from Col. 5, form HUD-51002) (net) $ __________

4. Current Adjusted Contract Amount (line 1 plus or minus net) $ __________

Computation of Balance Due this Payment

5. Value of Original Contract work completed to date (from other side of this form) $ __________

Completed Under Approved Change Orders

6. Additions (from Col. 4, form HUD-51002) $ __________

7. Deductions (from Col. 5, form HUD-51002) (net) $ __________

8. Total Value of Work in Place (line 5 plus or minus net line 7) $ __________

9. Less: Retainage, _________ % $ __________

10. Net amount earned to date (line 8 less line 9) $ __________

11. Less: Previously earned (line 10, last Periodic Estimate) $ __________

12. Net amount due, work in place (line 10 less line 11) $ __________

Value of Materials Properly Stored

13. At close of this period (from form HUD-51004) $ __________

14. Less: Allowed last period $ __________

15. Increase (decrease) from amount allowed last period $ __________

16. Balance Due This Payment $ __________

I further certify that all just and lawful bills against the undersigned and his/her subcontractors for labor, material, and equipment employed in the performance of this contract have been paid in full in accordance with the terms and conditions of this contract, and that the undersigned and his/her subcontractors have complied with, or that there is an honest dispute with respect to, the labor provisions of this contract.

Name of Contractor __________________ Signature of Authorized Representative __________________ Title __________________ Date (mm/dd/yyyy) __________________

Certificate of Authorized Project Representative and of Contracting Officer

Each of us certifies that he/she has checked and verified this Periodic Estimate No. __________; that to the best of his/her knowledge and belief it is a true statement of the value of work performed and material supplied by the contractor; that all work and material included in this estimate has been inspected by him/her or by his/her authorized assistants; and that such work has been performed or supplied in full accordance with the drawings and specifications, the terms and conditions of the contract, and duly authorized deviations, substitutions, alterations, and additions, all of which have been duly approved.

We, therefore, approve as the "Balance Due This Payment" the amount of $ __________.

Authorized Project Representative __________________ Date (mm/dd/yyyy) __________________ Contracting Officer __________________ Date (mm/dd/yyyy) __________________

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. This agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless that collection displays a valid OMB control number.

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**Instructions:** Contractors use this form for reporting the details of approved Change Orders. Attach an original (or a copy) to each copy of the Periodic Estimate for Partial Payment (form HUD-51001) submission, and send to the Public Housing Agency. Complete all entries. Only Change Orders which bear the signatures required by the contract are to be recorded.

<table>
<thead>
<tr>
<th>Name of Public Housing Agency</th>
<th>Supporting Periodic Estimate for Partial Payment Number</th>
<th>Period From (mm/dd/yyyy) to (mm/dd/yyyy)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location of Project</td>
<td>Project Number</td>
<td></td>
</tr>
<tr>
<td>Name of Contractor</td>
<td>Contract Number</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Approved Change Orders</th>
<th>Additions</th>
<th>Deductions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change Order Number</td>
<td>Dated</td>
<td>Total Amount of Change Order</td>
</tr>
<tr>
<td>(1)</td>
<td>(mm/dd/yyyy)</td>
<td>(3)</td>
</tr>
<tr>
<td>$</td>
<td>$</td>
<td>$</td>
</tr>
</tbody>
</table>

**Totals** $ $ $

Authorized Project Representative: Date (mm/dd/yyyy)

**Warning:** HUD will prosecute false claims and statements. Conviction may result in criminal and/or civil penalties. (18 U.S.C. 1001, 1010, 1012; 31 U.S.C. 3729, 3802)
**Schedule of Materials Stored**

Public reporting burden for this collection of information is estimated to average 1.5 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. This agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless that collection displays a valid OMB control number.

This information is collected under the authority of Section 6(c) of the U.S Housing Act of 1937 and HUD regulations. HAs are responsible for contract administration to ensure that the work for project development is done in accordance with State laws and HUD requirements. The contractor/subcontractor reports provide details and summaries on payments, change orders, and schedule of materials stored for the project. The information will be used to ensure that the total development costs, identified in the ACC, are kept as low as possible and consistent with HUD construction requirements. Responses to the collection are necessary to obtain a benefit. The information requested does not lend itself to confidentiality.

**Instructions:** This form is to be used to support the Periodic Estimate for Partial Payment (form HUD-51001). The contractor must prepare a separate schedule for his/her materials and for those of his/her subcontractors. Attach an original (or a copy) to each copy of the Summary of Materials Stored (form HUD-51004). Enter all identifying data and list materials stored. The listing of materials stored must correspond to the arrangement established on the Schedule of Contract Payments (form HUD-51000) and each item will be keyed by corresponding item number. This form must be signed as noted.

<table>
<thead>
<tr>
<th>Name of Public Housing Agency</th>
<th>Supporting Periodic Estimate for Partial Payment Number</th>
<th>Period From (mm/dd/yyyy)</th>
<th>To (mm/dd/yyyy)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name and Location of Project</td>
<td>Project Number</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Name of General Contractor</td>
<td>Contract Number</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Name of Subcontractor</td>
<td>Subcontract Number</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item Number*</th>
<th>Description and Quality</th>
<th>Quantity</th>
<th>Unit of Measure</th>
<th>Unit Price at Site</th>
<th>Total Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount Carried Forward</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total Amount or Amount Carried Forward</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Prepared by (Contractor's Representative)</td>
<td>Date (mm/dd/yyyy) Checked by (Owner's Representative)</td>
<td>Date (mm/dd/yyyy)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Warning:** HUD will prosecute false claims and statements. Conviction may result in criminal and/or civil penalties. (18 U.S.C. 1001, 1010, 1012; 31 U.S.C. 3729, form HUD-51003 (3/92) ref. Handbooks 7417.1 & 7450.1

* As identified in Schedule of Amounts for Contract Payments, form HUD-51000.

Previous editions are obsolete
### Summary of Materials Stored

Public reporting burden for this collection of information is estimated to average 2.5 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. This agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless that collection displays a valid OMB control number.

This information is collected under the authority of Section 6(c) of the U.S. Housing Act of 1937 and HUD regulations. HAs are responsible for contract administration to ensure that the work for project development is done in accordance with State laws and HUD requirements. The contractor/subcontractor reports provide details and summaries on payments, change orders, and schedule of materials stored for the project. The information will be used to ensure that the total development costs, identified in the ACC, are kept as low as possible and consistent with HUD construction requirements. Responses to the collection are necessary to obtain a benefit. The information requested does not lend itself to confidentiality.

**Instructions:** This form is for the Contractor to summarize the value of materials stored at the site (as shown on the schedule, form HUD-51003). Use a separate line for the contractor and each of his/her subcontractors. Prepare an original and one copy, attach form HUD-51003, and send to the Public Housing Agency with the Periodic Estimate for Partial Payment, form HUD-51001. **Payment Value.** No more than 90 percent of the estimated value of the stored materials will be allowed, and only the net amount will be carried to line 13 on the back of the Periodic Estimate for Partial Payment, form HUD-51001. **Signatures.** This form must be signed by those employees of the contractor and of the Public Housing Agency who prepare and check the Schedule of Materials Stored, form HUD-51003.

#### Name of Public Housing Agency

<table>
<thead>
<tr>
<th>Supporting Periodic Estimate</th>
<th>Period From (mm/dd/yyyy)</th>
<th>To (mm/dd/yyyy)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Project Number</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name of General Contractor</th>
<th>Contract Number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Name of General Contractor or Subcontractor

- General Contractor
  - $ 
- Subcontractors
  - $

<table>
<thead>
<tr>
<th>Amounts</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>General Contractor</td>
<td>$</td>
</tr>
<tr>
<td>Subcontractors</td>
<td>$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Less 10%</th>
<th>Net</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$</td>
<td>$</td>
<td>$</td>
</tr>
</tbody>
</table>

Prepared by: ___________________________  Date (mm/dd/yyyy): ___________________________

Checked by: ___________________________  Date (mm/dd/yyyy): ___________________________

I certify that I or my authorized representatives have examined and checked in detail the invoices representing the cost of materials set forth in appended "Schedule of Materials Stored", form HUD-51003, dated (mm/dd/yyyy) __ ___________________________ submitted by ___________________________ consisting of ______ sheets with an indicated cost of $ ______________, and find that the net unit prices set forth in the schedule are the same or less than the invoices examined, and that such materials were suitably stored at the site of the development as of (date)(mm/dd/yyyy) _____________________ .

Name of Owner: ___________________________  By: (Authorized Representative) ___________________________  Title: ___________________________  Date (mm/dd/yyyy): ___________________________

**Warning:** HUD will prosecute false claims and statements. Conviction may result in criminal and/or civil penalties. (18 U.S.C. 1001, 1010, 1012; 31 U.S.C. 3729, 3802)
CONTRACTOR CERTIFICATION

Partial Pay Request #__________

Project: ____________________________

Project #: __________________________

Owner: Yurok Indian Housing Authority

Contractor: __________________________

Per Section 007200 HUD-5370 Part 27(e) of the Bidding and Contracting Manual I hereby certify, to the best of my knowledge and belief, that:

1. The amounts requested are only for performance in accordance with the specifications, terms, and conditions of the contract;
2. Payments to subcontractors and suppliers have been made from previous payments received under the contract, and timely payments will be made from the proceeds of the payment covered by this certification, in accordance with subcontract agreements; and,
3. This request for progress payments does not include any amounts which the prime contractor intends to withhold or retain from a subcontractor or supplier in accordance with the terms and conditions of the subcontract.

____________________________________________________________________

Name

____________________________________________________________________

Title

____________________________________________________________________

Date
**Public Burden Statement**

While completion of Form WH-347 is optional, it is mandatory for covered contractors and subcontractors performing work on Federally financed or assisted construction contracts to respond to the information collection contained in 29 C.F.R. §§ 3.3, 5.5(a). The Copeland Act (40 U.S.C. § 3145) contractors and subcontractors performing work on Federally financed or assisted construction contracts to "furnish weekly a statement with respect to the wages paid each employee during the preceding week." U.S. Department of Labor (DOL) regulations at 29 C.F.R. § 5.5(a)(3)(ii) require contractors to submit weekly a copy of all payrolls to the Federal agency contracting for or financing the construction project, accompanied by a signed "Statement of Compliance" indicating that the payrolls are correct and complete and that each labor or mechanic has been paid not less than the proper Davis-Bacon prevailing wage rate for the work performed. DOL and federal contracting agencies receiving this information review the information to determine that employees have received legally required wages and fringe benefits.

**Public Burden Statement**

We estimate that is will take an average of 55 minutes to complete this collection, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. If you have any comments regarding these estimates or any other aspect of this collection, including suggestions for reducing this burden, send them to the Administrator, Wage and Hour Division, U.S. Department of Labor, Room S3302, 200 Constitution Avenue, N.W.

Washington, D.C. 20210
I, ________________________________ (Name of Signatory Party) ________________________________ (Title) do hereby state:

(1) That I pay or supervise the payment of the persons employed by ________________________________ (Contractor or Subcontractor) on the ________________________________ (Building or Work) that during the payroll period commencing on the ______ day of __________, ______, and ending the ______ day of __________, ______, all persons employed on said project have been paid the full weekly wages earned, that no rebates have been or will be made either directly or indirectly to or on behalf of said ________________________________ (Contractor or Subcontractor) weekly wages earned by any person and that no deductions have been made either directly or indirectly from the full wages earned by any person, other than permissible deductions as defined in Regulations, Part 3 (29 C.F.R. Subtitle A), issued by the Secretary of Labor under the Copeland Act, as amended (48 Stat. 948, 63 Stat. 108, 72 Stat. 967; 76 Stat. 357; 40 U.S.C. § 3145), and described below:

(2) That any payrolls otherwise under this contract required to be submitted for the above period are correct and complete; that the wage rates for laborers or mechanics contained therein are not less than the applicable wage rates contained in any wage determination incorporated into the contract; that the classifications set forth therein for each laborer or mechanic conform with the work he performed.

(3) That any apprentices employed in the above period are duly registered in a bona fide apprenticeship program registered with a State apprenticeship agency recognized by the Bureau of Apprenticeship and Training, United States Department of Labor, or if no such recognized agency exists in a State, are registered with the Bureau of Apprenticeship and Training, United States Department of Labor.

(4) That:

(a) WHERE FRINGE BENEFITS ARE PAID TO APPROVED PLANS, FUNDS, OR PROGRAMS

☐ — in addition to the basic hourly wage rates paid to each laborer or mechanic listed in the above referenced payroll, payments of fringe benefits as listed in the contract have been or will be made to appropriate programs for the benefit of such employees, except as noted in section 4(c) below.

(b) WHERE FRINGE BENEFITS ARE PAID IN CASH

☐ — Each laborer or mechanic listed in the above referenced payroll has been paid, as indicated on the payroll, an amount not less than the sum of the applicable basic hourly wage rate plus the amount of the required fringe benefits as listed in the contract, except as noted in section 4(c) below.

(c) EXCEPTIONS

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REMARKS:

NAME AND TITLE

SIGNATURE

THE WILLFUL FALSIFICATION OF ANY OF THE ABOVE STATEMENTS MAY SUBJECT THE CONTRACTOR OR SUBCONTRACTOR TO CIVIL OR CRIMINAL PROSECUTION. SEE SECTION 1001 OF TITLE 18 AND SECTION 231 OF TITLE 31 OF THE UNITED STATES CODE.