

PROJECT MANUAL

DOCUMENTS AND SPECIFICATIONS

**The Housing Authority of Frankfort
590 Walter Todd Drive
Frankfort, Kentucky 40601**

**MODERNIZATION PROGRAM FOR
PROJECT SITE NO. KY03-04**

**THE U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
PROGRAM NO. KY36P003-501(22)**

SET NO.: _____

FILE NO.: 19003-22
DATE: November, 2024

C S Design, Inc.
1088 Wellington Way
Lexington, Kentucky 40513
(859) 367-7521
www.csdesigninc.com



ARCHITECTS

MANAGEMENT CONSULTANTS

SUMMARY SHEET FOR BIDDERS

GENERAL INFORMATION

Owner: Housing Authority of Frankfort
590 Walter Todd Drive
Frankfort KY 40601
David Small, Executive Director
Phone: 502.223.2148

Project Name & Description: KY36P003-501(22)

Scope of Proposed Work: Administration Building Renovations

A/E Contact Person: Mr. Wayne L. Clayton
C S Design, Inc.
Phone: 859.367.7521
Fax: 859.367.0230
wlcayton@csdesigninc.com

BIDDING INFORMATION

Bid Date & Time; Location: December 19, 2024, at 10:00 a.m., (local time)
Main Office in Frankfort, KY

Pre-Bid Conference: December 5, 2024, at 10:00 a.m. (local time)
Main Office in Frankfort, KY

Information and Forms required of Bidders:

- Representations and Certifications (Document 00160 of Project Manual)
- Bid Form (Document 00320 of Project Manual)
- Certificate as to Corporate Principal (Document 00321 of Project Manual)
- Bid Bond (Document 00420 of Project Manual)
- Non-Collusive Affidavit (Document 00480 of Project Manual)
- Lead-Based Paint Renovators Certification (Document 00481 of Project Manual)
- Contractor's Certification of Compliance (Document 00483 - Part B of Project Manual)
- Section 3 Business Concern Certification for Contracting [*only if applicable*]
(Document 00483 - Part C of Project Manual)
- List of Brand Name Products to be Furnished (Document 00486 of Project Manual)
- List of Subcontractors to be Used (Document 00487 of Project Manual)
- Previous Participation Certification (Document 00488 of the Project Manual)

CONTRACT INFORMATION

Contract Time:	180 calendar days
Performance Bond Required?:	Yes
Payment Bond Required?:	Yes
Liquidated Damages:	\$250 per day
Units occupied during construction:	Yes
Do Davis Bacon Wage Rates Apply?:	Yes

Bidders are notified that this information provided on this Summary Sheet provides a partial list of the major requirements and/or conditions of the project. The Bidder should consult all sections of the Specifications to obtain complete bidding and contract information.

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BIDDING & CONTRACT REQUIREMENTS

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The Owner nor the A/E will be responsible for bids submitted that are based on incomplete bidding instruments.

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ADVERTISEMENT FOR BIDS

Sealed bids for Modernization Project KY36P003-501(22) will be received by The Housing Authority of Frankfort, on December 19, 2024, at 10:00 a.m. (local time) and then at said office publicly opened and read aloud. The project consists of:

Administration Building Renovations

The *Information for Bidders, Bid Form, Form of Contract, Drawings, Specifications, and forms of Bid Bond, Performance Bond and Payment Bond*, and other contract documents may be examined at the following locations:

CS Design, Inc.
1088 Wellington Way
Lexington, Kentucky 40513
Phone: 859.367.7521

Housing Authority of Frankfort
590 Walter Todd Drive
Frankfort, Kentucky 40601
Phone: 502.223.2148

AGC/McGraw Hill Construction/Dodge
632 Comanche Trail
Frankfort, KY 40601

Construction Market Data Group
30 Technology Parkway South, Suite 100
Norcross, GA 30092

Builders Exchange
2300 Meadow Drive
Louisville, KY 40218

Additional information is provided in the bidding documents. Copies of the bidding documents must be purchased at the following location to be eligible to submit a bid for this project.

Lynn Imaging
328 Old Vine Street
Lexington, Kentucky 40507
Telephone: (859) 255-1021
Attention: Plan Distribution Department
www.lynnimaging.com

Partial sets will not be issued.

Bid Bonds and Performance and Payment Bonds must be secured by a Guaranty or Surety Company listed in the latest issue of U. S. Treasury Circular 570 and shall be within the maximum amount specified for such company in said Circular 570. The "Bid Bond" and the "Performance and Payment Bond" must be issued by a surety company authorized to do business in the state where the project is located, and must be listed in U. S. Treasury Circular No. 570.

Attention is called to the fact that not less than the minimum salaries and wages set forth in the Contract Documents must be paid on this project.

The Contract will be subject to the "Section 3" Clause, see Document 00715 - General Conditions, Article 40, calling for utilization of low-income businesses and individuals from the project area where feasible.

Bidders must comply with the President's Executive Order Nos. 11246 and 11375, which prohibit discrimination in employment regarding race, creed, color, sex, or national origin.

Bidders must comply with Title VI of the Civil Rights Act of 1964, the Anti-Kickback Act, and the Contract Work Hour Standard Act.

Bidders must certify that they do not, and will not, maintain or provide for their employees any facilities that are segregated on a basis of race, color, creed, sex, or national origin.

Attention is called to the goals and timetables for minority and female participation.

The right is reserved to reject any or all bids or to waive any informalities in the bidding.

No Bidder may withdraw his bid within 60 days after the actual date of the opening thereof.

Attention is called to the fact that The Housing Authority of Frankfort is not an Indian Housing Authority.

WALK THROUGH AND PREBID CONFERENCE

A Pre-Bid Conference will be held on December 5, 2024, at 10:00 a.m. (local time) at the Housing Authority of Frankfort located at 590 Walter Todd Drive, Frankfort, KY, for purposes of answering Bidders' questions and to consider any suggestions they may wish to make concerning the project. Immediately following the Pre-Bid Conference, a walk through of the project will be held by the Owner. All Contractors are recommended to attend this walk through and Pre-Bid Conference.

The Housing Authority of Frankfort
By: David Small, Executive Director

END OF DOCUMENT

**U.S. Department of Housing and
Urban Development**
Office of Public and Indian Housing

**Instructions to Bidders for Contracts
Public and Indian Housing Programs**

Instructions to Bidders for Contracts

Public and Indian Housing Programs

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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 —

[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 deductibles, 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, except 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] —

(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;

(3) a 20 percent cash escrow;

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

(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 used 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 infeasible 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 [] does [] 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.

MODIFICATIONS AND ADDITIONS TO INSTRUCTIONS TO BIDDERS

The following articles are modified and/or added to the Instructions to Bidders Public and Indian Housing Programs, Document Form HUD-5369 (10/02), included in the Project Manual as follows:

1. GENERAL

Contractors are to disregard all references to Indian Housing Authority and IHA throughout this document.

2. CLAUSE 1: Paragraph (i), add the following paragraph:

- (i) It is the responsibility of each bidder to familiarize himself with the project site, subsurface conditions and general work conditions as required for preparation of the bid. Each unit price or a lump sum price shall include all materials and labor, overhead and profit associated with the complete installation of new work or replacement of existing items of work. The price shall also include adjustment of adjacent existing surfaces of fixtures in order to produce a complete product with all appurtenances thereto.

3. CLAUSE 2: Paragraph (a): In the first sentence change seven (7) days to ten (10) days.

4. CLAUSE 2: Paragraph (c), add the following paragraph:

- (c) Every request for interpretation should be in writing addressed to:

Mr. Wayne L. Clayton
CS Design, Inc.
1088 Wellington Way
Lexington, Kentucky 40513

5. CLAUSE 7: Paragraph (b), Protests shall be served to:

David Small, Executive Director
Housing Authority of Frankfort
590 Walter Todd Drive
Frankfort, Kentucky 40601
Telephone: (502) 223-2148

6. CLAUSE 10: Subparagraph (a)(3), Change 20 percent to 25 percent cash escrow.

7. CLAUSE 10: Subparagraph (d), Addition: *Assurance of Completion* shall be received by the PHA within ten (10) days of Notification by PHA to Contractor of *Intent to Award*.

8. Add the following clause:

CLAUSE 13: REQUIRED SUBMITTALS BY PROJECT PHASE

- a. Bid: Submitted with Bid Package:

00160 Representations, Certifications, and Other
Statements of Bidders

00320 Bid Form

00321 Certificate as to Corporate Principal

00420 Bid Bond (if base bid exceeds \$25,000)

00480 Noncollusive Affidavit of Prime Bidder

00481 Lead-Based Paint Renovators Certification

00483 Section 3 Plan Materials (Part B & Part C)

00486 List of Brand Name Products to be Furnished

00487 List of Subcontractors to be Used

00488 Previous Participation Certification

- b. Contract: (Within ten (10) calendar days after Notice of Award)

00502 Form of Contract

00620 Performance Bond

00621 Payment Bond

00901 Schedule of Amounts for Contract Payments and Certificates of Insurance

02080 Asbestos Abatement Procedures, if required

1) All items outlined under Paragraph 1.4.A

02090 Lead Based Paint Abatement Procedures, if required

1) All items outlined under Paragraph 1.5.A

- c. Subcontract Documents: Submitted and approved prior to use of subcontractor on the project:

Insurance Certificates from Each Subcontractor

List of Proposed Subcontractors and Amount of Each Subcontract

- d. During Construction:

00901 Schedule of Amounts for Contract Payments (HUD Form)

00904 HUD 51001, Periodical Estimate for Partial Payment

00905 HUD 51002, Schedule of Change Orders

00908 Payroll - WH-347

00914 Certificate of Progress Payment

- e. After Construction:

00909 Certificate and Release

00910 Certificate of Completion – Consolidated Product Guarantees General
Guarantee and all Manufacturer's Warranties

02080 Asbestos Abatement Procedures, if required

1) All items outlined under Paragraph 1.4.B.

02090 Lead Based Paint Abatement Procedures, if required

1) All items outlined under Paragraph 1.5.B.

9. Add the following clause:

CLAUSE 14: PROHIBITION AGAINST LEAD-BASED PAINT

- a. Any Contractor awarded a contract for construction shall comply with 24CFR, Part 35, prohibiting the use of lead-based paint.

END OF DOCUMENT

**U.S. Department of Housing
and Urban Development**
Office of Public and Indian Housing

**Representations, Certifications,
and Other Statements of Bidders**
Public and Indian Housing Programs

Representations, Certifications, and Other Statements of Bidders

Public and Indian Housing Programs

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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 being 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

(2) (i) Has been authorized, in writing, to act as agent for the following principals in certifying that those principals have not participated, and will not participate in any action contrary to subparagraphs (a)(1) through (a)(3) above.

_____ [insert full name of person(s) in the bidder's organization responsible for determining the prices offered in this bid or proposal, and the title of his or her position in the bidder's organization];

(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

(iii) 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.

[] [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.

(b) 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.

(c) 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.

(d) 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: calendar days.

(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:

(Check the block applicable to you)

- | | |
|------------------------|------------------------------|
| [] Black Americans | [] Asian Pacific Americans |
| [] Hispanic Americans | [] Asian Indian Americans |
| [] Native Americans | [] Hasidic Jewish 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 penalty for making false statements is prescribed in the U. S. Criminal Code, 18 U.S.C. 1001.

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)

BID FORM
FOR
MODERNIZATION PROGRAM KY36P003-501(22)

DATE:

TO: The Housing Authority of Frankfort
Frankfort, Kentucky

1. The undersigned acknowledges receipt of the following Addenda previously issued:

No. _____	Dated _____
No. _____	Dated _____
No. _____	Dated _____
No. _____	Dated _____
No. _____	Dated _____

2. The undersigned, having familiarized himself with the local conditions affecting the cost of the Work, and with the Specifications (including Invitation for Bids, Instructions to Bidders, this bid form, the form of Bid Bond, the form of Construction Contract, the form of Performance Bond, the General Conditions, and Technical Specifications), the Drawings, and the Addenda, if any, thereto, as prepared by CS Design, Inc., and on file at the office of the Housing Authority, hereby proposes to furnish all labor, materials, equipment, and services required to construct and complete all work for the project entitled Modernization Program No. KY36P003-501(22), all in accordance therewith, as follows:

LUMP SUM BASE BID A

(To include the complete scope of work as outlined in the drawings and specifications.)

_____ (Dollars and Cents)

(\$ _____)

(Figures)

Contractor's Name

3.1 ALTERNATE BIDS:

To be used for adjustments to Base Bid. Alternates shall be invoked in the manner most beneficial to the PHA to comply with the available budget. The amount of each alternate shall equal the amount of the corresponding work item included in the Base Bid.

No.	Description	Deduct Amount
1	Delete all new Landscape Plantings shown on Drawings (All planting areas to be mulched)	\$
2	Delete all minor renovations shown on Drawings to be completed in the existing Administration Area, including construction of new canopy at Door #002	\$

3.2 UNIT PRICES:

To be used for adjustments to Base Bid. Unit Prices shall be used for adjustment of the Base Bid/Contract as deemed appropriate by the Owner. All unit prices to include material, labor, overhead & profit (including any commissions).

No.	Description	Add/Deduct Amount
1	Concrete Parking Replacement	\$ / SF
2	New Concrete Walk	\$ / SF

4. In submitting this bid, it is understood that the right is reserved by the Housing Authority to reject any and all bids. If written notice of the acceptance of this bid is mailed, telegraphed or delivered to the undersigned within sixty (60) days after the opening thereof, or at any time thereafter before this bid is withdrawn, the undersigned agrees to execute and deliver a contract in the prescribed form and furnish the required bond within ten (10) days after the contract is presented to him for signature.
5. Security in the amount of _____ and Cents (\$ _____) is submitted herewith in accordance with the Specifications.
6. Attached hereto is an affidavit in proof that the undersigned has not entered into any collusion with any person in respect to this proposal or any other proposal or the submitting of proposals for the contract for which this proposal is submitted.
7. The bidder represents that he has (), has not (), participated in a previous contract or subcontract subject to the Equal Opportunity Clause prescribed by Executive Orders 10925, 1114, or 11246 of the Secretary of Labor, that he has (), has not (), filed all required compliance reports and that representations indicating submission of required compliance reports signed by proposed subcontractors will be obtained prior to subcontract award. (The above representation need not be submitted in connection with contracts or subcontracts which are exempt from the Clause.)

Contractor's Name

8. Certification of Non-segregated Facilities. By signing this Bid, the bidder certifies that he does not maintain or provide for his employees any segregated facilities at any of his establishments, and that he does not permit his employees to perform their services at any location under this control where segregated facilities are maintained. The bidder agrees that a breach of this certification is a violation of the Equal Opportunity Clause in this Contract. As used in this certification, the term "segregated facilities" shall mean any waiting rooms, work areas, rest rooms, washrooms, restaurants and other eating areas, time clocks, locker rooms, storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact, segregated on the basis of race, color, religion, or national origin because of habit, local custom, or otherwise. He further agrees that (except where he has obtained identical certifications from proposed subcontractors for specific time periods) he will obtain identical certifications from proposed subcontractors prior to the award of subcontract exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity Clause; that he will retain such certificates in his files; and that he will forward a notice to his proposed subcontractors as provided in the INSTRUCTIONS TO BIDDERS.

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

Date: _____ Contractor

By: _____
(Printed Name)

Title: _____

Seal- (if a bid is by a corporation)

Business Address: _____

Telephone No.: _____

Contractor's License No.: _____

END OF DOCUMENT

Contractor's Name

CERTIFICATE AS TO CORPORATE PRINCIPAL

I, _____, certify that I am the
_____ of the corporation named as principal in the
within bond; that _____, who signed the said bond on behalf
of the principal was then the _____ of said corporation; that I know his
signature, and his signature thereto is genuine; and that said bond was duly signed, sealed, and
attested to, for and in behalf of said corporation by authority of its governing body.

END OF DOCUMENT

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we the undersigned,

(Name of Principal)

as PRINCIPAL, and _____,
(Name of Surety)

as SURETY, are held and firmly bound unto The Housing Authority of Frankfort,

hereinafter called the "Owner," in the penal sum of _____

DOLLARS, (\$ _____) lawful money of the United States, for the payment of
which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators,
successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Principal has
submitted the accompanying bid, dated _____ 20__, for:

Administration Building Renovations

NOW, THEREFORE, if the Principal shall not withdraw said bid within the period specified therein after the opening of the same, or, if no period be specified, within thirty (30) days after the said opening, and shall within the period specified therefore, or, if no period be specified within ten (10) days after the prescribed forms are presented to him for signature, enter into a written contract with the Local Authority in accordance with the bid as accepted, and give bond with good and sufficient surety or sureties, as may be required, for the faithful performance and proper fulfillment of such contract; or in the event of the withdrawal of said bid within the period specified, or the failure to enter into such contract and give such bond within the time specified, if the Principal shall pay the Local Authority the difference between the amount specified in said bid and the amount for which the Local Authority may procure the required work or supplies or both, if the latter amount be in excess of the former, then the above obligation shall be void and of no effect, otherwise to remain in full force and virtue.

IN WITNESS WHEREOF, the above-bounded parties have executed this instrument under their several seals this _____ day of _____, 20____, the name and corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

IN PRESENCE OF:

(Individual Principal) (Seal)

(Business Address)

Attest:

(Individual Principal) (Seal)

(Business Address)

Attest::

(Corporate Principal)

(Business Address)

BY: _____
(Affix Corporate Seal)

Attest: _____
(Corporate Surety)

BY: _____
(Affix Corporate Seal)

(Power-of-Attorney for person signing for surety company must be attached to bond.)

END OF DOCUMENT

NONCOLLUSION AFFIDAVIT OF PRIME BIDDER

Commonwealth of _____

County of _____

_____, being first duly sworn, deposes and says that:

1. He is _____ of _____, the Bidder who has submitted the attached Bid;
2. He is fully informed respecting the preparation and contents of the attached Bid and of all pertinent circumstances respecting such Bid;
3. Such Bid is genuine and is not a collusive or sham Bid;
4. Neither the said Bidder nor any of its officers, partners, owners, agents, representatives, employees, or parties in interest, including this affiant, has in any way colluded, conspired, connived, or agreed, directly or indirectly, with any other Bidder, firm, or person to submit a collusive or sham Bid in connection with the Contract for which the attached Bid has been submitted or to refrain from bidding in connection with such Contract, or has in any manner, directly or indirectly, sought by agreement or collusion or communication or conference with any other Bidder, firm, or person to fix the price or prices in the attached Bid or of any other Bidder, or to fix any overhead, profit, or cost element of the Bid price or the Bid prices of any other Bidder, or to secure through any collusion, Conspiracy, connivance, or unlawful agreement any advantage against the Owner or any person interested in the Contract; and
5. The price or prices quoted in the attached Bid are fair and proper and are not tainted by any collusion, conspiracy, connivance, or unlawful agreement on the part of the Bidder or any of its agents, representatives, owners, employees, or parties in interest, including this affiant.

(Signed) _____

Title

Subscribed and sworn to before me
this _____ day of _____, 20____.

By: _____

Title: _____

My commission expires: _____.

END OF DOCUMENT

LEAD BASED PAINT RENOVATORS CERTIFICATION

Name of Business: _____

Address of Business: _____

Type of Business: _____

I understand that any contract with the Housing Authority of Frankfort (name of Housing Authority) is subject to the requirements of 40 CFR 745.85.

I certify that the firm of _____ (company's name) is a "Certified Renovator" as outlined in 40 CFR 745.85 and will provide documentation as evidence to substantiate this. The "Certified Renovator" will provide the following at a minimum:

- A. Perform pre-renovation testing to identify all hazards related to construction as outlined in 40 CFR 745.85.
- B. Perform post-renovation cleaning verification described in 40 CFR 745.85.
- C. Perform or direct workers who perform all of the work practices described in 40 CFR 745.85.
- D. Provide training to workers on the work practices they will be using in performing their assigned tasks.
- E. Be physically present at the work site when the signs required by 40 CFR 745.85 are posted, while the work area containment required by 40 CFR 745.85 is being established, and while the work area cleaning required by 40 CFR 745.85 is performed.
- F. Regularly direct the work being performed by other workers to ensure that the work practices are being followed, including maintaining the integrity of the containment barriers and ensuring that dust or debris does not spread beyond the work area.
- G. Be available, either on-site or by telephone, at all times that renovations are being conducted.
- H. When requested by the party for renovation services, use the acceptable test kit to determine whether components to be affected by the renovation contain lead-based paint.
- I. Have with them at the work site copies of their initial course completion certificate and their most recent refresher course completion certificate.
- J. Prepare the records required to demonstrate that renovations have been performed in accordance with the requirements of 40 CFR 745.85.

Signature of Chief Executive Officer

Date

END OF DOCUMENT

SECTION 3 PLAN MATERIALS

MATERIALS INCLUDED

Part A - Section 3 Clause

Part B - Contractor's Certification of Compliance (*Required of Bidders*)

Part C – Section 3 Contractor Certification (*Required of Bidders - only if applicable*)

Part D - Section 3 Subcontractor Certification

Part E - Section 3 Resident Certification

Part F- Examples of Efforts to Offer Training and Employment Opportunities
to Section 3 Residents

Part G - Examples of Efforts to Award Contracts to Section 3 Business Concerns

Part H - Examples of Procurement Procedures that Provide for Preference
for Section 3 Business Concerns

Part J – Good Faith Effort

Part K - Definitions

SECTION 3 CLAUSE

All contracts subject to the Section 3 requirements will include the following clause:

- A. The work to be performed under this contract is subject to the requirements of Section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. 1701u (Section 3). The purpose of Section 3 is to ensure that employment and other economic opportunities generated by HUD assistance or HUD-assisted projects covered by Section 3 shall, to the greatest extent feasible, be directed to low-and very low-income persons, particularly persons who are recipients of HUD assistance for Housing.
- B. The parties to this contract agree to comply with HUD's regulations in 24 CFR Part 135, which implement Section 3. As evidenced by their execution of this contract, the parties to this contract certify that they are under no contractual or other impediment that would prevent them from complying with part 135 of the regulations.
- C. The contractor agrees to send to each labor organization or representative of workers with which the contractor has a collective bargaining agreement or other understanding, if any, a notice advising the labor organization or worker's representative of the contractor's commitments under this Section 3 clause, and will post copies of the notice in conspicuous places at the work site where both employees and applicants for training and employment positions can see the notice. The notice shall describe the Section 3 preference, shall set forth minimum number and job titles subject to hire, availability of apprenticeship and training positions, the qualifications for each; and the name and location of the person(s) taking applications for each of the positions; and the anticipated date the work shall begin.
- D. The contractor agrees to include this Section 3 clause in every subcontract subject to compliance with regulations in 24 CFR Part 135, and agrees to take appropriate action, as provided in an applicable provision of the subcontract or in this Section 3 clause, upon a finding that the subcontractor is in violation of the regulations in 24 CFR Part 135. The contractor will not subcontract with any subcontractor when the contractor has notice or knowledge that the subcontractor has been found in violation of the regulations in 24 CFR part 135.
- E. The Contractor will certify that any vacant employment positions, including training positions, that are filled (1) after the contractor is selected but before the contract is executed, and (2) with persons other than those to whom the regulations of 24 CFR Part 135 require employment opportunities to be directed were not filled to circumvent the contractor's obligations under 24 CFR Part 135.
- F. Noncompliance with HUD's regulations in 24 CFR Part 135 may result in sanctions, termination of this contract for default, and debarment or suspension from future HUD assisted contracts.

CONTRACTOR'S CERTIFICATION OF COMPLIANCE

The purpose of Section 3 of the Housing and Urban Development Act of 1968, as amended (12 U.S.C. 1701u) (Section 3), is to ensure that training, employment and other economic opportunities generated by certain HUD financial assistance shall, to the greatest extent feasible, and consistent with existing Federal, State and Local laws and regulations, be directed to the greatest extent possible to low- and very low-income persons, particularly those who are recipients of government assistance for housing, and to business concerns, which provide economic opportunities to low- and very low-income persons.

_____ (Contractor's Name), hereinafter called the "Contractor", upon awarded a contract by the Housing Authority of Frankfort, hereinafter called the "Local Authority", for Modernization No. KY36P003-501(22) located in Frankfort, KY, to the extent feasible, will make a good faith effort to train and employ lower income residents and shall make a good faith effort to utilize the services of businesses located in or substantially owned by persons who live within the project area in compliance with Section 3 requirements.

The project area is coextensive with the City of Frankfort boundaries.

SECTION 3 PLAN

- I. Training and Employment Opportunities for Section 3 Residents
 - A. The Contractor will, to the greatest extent feasible, commit to providing training and employment opportunities to Section 3 Residents as follows:
 1. 30 percent of the aggregate number of new hires.
 - B. The Contractor will, to the greatest extent feasible, provide training and employment opportunities to Section 3 Residents in the order of priority as follows:
 1. Section 3 Residents of the housing development(s) included in this contract.
 2. Section 3 Residents of other housing development(s) managed by the Local Authority, but not included in this contract.
 3. Participants in HUD Youthbuild programs being carried out in Franklin County.
 4. Other Section 3 Residents.
- II. Contracting Opportunities for Section 3 Business Concerns
 - A. The Contractor will, to the greatest extent feasible, direct their efforts to award contracts to Section 3 Business Concerns as follows:
 1. At least 10 percent of the total dollar amount of this contract.
 - B. The Contractor will, to the greatest extent feasible, direct their efforts to award contracts to Section 3 Business Concerns in the order of priority as follows:
 1. Business Concerns that at least 51% of the Business is owned and controlled by low-income or very low-income persons.

2. Business Concerns with Section 3 workers having performed over 75% of the labor hours during the prior three-month period.
3. HUD Youthbuild programs being carried out in Franklin County.
4. Business Concerns that at least 51% of the Business is owned and controlled by current public housing residents or residents who currently live in Section 8-assisted housing.

III. Workforce Needs and Subcontracts

- A. The Contractor shall list all projected workforce needs for all phases of this project by occupation, trade, skill level, and number of positions in Table A – Estimated Workforce Breakdown.
- B. The Contractor shall list information related to subcontracts to be awarded in Table B – Proposed Subcontract Breakdown.

TABLE A - ESTIMATED WORKFORCE BREAKDOWN

JOB CATEGORY	APPROX. NUMBER OF POSITIONS REQUIRED	TOTAL NUMBER OF POSITIONS CURRENTLY OCCUPIED BY PERMANENT EMPLOYEES	TOTAL NUMBER OF POSITIONS TO BE FILLED	TOTAL NUMBER OF POSITIONS TO BE FILLED WITH SECTION 3 RESIDENTS
OFFICERS/SUPERVISORS				
PROFESSIONALS				
TECHNICIANS				
OFFICE/CLERICAL				
SERVICE WORKERS				
OTHERS				

TRADE:

SKILLED				
SEMI-SKILLED				
TRAINEES				
OTHERS				

TRADE:

SKILLED				
SEMI-SKILLED				
TRAINEES				
OTHERS				

TRADE:

SKILLED				
SEMI-SKILLED				
TRAINEES				
OTHERS				

TRADE:

SKILLED				
SEMI-SKILLED				
TRAINEES				
OTHERS				

IV. Workforce and Subcontracting Certification

- A. The Contractor certifies that the information in Table A – Estimated Workforce Breakdown represents the approximate number of employee positions that are needed and which are not presently filled by regular and permanent employees, and which new employees will be required in the execution of this contract and also represents the number of Section 3 Residents that the Contractor proposes to make a good faith effort to employ.
- B. The Contractor certifies that it will make a good faith effort to employ the number of Section 3 Residents stated above through efforts such as those listed in Document 00483 – Part F, Examples of Efforts to Offer Training and Employment Opportunities to Section 3 Residents.

_____, the Contractor, has read and understands all parts of Document 00483, Section 3 Plan Materials, and will, to the greatest extent feasible, abide by the requirements of Section 3 of the Housing and Urban Development Act of 1968, 12, U.S.C. 1701u, in carrying out this contract.

Contractor

Housing Authority of Frankfort	KY36P003-501(22)
Project Name	Project Number

EEO Officer- Signature	Date
------------------------	------

TABLE B – PROPOSED SUBCONTRACTOR BREAKDOWN

FOR THE PERIOD COVERING _____, 20___ THROUGH _____, 20___.

PROPOSED SUBCONTRACTS	ESTIMATED DOLLAR AMOUNT OF SUBCONTRACT	USE OF SECTION 3 BUSINESS CONCERNS (YES/NO)	ESTIMATED DOLLAR AMOUNT TO SECTION 3 BUSINESS CONCERNS
TOTALS	\$		\$

V. Workforce and Subcontracting Certification

- A. The Contractor certifies that the information in Table B – Proposed Subcontractors Breakdown represents the approximate dollar amount of contracts to be offered to Section 3 Business Concerns.
- B. The Contractor certifies that it will make a good faith effort to award contracts totaling the dollar amount stated above to Section 3 Business Concerns through efforts such as those listed in Document 00483 – Part G, Examples of Efforts to Award Contracts to Section 3 Business Concerns.
- C. The Contractor, prior to subcontracting any portion of the work covered by this contract, will require the subcontractor to submit a certification of compliance, estimated workforce breakdown, and proposed subcontractor breakdown similar to those provided in this contract. The Contractor will include the Section 3 Clause in all subcontracts.

_____, the Contractor, has read and understands all parts of Document 00483, Section 3 Plan Materials, and will, to the greatest extent feasible, abide by the requirements of Section 3 of the Housing and Urban Development Act of 1968, 12, U.S.C. 1701u, in carrying out this contract.

Contractor

Housing Authority of Frankfort
Project Name

KY36P003-501(22)
Project Number

EEO Officer- Signature

Date

Section 3 Business Concern Certification for Contracting

Instructions: Enter the following information and select the criterion that applies to certify your business' Section 3 Business Concern status.

Business Information

Name of Business _____

Address of Business _____

Name of Business Owner _____

Phone Number of Business Owner _____

Email Address of Business Owner _____

Preferred Contact Information

Same as above

Name of Preferred Contact _____

Phone Number of Preferred Contact _____

Type of Business (select from the following options):

Corporation

Partnership

Sole Proprietorship

Joint Venture

Select from *ONE* of the following three options below that applies:

At least 51 percent of the business is owned and controlled by low- or very low-income persons (Refer to Part E income guidelines).

At least 51 percent of the business is owned and controlled by current public housing residents or residents who currently live in Section 8-assisted housing.

Over 75 percent of the labor hours performed for the business over the prior three-month period are performed by Section 3 workers (Refer to Part E for definitions).

Business Concern Affirmation

I affirm that the above statements (on the front side of this form) are true, complete, and correct to the best of my knowledge and belief. I understand that businesses who misrepresent themselves as Section 3 business concerns and report false information to the Housing Authority of Frankfort may have their contracts terminated as default and be barred from ongoing and future considerations for contracting opportunities. I hereby certify, under penalty of law, that the following information is correct to the best of my knowledge.

Print Name: _____

Signature: _____ Date: _____

*Certification expires within six months of the date of signature

Information regarding Section 3 Business Concerns can be found at [24 CFR 75.5](#)

FOR ADMINISTRATIVE USE ONLY

Is the business a Section 3 business concern based upon their certification?
 YES NO

EMPLOYERS MUST RETAIN THIS FORM IN THEIR SECTION 3 COMPLIANCE FILE FOR FIVE YEARS.

Section 3 Worker and Targeted Section 3 Worker Self-Certification Sample Form

The purpose of HUD's Section 3 program is to provide employment, training and contracting opportunities to low-income individuals, particularly those who are recipients of government assistance for housing or other public assistance programs. **Your response is voluntary, confidential, and has no effect on your employment.**

Eligibility for Section 3 Worker or Targeted Section 3 Worker Status

A Section 3 worker seeking certification shall self-certify and submit this form to the recipient contractor or subcontractor, that the person is a Section 3 worker or Targeted Section 3 Worker as defined in 24 CFR Part 75.

Instructions: Enter/select the appropriate information to confirm your Section 3 worker or Targeted Section 3 Worker status.

Employee Name: _____

1. Are you a resident of public housing or a Housing Choice Voucher Holder (Section 8)? YES NO
2. Are you a resident of the [City/County of insert name] YES NO
3. In the field below, select the amount of individual income you believe you earn on an annual basis. *The grantee should confirm that their state and local laws do not prohibit this question.

- | | | |
|--|--|---|
| <input type="checkbox"/> Less than \$10,000 | <input type="checkbox"/> \$30,001 - \$40,000 | <input type="checkbox"/> More than \$60,000 |
| <input type="checkbox"/> \$10,001 - \$20,000 | <input type="checkbox"/> \$40,001 - \$50,000 | |
| <input type="checkbox"/> \$20,001 - \$30,000 | <input type="checkbox"/> \$50,001 - \$60,000 | |

Select from **ONE** of the following two options below:

I qualify as a:

- Section 3 Worker (as defined on Part E)
- Targeted Section 3 Worker (as defined on Part E)

Employee Affirmation

I affirm that the above statements are true, complete, and correct to the best of my knowledge and belief. I hereby certify, under penalty of law, that the following information is correct to the best of my knowledge.

Employee Address: _____

Print Name: _____ Date Hired: _____

Signature: _____ Date: _____

FOR ADMINISTRATIVE USE ONLY

Is the employee a Section 3 worker based upon their self-certification? YES NO

Is the employee a Targeted Section 3 worker based upon their self-certification? YES NO

Was this an applicant who was hired as a result of the Section 3 project? YES NO

If Yes, what is the name of the company? _____

What was the date of hire? _____

EMPLOYERS MUST RETAIN THIS FORM IN THEIR SECTION 3 COMPLIANCE FILE FOR FIVE YEARS.

Section 3 Income Limits

Eligibility Guidelines

The worker's income must be at or below the amount provided below for an individual (household of 1) regardless of actual household size.

Individual Income Limits

FY 2024 Income Limit Area	Income Limits Category	FY 2024 Income Limits
City of Frankfort	Extremely Low Income Limits (30%)	\$17,750
	Very Low Income Limits (50%)	\$29,550
	Low Income Limits (80%)	\$47,250

See <https://www.huduser.gov/portal/datasets/il.html> for most recent income limits.

Section 3 Worker Definition:

- A low or very low-income resident (the worker's income for the previous or annualized calendar year is below the income limit established by HUD); or
- Employed by a Section 3 business concern; or
- A YouthBuild participant.

Targeted Section 3 Worker Definition:

- Employed by a Section 3 business concern or
- Currently meets or when hired met at least one of the following categories as documented within the past five years:
 - A resident of public housing; or
 - A resident of other public housing projects or Section 8-assisted housing; or
 - A YouthBuild participant.

EXAMPLES OF EFFORTS TO OFFER TRAINING AND EMPLOYMENT OPPORTUNITIES TO SECTION 3 RESIDENTS

1. Entering into "first source" hiring agreements with organizations representing Section 3 residents.
2. Sponsoring a HUD-certified "Step-Up" employment and training program for Section 3 residents.
3. Establish training programs, which are consistent with the requirements of the Department of Labor for public and Indian housing residents, and other Section 3 residents in the building trades.
4. Advertising the training and employment positions by distributing flyers (which identify the positions to be filled, the qualifications required, and where to obtain additional information about the applications process) to every occupied dwelling unit in the housing development or developments.
5. Advertising the training and employment positions by posting flyers (which identify the positions to be filled, the qualifications required, and where to obtain additional information about the application process) in the common areas or other prominent areas of the housing development or developments.
6. Contacting resident councils, resident management corporations, or other resident organizations, where they exist, in the housing development or developments and community organizations in HUD-assisted neighborhoods, to request the assistance of these organizations in notifying residents of the training and employment positions to be filled.
7. Sponsoring (scheduling, advertising, financing or providing in-kind services) a job informational meeting to be conducted by a housing authority or contractor representative or representatives at a location in the housing development.
8. Arranging assistance in conducting job interviews and completing job applications for residents of the housing developments or developments and in the neighborhood or service area in which a Section 3 project is located.
9. Arranging for a location in the housing development or developments where category 1 persons reside, or the neighborhood or service area of the project where job applications may be delivered to and collected by a recipient or contractor representative or representatives.
10. Contacting agencies administering HUD Youthbuild programs, and requesting their assistance in recruiting HUD Youthbuild program participants for the Housing Authority's or contractor's training and employment positions.
11. Consulting with State and local agencies administering training programs funded through JTPA or JOBS, probation and parole agencies, unemployment compensation programs, community organizations and other officials or organizations to assist with recruiting Section 3 residents for the Housing Authority's or contractor's employment positions.

12. Advertising the employment opportunities through the local media, such as community television networks, newspapers of general circulation and radio advertising.
13. Employing a job coordinator, or contracting with a business concern that is licensed in the field of job placement (preferably one of the Section 3 business concerns identified in part 135) that will undertake on behalf of the Housing Authority, other recipients, or the contractor, the efforts to match eligible and qualified Section 3 residents with the training and employment positions that the Housing Authority or contractor intend to fill.
14. For a Housing Authority, employment of Section 3 residents directly on either a permanent or a temporary basis to perform work generated by Section 3 assistance. (This type of employment is referred to as "force account labor" in HUD's Indian housing regulations. See 24 CFR 905.102, and 905.201(a)(6).)
15. Where there are more qualified Section 3 residents than there are positions to be filled, maintaining a file of eligible qualified Section 3 residents for future employment.
16. Undertaking job counseling, education and related programs in association with local educational institutions.
17. Undertaking such continued job training efforts as may be necessary to ensure the continued employment of Section 3 residents previously hired for employment opportunities.
18. After selection of bidders, but prior to contract execution, incorporating into the contract negotiated provisions for a specific number of public housing or other Section 3 residents to be trained or employed on the Section 3 covered assistance.
19. Coordinating plans and implementation of economic development (e.g. job training/preparation and business development assistance for residents) with the planning for housing and community development.

EXAMPLES OF EFFORTS TO AWARD CONTRACTS TO SECTION 3 BUSINESS CONCERNS

Utilizing procurement procedures for Section 3 business concerns similar to those provided in 24 CFR part 905 for business concerns owned by Native Americans (see section III of this Appendix).

1. In determining the responsibility of potential contractors, consider their record of Section compliance as evidenced by past actions and their current plans for the pending contract.
2. Contacting business assistance agencies, minority contractors associations and community organizations to inform them of contracting opportunities and requesting their assistance in identifying Section 3 businesses which may solicit bids or proposals for contracts for work in connection with Section 3 covered assistance.
3. Advertising contracting opportunities by posting notices, which provide general information about the work to be contracted and where to obtain additional information in the common area or other prominent areas of the housing development or developments owned and managed by the HA.
4. For HAs, contacting resident councils, resident management corporations, or other resident organizations, where they exist, and requesting their assistance in identifying eligible business concerns.
5. Providing written notice to all known Section 3 business concerns of the contracting opportunities. This notice should be in sufficient time to allow the Section 3 business concerns to respond to the bid invitations or request for proposals.
6. Following up with Section 3 business concerns that have expressed interest in the contracting opportunities by contacting them to provide additional information on the contracting opportunities.
7. Coordinating pre-bid meetings at which Section 3 business concerns could be informed of upcoming contracting and subcontracting opportunities.
8. Carrying out workshops on contracting procedures and specific contract opportunities in a timely manner so that Section 3 business concerns can take advantage of upcoming contracting opportunities, with such information being made available in language other than English where appropriate.
9. Advising Section 3 business concerns as to where they may seek assistance in overcoming limitations such as inability to obtain bonding, lines of credit, financing, or insurance.
10. Arranging solicitations, times for the presentation of bids, quantities, specifications, and Delivery schedules in ways to facilitate the participation of Section 3 business concerns.
11. Where appropriate, breaking out contract work items into economically feasible units to facilitate participation by Section 3 business concerns.

12. Contacting agencies, administering HUD Youthbuild programs, and notifying these agencies of the contracting opportunities.
13. Advertising the contracting opportunities through trade association papers and newsletters, and through the local media, such as community television networks, newspapers of general circulation and radio advertising.
14. Developing a list of eligible Section 3 business concerns.
15. For Housing Authorities, participating in the "Contracting with Resident-Owned Business" program provided under 24 CFR part 963.
16. Establishing or sponsoring programs designed to assist residents of public or Indian housing in the creation and development of resident-owned businesses.
17. Establishing numerical goals (number of awards and dollar amount of contracts) for award of contracts to Section 3 business concerns.
18. Supporting businesses that provide economic opportunities to low-income persons by linking them to the support services available through the Small Business Administration (SBA), the Department of Commerce and comparable agencies at the State and local levels.
19. Encouraging financial institutions, in carrying out their responsibilities under the Community Reinvestment Act, to provide low- income loans by providing working capitals and other financial business needs.
20. Actively supporting joint ventures with Section 3 business concerns.
21. Actively supporting the development or maintenance of business incubators that assist Section 3 business concerns.

EXAMPLES OF PROCUREMENT PROCEDURES THAT PROVIDE FOR PREFERENCE TO SECTION 3 BUSINESS CONCERNS

This section (Section III of the Regulations), provides specific procedures that may be followed by recipients and contractors (collectively, referred to as the "contracting party") for implementing the Section 3 contracting preference for each of the competitive procurement methods authorized in 24 CFR 85.36(d).

I. Small Purchase Procedures

For Section 3 covered contracts aggregating no more than \$25,000, the methods set forth in this paragraph or the more formal procedures set forth in paragraphs (2) and (3) of this section may be utilized.

A. Solicitation

1. Quotations may be solicited by telephone, letter or other informal procedure provided that the manner of solicitation provides for participation by a reasonable number of competitive sources. At the time of solicitation the parties must be informed of:

The Section 3 covered contract to be awarded with sufficient specificity:

- The time within which quotations must be submitted; and
- The information that must be submitted with each quotation.

2. If the method described in paragraph (i) (A) is utilized, there must be an attempt to obtain quotations from a minimum of three qualified sources in order to promote competition. Fewer than three quotations are acceptable when the contracting party has attempted, but has been unable to obtain a sufficient number of competitive quotations. In unusual circumstances, the contracting party may accept the sole quotation received in response to a solicitation received in response to a solicitation provided the price is reasonable. In all cases, the contracting party shall document the circumstances when it has been unable to obtain at least three quotations.

B. Award

1. Where the Section 3 covered contract is to be awarded based upon the lowest price, the contract shall be awarded to the qualified Section 3 business concern with the lowest responsive quotation, if it is reasonable and no more than 10 percent higher than the quotation of the lowest responsive quotation from any qualified source. If no responsive quotation by a qualified Section 3 business concern is within 10 percent of the lowest responsive quotation from any qualified source, the award shall be made to the source with the lowest quotation.
2. Where the Section 3 covered contract is to be awarded based on factors other than price, a request for quotations shall be issued by developing the particulars of the solicitation, including a rating system for the assignment of points to evaluate the merits of each quotation. The solicitation shall identify all factors to be considered, including price or cost. The rating system shall provide for a range of 15 to 25 percent of the total number of available rating points to be set aside for the provision of preference for Section 3 business concerns. The purchase order shall be awarded to the responsible firm whose quotation is the most advantageous, considering price and all other factors specified in the rating system.

II. Procurement by Sealed Bids (Invitations for Bids)

Preference in the award of Section 3 covered contracts that are awarded under a sealed bid (IFB) process may be provided as follows:

A. Bids shall be solicited from all businesses (Section 3 business concerns, and non-Section 3 business concerns). An award shall be made to the qualified Section 3 business concern with the highest priority ranking and with the lowest responsive bid if that bid:

1. Is within the maximum total contract price established in the contracting party's budget for the specific project for which bids are being taken, and
2. Is no more than "X" higher than the total bid price of the lowest responsive bid from any responsible bidder. "X" is determined as follows:

X = lesser of:

When the lowest responsive bid is:

Less than \$100,000.....10% of that bid or \$9,000

At least \$100,000, but less than \$200,000.....9% of that bid, or \$16,000

At least \$200,000 but less than \$300,000.....8% of that bid, or \$21,000

At least \$300,000 but less than \$400,000.....7% of that bid, or \$24,000

At least \$400,000 but less than \$500,000.....6% of that bid, or \$25,000

At least \$500,000 but less than \$1 million.....5% of that bid, or \$40,000

At least \$1 million but less than \$2 million.....4% of that bid, or \$60,000

At least \$2 million but less than \$4 million.....3% of that bid, or \$80,000

At least \$4 million but less than \$7 million.....2% of that bid, or \$105,000

\$7 million or more.....1 1/2 % of the lowest responsive bid, with no dollar limit.

B. If no responsive bid by a Section 3 business concern meets the requirements of paragraph (2) (l) of this section, the contract shall be awarded to a responsible bidder with the lowest responsive bid.

III. Procurement Under the Competitive Proposals Method of Procurement (Request for Proposals RFP)

For contracts and subcontracts awarded under the competitive proposals method of procurement (24 CFR 85.36(d)(3)), a Request for Proposals (RFP) shall identify all evaluation factors (and their relative importance) to be used to rate proposals.

- A. One of the evaluation factors shall address both the preference for Section 3 business concerns and the acceptability of the strategy for meeting the greater extent feasible requirement (Section 3 strategy), as disclosed in proposals submitted by all business concerns (Section 3 and non-Section 3 business concerns). This factor shall provide for a range of 15 to 25 percent of the total number of available points to be set aside for the evaluation of these two components.
- B. The component of this evaluation factor, designed to address the preference for Section 3 business concerns, must establish a preference for these business concerns in the order of priority ranking as described in 24 CFR 135.36.
- C. With respect to the second component (the acceptability of the Section 3 strategy), the RFP shall require the disclosure of the contractor's Section 3 strategy to comply with the Section 3 training and employment preference, or contracting preference, or both, if applicable. A determination of the contractor's responsibility will include the submission of an acceptable Section 3 strategy. The contract award shall be made to the responsible firm (either Section 3 or non-Section 3 business concern) whose proposal is determined most advantageous, considering price and all other factors specified in the RFP.

GOOD FAITH EFFORT

At a minimum, the following tasks must be completed to demonstrate a good faith effort with the requirements of Section 3. The contracting party and each contractor or subcontractor seeking to establish a good faith effort as required should be filling all training positions with persons residing in the target area.

1. Send notices of job availability subcontracting opportunities subject to these requirements to recruitment sources, trade organizations and other community groups capable of referring eligible Section 3 applicants, including the Department of Labor.
2. Include in all solicitations and advertisements a statement to encourage eligible Section 3 residents to apply.
3. When using a newspaper of major circulation to request bids/quotes or to advertise employment opportunities to also advertise in minority-owned newspapers.
4. Maintain a list of all residents from the target area who have applied either on their own or by referral from any service, and employ such persons, if otherwise eligible and if a trainee position exists. (If the contractor has no vacancies, the applicant, if otherwise eligible, shall be listed for the first available vacancy). A list of eligible applicants will be maintained for future vacancies.

The contractor must certify that any vacant employment positions, including training positions, that are filled (1) after the contractor is selected but before the contract is executed, and (2) with persons other than those to whom the regulations of 24 CFR Part 135 require employment opportunities to be directed were not filled to circumvent the contractor's obligation under 24 CFR Part 135.

DEFINITIONS

Applicant means any entity that makes an application for Section 3 covered assistance, and includes, but is not limited to, any State, unit of local government, public housing agency, Indian housing authority, Indian tribe, or other public body, public or private nonprofit organization, private agency or institution, mortgagor, developer, limited dividend sponsor, builder, property manager, community housing development organizations (CHDO), resident management corporation, resident council, or cooperative association.

Assistant Secretary means the Assistant Secretary for Fair Housing and Equal Opportunity.

Business concern means a business entity formed in accordance with State law, and which is licensed under State, county or municipal law to engage in the type of business activity for which it was formed. Business concern that provides economic opportunities for low-and very-low income persons.

Contract See the definition of "Section 3 covered contract" in this section.

Contractor means any entity which contracts to perform work generated by the expenditure of Section 3 covered assistance, or for work in connection with a Section 3 covered project.

Department or HUD means the Department of Housing and Urban Development, including its Field Offices to which authority has been delegated to perform functions under this part.

Employment opportunities generated by Section 3 covered assistance means all employment opportunities generated by the expenditure of Section 3 covered public and Indian housing assistance (i.e. operating assistance, development assistance and modernization assistance, as described in 135.3(a)(1)). With respect to Section 3 covered housing and community development assistance, this term means all employment opportunities arising in connection with Section 3 covered projects (as described in 135.3(a)(2)), including management and administrative jobs connected with the Section 3 covered project. Management and administrative jobs include architectural, engineering or related professional services required to prepare plan, drawings, specification, or work write-ups; and jobs directly related to administrative support of these activities, e.g., construction manager, relocation specialist, payroll clerk, etc.

Housing Authority (HA) means, collectively, public housing agency and Indian housing authority.

Housing and community development assistance means any financial assistance provided or otherwise made available through a HUD housing or community development program through any grant, loan, loan guarantee, cooperative agreement, or contract, and includes community development funds in the form of community development block grants, and loans guaranteed under Section 108 of the Housing and Community Development Act of 1974, as amended. Housing and community development assistance does not include financial assistance provided through a contract of insurance or guaranty.

Housing development means low-income housing owned, developed, or operated by public housing agencies or Indian housing authorities in accordance with HUD's public and Indian housing program regulations codified in 24 CFR Chapter IX.

HUD Youthbuild programs means programs that receives assistance under subtitle D of Title IV of the National Affordable Housing Act, as amended by the Housing and Community Development Act of 1992 (42 U.S.C. 12899), and provide disadvantaged youth with opportunities for employment, education, leadership development, and training in the construction or rehabilitation of housing for homeless individual and members of low-and very low-income families.

JTPA means the Job Training Partnership Act (29 U.S.C. 1579(a)).

Low-income person See the definition of "Section 3 resident" in this section.

Metropolitan Area means a metropolitan statistical area (MSA), as established by the Office of Management and Budget.

Neighborhood Area means, for HUD housing programs, a geographical location within the jurisdiction of a unit of general local government (but not the entire jurisdiction) designated in ordinances, or other local documents as a neighborhood, village, or similar geographical designation.

New hires means full-time employees for permanent, temporary or seasonal employment opportunities.

Non-Metropolitan County means any county outside of a metropolitan area.

Other HUD Programs means HUD programs, other than public and Indian housing programs that provide housing and community development assistance for "Section 3 covered projects," as defined in this section.

Public Housing Agency (PHA) has the meaning given this term in 24 CFR part 941.

Public Housing Resident has the meaning given this term in 24 CFR part 963.

Recipient means any entity which receives Section 3 covered assistance, directly from HUD or from another recipient and includes, but is not limited to, any State, unit of local government, PHA, IHA, Indian tribe, or other public body, public or private nonprofit organization, private agency or institution, mortgagor, developer, limited dividend sponsor, builder, property manager, community housing development organization, resident management corporation, resident council, or cooperative association. Recipient also includes any successor, assignee or transferees of any such entity, but does not include any ultimate beneficiary under the HUD program to which Section 3 applies and does not include contractors.

Secretary means the Secretary of Housing and Urban Development.

Section 3 means Section 3 of the Housing and Urban Development Act of 1968, as amended (12 U.S.C. 1701u).

Section 3 Business Concern means a business concern, defined as follows:

1. That is at least 51% owned and controlled by low-income or very low-income persons; or
2. Whose permanent, full-time employees include Section 3 workers that have performed over 75% of the labor hours by the business over the prior three-month period; or
3. That at least 51% of the Business is owned and controlled by current public housing residents or residents who currently live in Section 8-assisted housing; or
3. That provides evidence of a commitment to subcontract in excess of 25 percent of the dollar award of all subcontracts to be awarded to business concerns that meet the

qualifications set forth in paragraph (1) or (2) in this definition of "Section 3 business concern."

Section 3 Clause means the contract provisions set forth in 135.38.

Section 3 Covered Activity means any activity that is funded by Section 3 covered assistance public and Indian housing assistance.

Section 3 Covered Assistance means:

1. Public and Indian housing development assistance provided pursuant to section 5 of the 1937 Act;
2. Public and Indian housing operating assistance provided pursuant to section 9 of the 1937 Act;
3. Public and Indian housing modernization assistance provided pursuant to section 14 of the 1937 Act;
4. Assistance provided under any HUD housing or community development program that is expended for work arising in connection with:
 - (i) Housing rehabilitation (including reduction and abatement of lead-based paint hazards, but excluding routine maintenance, repair and replacement);
 - (ii) Housing construction; or
 - (iii) Other public construction project (which includes other buildings or improvements, regardless of ownership).

Section 3 Covered Contract means a contract or subcontract (including a professional service contract) awarded by a recipient or contractor for work generated by the expenditure of Section 3 covered assistance, or for work arising in connection with a Section 3 covered project.

"Section 3 covered contracts" do not include contracts awarded under HUD's procurement program, which are governed by the Federal Acquisition Regulation System (see 48 CFR, Chapter 1). "Section 3 covered contracts" also do not include contracts for the purchase of supplies and materials. However, whenever a contract for materials includes the installation of the materials, the contract constitutes a Section 3 covered contract. For example, a contract for the purchase and installation of a furnace would be a Section 3 covered contract because the contract is for work (i.e. the installation of the furnace) and thus is covered by Section 3.

Section 3 Covered Project means the construction, reconstruction, conversion or rehabilitation of housing (including reduction and abatement of lead-based paint hazards), other public construction which includes buildings or improvements (regardless of ownership assisted with housing or community development assistance.

Section 3 Joint Venture means an association of business concerns, one of which qualifies as a Section 3 business concerns, one of which qualifies as a Section 3 business concern, formed by written joint venture agreement to engage in and carry out a specific business venture for which purpose the business concerns combine their efforts, resources, and skills for joint profit, but not necessarily on a continuing or permanent basis for conducting business generally, and for which the Section 3 business concern:

- (i) Is responsible for a clearly defined portion of the work to be performed and holds management responsibilities in the joint venture; and
- (ii) Performs at least 25 percent of the work and is contractually entitled to compensation proportionate to its work.

Section 3 Residents means:

1. A public housing resident; or
2. An individual who resides in the metropolitan area or non-metropolitan county in which the Section 3 covered assistance is expended, and who is:

- (i) A low-income person, as this term is defined in Section 3 (b) (2) of 1937 Act (42 U.S.C. 1437a(b) (2)). Section 3 (b) (2) of the 1937 Act defines this term to mean families (including single persons) whose incomes do not exceed 80 per cent of the median income for the area, as determined by the Secretary, with adjustments for smaller and larger families, except that the Secretary may establish income ceilings higher or lower than 80 per cent of the median for the area on the basis of the Secretary's findings that such variations are necessary because of prevailing levels of construction costs or unusually high or low-income families; or
 - (ii) A very low-income person, as this term is defined in Section 3(b) (2) of the 1937 Act (42 U.S.C. 1437a(b) (2)). Section 3 (b) (2) of the 1937 Act (42 U.S.C. 1437a(b) (2)) defines this term to mean families (including single persons) whose income does not exceed 50 per cent of the median family income for the area, as determined by the Secretary with adjustments for smaller and larger families, except that the Secretary may establish income ceilings higher or lower than 50 per cent of the median for the area on the basis of the Secretary's findings that such variations are necessary because of unusually high or low income family incomes.
3. A person seeking the training and employment preferences provided by Section 3 bears the responsibility of providing evidence (if requested) that the person is eligible for the preference.

Section 8 Assistance means assistance provided under Section 8 of the 1937 Act (42 U.S.C. 1437f) pursuant to 24 CFR part 882, subpart G.

Service Area means the geographical area in which the persons benefiting from the Section 3 covered project reside. The service shall not extend beyond the unit of general local government in which the Section 3 covered assistance is expended. In HUD's Indian housing programs, the service area, for IHAs established by an Indian tribe as a result of the exercise of the tribe's sovereign power, is limited to the area of tribal jurisdiction.

Subcontractor means any entity (other than a person who is an employee of the contractor) which has a contract with a contractor to undertake a portion of the contractor's obligation for the performance of work generated by the expenditure of Section 3 covered assistance, or arising in connection with a Section 3 covered project.

Very Low-Income Person See the definition of "Section 3 resident" in this section.

Youthbuild Programs See the definition of "HUD Youthbuild programs" in this section.

END OF DOCUMENT

LIST OF BRAND NAME PRODUCTS TO BE FURNISHED

The bidder submits the following list of products to be used in executing the construction project and will not deviate from the manufacturers and models listed below without the express approval of the Owner.

Product Description	Manufacturer	Model/Stock #
Roofing Shingles		
Vinyl Siding		
Exterior Doors		
Storefront System		
Interior Doors		
Door Locks		
Ceramic Tile		
Plank Vinyl Flooring		
Carpeting		
Resilient Base		
Casework		
Toilets (WC1)		
Urinal (UR1)		
Lavatory (LAV-1)		
Lavatory (LAV2)		
Faucets		
Drinking Fountain (EWC)		
HVAC Equipment		
Exhaust Fan (EF-1)		
Electric Heater ((EWH-1)		

END OF DOCUMENT

LIST OF SUBCONTRACTORS TO BE USED

The bidder submits the following list of Subcontractors to be used in executing the construction project and will not deviate from those businesses listed below without the express approval of the Owner.

Trade Description	Subcontractor	Address
Supervision		
Concrete		
Demolition		
Rough Carpentry		
Finish Carpentry		
Exterior Doors		
Interior Doors		
Storefront System		

Trade Description	Subcontractor	Address
Drywall Installation		
Painting		
Flooring		
HVAC		
Electrical		

END OF DOCUMENT

US Department of Housing and Urban Development
Office of Housing/Federal Housing Commissioner

US Department of Agriculture
Farmers Home Administration

Part I to be completed by Controlling Participant(s) of Covered Projects <i>(See instructions)</i>		For HUD HQ/FmHA use only	
Reason for submission:			
1. Agency name and City where the application is filed Housing Authority of Frankfort, Franklin County, KY		2. Project Name, Project Number, City and Zip Code KY363P003-501(22)	
3. Loan or Contract amount \$	4. Number of Units or Beds	5. Section of Act <input type="checkbox"/> Existing <input type="checkbox"/> Rehabilitation <input type="checkbox"/> Proposed (New)	
7. List all proposed Controlling Participants and attach complete organization chart for all organizations showing ownership %			
Name and address (Last, First, Middle Initial) of controlling participant(s) proposing to participate		8 Role of Each Principal in Project	
		9. SSN or IRS Employer Number (TIN)	

Certifications: The controlling participants(s) listed above hereby apply to HUD or USDA FmHA, as the case may be, for approval to participate as controlling participant(s) in the role(s) and project listed above. The controlling participant(s) certify that the information provided on this form and in any accompanying documentation is true and accurate. I/we acknowledge that making, presenting, or submitting a false, fictitious, or fraudulent statement, representation, or certification may result in criminal, civil, and/or administrative sanctions, including fines, penalties, and imprisonment. The controlling participant(s) further certify to the truth and accuracy of the following:

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 controlling participant(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 controlling participants 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 controlling participants or their projects;
 - d. There has not been a suspension or termination of payments under any HUD assistance contract due to the controlling participant's fault or negligence;
 - e. The controlling participants 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 controlling participants 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 controlling participants 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;
 - h. All the names of the controlling participants who propose to participate in this project are listed above.
3. None of the controlling participants 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 controlling participants 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 controlling participants 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 controlling participants 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 controlling participants 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 controlling participant(s) cannot certify have been deleted by striking through the words with a pen, and the controlling participant(s) have initialed each deletion (if any) and have attached a true and accurate signed statement (if applicable) to explain the facts and circumstances.

Name of Controlling Participant	Signature of Controlling Participant	Certification Date (mm/dd/yyyy)	Area Code and Tel. No.
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 controlling participants' previous participation projects and participation history in covered projects as per 24 CFR, part 200 §200.214 and multifamily Housing programs of FmHA, State and local Housing Finance Agencies, if applicable. **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".

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

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.

Date (mm/dd/yyyy)	Tel No. and area code	<input type="checkbox"/> A. No adverse information; form HUD-2530 approval recommended. <input type="checkbox"/> B. Name match in system <input type="checkbox"/> C. Disclosure or Certification problem <input type="checkbox"/> D. Other (attach memorandum)
Staff	Processing and Control	Approved <input type="checkbox"/> Yes <input type="checkbox"/> No Date (mm/dd/yyyy)
Signature of authorized reviewer		Signature of authorized reviewer

Previous editions are obsolete

Instructions for Completing the Previous Participation Certificate, form HUD-2530

Carefully read these instructions and the applicable regulations. A copy of the regulations published at 24 C.F.R. part 200, subpart H, § 200.210-200.222 can be obtained on-line at www.gpo.gov and from the Account Executive at any HUD Office. Type or print neatly in ink when filling out this form. Incomplete form will be returned to the applicant.

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 Account Executive.

Purpose: This form provides HUD/USDA FmHA with a certified report of all previous participation in relevant HUD/USDA programs by those parties submitting the application. The information requested in this form is used by HUD/USDA to determine if you meet the standards established to ensure that all controlling participants in HUD/USDA projects will honor their legal, financial and contractual obligations and are of acceptable risks from the underwriting standpoint of an insurer, lender or governmental agency. HUD requires that you certify and submit your record of previous participation, in relevant projects, by completing and signing this form, before your 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 Controlling Participants of Covered Projects, as such terms are defined in 24 CFR part 200 §200.212, and as further clarified by the Processing Guide (HUD notice H 2016-15) referenced in 24 CFR §200.210(b) and available on the HUD website at: http://portal.hud.gov/hudportal/HUD?src=/program_offices/housing/mfh/prevparticipation.

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 filed with applications for projects listed in 24 CFR §200.214 and for the Triggering Events listed at 24 CFR §200.218.

Review of Adverse Determination: If approval of your participation in a HUD project is denied, withheld, or conditionally granted on the basis of your record of previous participation, you will be notified by the HUD Office. You may request reconsideration in accordance with 24 CFR §200.222 and further clarified by the Processing Guide. Request must be made in writing within 30 days from your receipt of the notice of determination.

The Department of Housing and Urban Development (HUD) is authorized to collect this information by law 42 U.S.C. 3535(d) 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 controlling 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 controlling participant may not participate in a proposed or existing multifamily or healthcare project. HUD uses this information to evaluate whether or not controlling participants pose an unsatisfactory underwriting risk. The information is used to evaluate the potential controlling participants 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.

Purpose: The information collected by form HUD-2530 is required for principals applying to participate in multifamily programs to become HUD-approved controlling participants. The information you provide will enable HUD to evaluate your record with respect to established standards of performance, responsibility, and eligibility.

Routine Use: The information collected by this form will not be otherwise disclosed outside of HUD, except to public agencies and private sector sources for automated processing of your records and for requesting information about you for participant approval; to appropriate agencies, entities, and persons when it is reasonably necessary to mitigate a breach or related incident; to Federal, state and/or local agencies when relevant to civil, criminal, or regulatory investigations and prosecutions or for other inquiries.

Disclosure: Providing the information is voluntary. You must provide all information requested in this application, including your SSN. Without prior approval or information, a controlling participant may not participate in a proposed or existing multifamily or healthcare project.

SORN ID/URL:<https://www.govinfo.gov/content/pkg/FR-2016-07-29/pdf/2016-18026.pdf>

Public reporting burden for this collection of information is estimated to average three 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.

FORM OF CONTRACT

THIS AGREEMENT, made this ____ day of _____ in the year of Two Thousand and Twenty Four

by and between _____
(Fill in exact name of Contractor)

- () A corporation organized and existing under the Laws of the State/Commonwealth of _____
- () A partnership consisting of _____
- () An individual trading as _____, hereinafter called the "Contractor"

and The Housing Authority of Frankfort, hereinafter called the "Local Authority."

WITNESSETH, that the Contractor and the Local Authority for the consideration stated herein mutually agree as follows:

ARTICLE 1. STATEMENT OF WORK. The Contractor shall furnish all labor, materials, equipment, and services and perform and complete all work required for the construction and completion of:

Administration Building Renovations

ARTICLE 2. THE CONTRACT PRICE. The Local Authority shall pay the Contractor for the performance of the Contract in current funds, subject to additions and deductions as provided in the specifications in the sum of:

_____ Dollars (\$_____.)

All payments under this Contract shall be made at the Office of the Local Authority.

ARTICLE 3. JURISDICTION AND VENUE. In the event of a Contract dispute or litigation arising out of said Contract, it is understood and agreed that this Contract was executed and performed in Franklin County, and, as such, it is agreed by both parties that venue for said litigation, including an action of Declaratory Judgment, will be in Franklin County.

ARTICLE 4. ATTORNEY'S FEES. In the event of litigation arising out of said Contract, it is agreed that if _____ is held liable for damages, or is found to have breached the Contract, that _____ will also pay the Local Authority's reasonable attorney's fees and expenses involved in the litigation.

ARTICLE 5. LIQUIDATED DAMAGES. As actual damages for any delay in completion of the work which the Contractor is required to perform under this Contract are impossible to determine, the Contractor and his Sureties shall be liable for and shall pay the Local Authority as liquidated damages the sum of \$250 Dollars per day for each calendar day of delay from the date stipulated for completion or as modified in accordance with Section 29, Changes in the Work, under General Conditions, until such work is satisfactorily completed and accepted.

ARTICLE 6. CONTRACT DOCUMENTS. The Contract shall consist of the following component parts:

- a. Document 00502 - Form of Contract
- b. Document 00150 - Instructions to Bidders
- c. Document 00151 - Modifications and Additions to Instructions to Bidders
- d. Document 00320 - Contractor's Proposal
- e. Document 00321 - Certificate as to Corporate Principal
- f. Document 00715 - General Conditions
- g. Document 00716 - Special Conditions
- h. Specifications Division 1 through Division 16 of the Project Manual
- i. Drawings
- j. Addenda (if applicable)

This instrument, together with the other documents enumerated in this Article 6, which said other documents are as fully a part of the Contract as if hereto attached or herein repeated, from the Contract. In the event that any provision of any other component part, the provision of the component part first enumerated in this Article 6 shall govern, except as otherwise specifically stated. The various provisions in Addenda shall be construed in the order of preference of the component part of the Contract which each modifies.

IN WITNESS WHEREOF, the parties hereto have caused this Instrument to be executed in four (4) original counterparts the day and year first above written.

Attest:

(Signature)

(Print Name)

(Contractor)

By: _____

(Signature)

(Print Name)

Title: _____

Street: _____

City: _____

State: _____ Zip: _____

Attest:

(Signature)

(Print Name)

HOUSING AUTHORITY OF FRANKFORT

(Local Authority)

By: _____

(Signature)

David Small

(Print Name)

Title: Contracting Officer / Executive Director

Street: 590 Walter Todd Drive

City: Frankfort

State: KY Zip: 40601

(Print or type names underneath all signatures.)

END OF DOCUMENT

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: That we, _____,

_____ a _____

hereinafter called "Principal," and _____

of _____, State of _____ hereinafter called the "Surety," are held and

firmly bound unto the Housing Authority of Frankfort, hereinafter called "Owner,"

in the penal sum of _____

_____ Dollars (\$ _____)

in lawful money of the United States, for the payment of which sum well and truly to be made we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by those present.

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

Administration Building Renovations

NOW THEREFORE, if the Principal shall well, truly, and faith-fully perform his duties, all of the undertakings, covenants, terms, conditions, and agreements of said Contract during the original term thereof and any extensions thereof which may be granted by the Owner, with or without notice to the Surety, and if he shall satisfy all claims and demands incurred under such Contract, shall fully indemnify and save harmless the Owner from all costs and damages which he 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, it shall 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, or alteration or addition to the terms of the Contract, or to the work to be performed thereunder or to the 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 specifications.

PROVIDED, FURTHER, that no final settlement between the Owner and the Contractor shall abridge the right of any beneficiary here- under whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in four (4) counterparts, each one of which shall be deemed an original, this the _____ day of _____, 20____.

Attest:

(Principal) Secretary

(SEAL)

Witness as to Principal

Principal

By: _____

Address

Attest:

(Surety) Secretary

(SEAL)

Witness as to Surety

Address

Surety

By: _____

Attorney-in-Fact

Address

END OF DOCUMENT

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: That we, _____
_____, a _____
hereinafter called "Principal," and _____
of _____, State of _____, hereinafter called the "Surety," are held and
firmly bound unto the Housing Authority of Frankfort, hereinafter called
"Owner", in the penal sum of _____
_____ Dollars (\$ _____)
in lawful money of the United States, for the payment of which sum well and truly to be made we
bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by
these presents.

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

Administration Building Renovations

NOW, THEREFORE, if the Principal shall promptly make payment to all persons, firms,
subcontractors, and corporations furnishing material 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, and repairs on machinery,
equipment, and tools) consumed or used in connection with the construction of such work; for 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 it shall 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 thereunder or the specifications accompanying same shall in any wise affect
its obligation or this bond, and it does hereby waive notice of any such change, extension of time,
alteration, or addition to the terms of the Contract or to the work or to the specifications.

PROVIDED, FURTHER, that no final settlement between the Owner and the Contractor shall
abridge the right of any beneficiary hereunder whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in four (4) counterparts, each one of which shall be deemed an original, this the _____ day of _____, 20__.

Attest:

(Principal) Secretary

(SEAL)

Witness as to Principal

Attest:

(Surety) Secretary

(SEAL)

Witness as to Surety

Address

Principal

By:

Address

Surety

By:

Attorney-in-Fact

Address

END OF DOCUMENT

General Conditions for Construction Contracts - Public Housing Programs

U.S. Department of Housing and Urban Development
 Office of Public and Indian Housing
 OMB Approval No. 2577-0157 (exp. 11/30/2023)

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

Public reporting burden for this collection of information is estimated to average 1 hour. This includes the time for collecting, reviewing, and reporting the data. The information requested is required to obtain a benefit. 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, PHAs would be unable to enforce their contracts.. There are no assurances of confidentiality. HUD may not conduct or sponsor, and an applicant is not required to respond to a collection of information unless it displays a currently valid OMB control number.

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1. Definitions

- (a) "Architect" means the person or other entity engaged by the PHA to perform architectural, engineering, design, and other services related to the work as provided for in the contract. When a PHA uses an engineer to act in this capacity, the terms "architect" and "engineer" shall be synonymous. The Architect shall serve as a technical representative of the Contracting Officer. The Architect's authority is as set forth elsewhere in this contract.
- (b) "Contract" means the contract entered into between the PHA and the Contractor. It includes the forms of Bid, the Bid Bond, the Performance and Payment Bond or Bonds or other assurance of completion, the Certifications, Representations, and Other Statements of Bidders (form HUD-5370), these General Conditions of the Contract for Construction (form HUD-5370), the applicable wage rate determinations from the U.S. Department of Labor, any special conditions included elsewhere in the contract, the specifications, and drawings. It includes all formal changes to any of those documents by addendum, change order, or other modification.
- (c) "Contracting Officer" means the person delegated the authority by the PHA to enter into, administer, and/or terminate this contract and designated as such in writing to the Contractor. The term includes any successor Contracting Officer and any duly authorized representative of the Contracting Officer also designated in writing. The Contracting Officer shall be deemed the authorized agent of the PHA in all dealings with the Contractor.
- (d) "Contractor" means the person or other entity entering into the contract with the PHA to perform all of the work required under the contract.
- (e) "Drawings" means the drawings enumerated in the schedule of drawings contained in the Specifications and as described in the contract clause entitled Specifications and Drawings for Construction herein.
- (f) "HUD" means the United States of America acting through the Department of Housing and Urban Development including the Secretary, or any other person designated to act on its behalf. HUD has agreed, subject to the provisions of an Annual Contributions Terms and Conditions (ACC), to provide financial assistance to the PHA, which includes assistance in financing the work to be performed under this contract. As defined elsewhere in these General Conditions or the contract documents, the determination of HUD may be required to authorize changes in the work or for release of funds to the PHA for payment to the Contractor. Notwithstanding HUD's role, nothing in this contract shall be construed to create any contractual relationship between the Contractor and HUD.
- (g) "Project" means the entire project, whether construction or rehabilitation, the work for which is provided for in whole or in part under this contract.
- (h) "PHA" means the Public Housing Agency organized under applicable state laws which is a party to this contract.
- (i) "Specifications" means the written description of the technical requirements for construction and includes the criteria and tests for determining whether the requirements are met.
- (l) "Work" means materials, workmanship, and manufacture and fabrication of components.

2. Contractor's Responsibility for Work

- (a) The Contractor shall furnish all necessary labor, materials, tools, equipment, and transportation necessary for performance of the work. The Contractor shall also furnish all necessary water, heat, light, and power not made available to the Contractor by the PHA pursuant to the clause entitled Availability and Use of Utility Services herein.
- (b) The Contractor shall perform on the site, and with its own organization, work equivalent to at least [] (12 percent unless otherwise indicated) of the total amount of work to be performed under the order. This percentage may be reduced by a supplemental agreement to this order if, during performing the work, the Contractor requests a reduction and the Contracting Officer determines that the reduction would be to the advantage of the PHA.
- (c) At all times during performance of this contract and until the work is completed and accepted, the Contractor shall directly superintend the work or assign and have on the work site a competent superintendent who is satisfactory to the Contracting Officer and has authority to act for the Contractor.
- (d) The Contractor shall be responsible for all damages to persons or property that occur as a result of the Contractor's fault or negligence, and shall take proper safety and health precautions to protect the work, the workers, the public, and the property of others. The Contractor shall hold and save the PHA, its officers and agents, free and harmless from liability of any nature occasioned by the Contractor's performance. The Contractor shall also be responsible for all materials delivered and work performed until completion and acceptance of the entire work, except for any completed unit of work which may have been accepted under the contract.
- (e) The Contractor shall lay out the work from base lines and bench marks indicated on the drawings and be responsible for all lines, levels, and measurements of all work executed under the contract. The Contractor shall verify the figures before laying out the work and will be held responsible for any error resulting from its failure to do so.
- (f) The Contractor shall confine all operations (including storage of materials) on PHA premises to areas authorized or approved by the Contracting Officer.
- (g) The Contractor shall at all times keep the work area, including storage areas, free from accumulations of waste materials. After completing the work and before final inspection, the Contractor shall (1) remove from the premises all scaffolding, equipment, tools, and materials (including rejected materials) that are not the property of the PHA and all rubbish caused by its work; (2) leave the work area in a clean, neat, and orderly condition satisfactory to the Contracting Officer; (3) perform all specified tests; and, (4) deliver the installation in complete and operating condition.
- (h) The Contractor's responsibility will terminate when all work has been completed, the final inspection made, and the work accepted by the Contracting Officer. The Contractor will then be released from further obligation except as required by the warranties specified elsewhere in the contract.

3. Architect's Duties, Responsibilities, and Authority

- (a) The Architect for this contract, and any successor, shall be designated in writing by the Contracting Officer.

- (b) The Architect shall serve as the Contracting Officer's technical representative with respect to architectural, engineering, and design matters related to the work performed under the contract. The Architect may provide direction on contract performance. Such direction shall be within the scope of the contract and may not be of a nature which: (1) institutes additional work outside the scope of the contract; (2) constitutes a change as defined in the Changes clause herein; (3) causes an increase or decrease in the cost of the contract; (4) alters the Construction Progress Schedule; or (5) changes any of the other express terms or conditions of the contract.
- (c) The Architect's duties and responsibilities may include but shall not be limited to:
- (1) Making periodic visits to the work site, and on the basis of his/her on-site inspections, issuing written reports to the PHA which shall include all observed deficiencies. The Architect shall file a copy of the report with the Contractor's designated representative at the site;
 - (2) Making modifications in drawings and technical specifications and assisting the Contracting Officer in the preparation of change orders and other contract modifications for issuance by the Contracting Officer;
 - (3) Reviewing and making recommendations with respect to - (i) the Contractor's construction progress schedules; (ii) the Contractor's shop and detailed drawings; (iii) the machinery, mechanical and other equipment and materials or other articles proposed for use by the Contractor; and, (iv) the Contractor's price breakdown and progress payment estimates; and,
 - (4) Assisting in inspections, signing Certificates of Completion, and making recommendations with respect to acceptance of work completed under the contract.

4. Other Contracts

The PHA may undertake or award other contracts for additional work at or near the site of the work under this contract. The Contractor shall fully cooperate with the other contractors and with PHA employees and shall carefully adapt scheduling and performing the work under this contract to accommodate the additional work, heeding any direction that may be provided by the Contracting Officer. The Contractor shall not commit or permit any act that will interfere with the performance of work by any other contractor or by PHA employees

Construction Requirements

5. Pre-construction Conference and Notice to Proceed

- (a) Within ten calendar days of contract execution, and prior to the commencement of work, the Contractor shall attend a preconstruction conference with representatives of the PHA, its Architect, and other interested parties convened by the PHA. The conference will serve to acquaint the participants with the general plan of the construction operation and all other requirements of the contract. The PHA will provide the Contractor with the date, time, and place of the conference.
- (b) The contractor shall begin work upon receipt of a written Notice to Proceed from the Contracting Officer or designee. The Contractor shall not begin work prior to receiving such notice.

6. Construction Progress Schedule

- (a) The Contractor shall, within five days after the work commences on the contract or another period of time determined by the Contracting Officer, prepare and submit to the Contracting Officer for approval three copies of a practicable schedule showing the order in which the Contractor proposes to perform the work, and the dates on which the Contractor contemplates starting and completing the several salient features of the work (including acquiring labor, materials, and equipment). The schedule shall be in the form of a progress chart of suitable scale to indicate appropriately the percentage of work scheduled for completion by any given date during the period. If the Contractor fails to submit a schedule within the time prescribed, the Contracting Officer may withhold approval of progress payments or take other remedies under the contract until the Contractor submits the required schedule.
- (b) The Contractor shall enter the actual progress on the chart as required by the Contracting Officer, and immediately deliver three copies of the annotated schedule to the Contracting Officer. If the Contracting Officer determines, upon the basis of inspection conducted pursuant to the clause entitled Inspection and Acceptance of Construction, herein that the Contractor is not meeting the approved schedule, the Contractor shall take steps necessary to improve its progress, including those that may be required by the Contracting Officer, without additional cost to the PHA. In this circumstance, the Contracting Officer may require the Contractor to increase the number of shifts, overtime operations, days of work, and/or the amount of construction plant, and to submit for approval any supplementary schedule or schedules in chart form as the Contracting Officer deems necessary to demonstrate how the approved rate of progress will be regained.
- (c) Failure of the Contractor to comply with the requirements of the Contracting Officer under this clause shall be grounds for a determination by the Contracting Officer that the Contractor is not prosecuting the work with sufficient diligence to ensure completion within the time specified in the Contract. Upon making this determination, the Contracting Officer may terminate the Contractor's right to proceed with the work, or any separable part of it, in accordance with the Default clause of this contract.

7. Site Investigation and Conditions Affecting the Work

- (a) The Contractor acknowledges that it has taken steps reasonably necessary to ascertain the nature and location of the work, and that it has investigated and satisfied itself as to the general and local conditions which can affect the work or its cost, including but not limited to, (1) conditions bearing upon transportation, disposal, handling, and storage of materials; (2) the availability of labor, water, electric power, and roads; (3) uncertainties of weather, river stages, tides, or similar physical conditions at the site; (4) the conformation and conditions of the ground; and (5) the character of equipment and facilities needed preliminary to and during work performance. The Contractor also acknowledges that it has satisfied itself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is

reasonably ascertainable from an inspection of the site, including all exploratory work done by the PHA, as well as from the drawings and specifications made a part of this contract. Any failure of the Contractor to take the actions described and acknowledged in this paragraph will not relieve the Contractor from responsibility for estimating properly the difficulty and cost of successfully performing the work, or for proceeding to successfully perform the work without additional expense to the PHA.

- (b) The PHA assumes no responsibility for any conclusions or interpretations made by the Contractor based on the information made available by the PHA. Nor does the PHA assume responsibility for any understanding reached or representation made concerning conditions which can affect the work by any of its officers or agents before the execution of this contract, unless that understanding or representation is expressly stated in this contract.

8. Differing Site Conditions

- (a) The Contractor shall promptly, and before the conditions are disturbed, give a written notice to the Contracting Officer of (1) subsurface or latent physical conditions at the site which differ materially from those indicated in this contract, or (2) unknown physical conditions at the site(s), of an unusual nature, which differ materially from those ordinarily encountered and generally recognized as inhering in work of the character provided for in the contract.
- (b) The Contracting Officer shall investigate the site conditions promptly after receiving the notice. Work shall not proceed at the affected site, except at the Contractor's risk, until the Contracting Officer has provided written instructions to the Contractor. If the conditions do materially so differ and cause an increase or decrease in the Contractor's cost of, or the time required for, performing any part of the work under this contract, whether or not changed as a result of the conditions, the Contractor shall file a claim in writing to the PHA within ten days after receipt of such instructions and, in any event, before proceeding with the work. An equitable adjustment in the contract price, the delivery schedule, or both shall be made under this clause and the contract modified in writing accordingly.
- (c) No request by the Contractor for an equitable adjustment to the contract under this clause shall be allowed, unless the Contractor has given the written notice required; provided, that the time prescribed in (a) above for giving written notice may be extended by the Contracting Officer.
- (d) No request by the Contractor for an equitable adjustment to the contract for differing site conditions shall be allowed if made after final payment under this contract.

9. Specifications and Drawings for Construction

- (a) The Contractor shall keep on the work site a copy of the drawings and specifications and shall at all times give the Contracting Officer access thereto. Anything mentioned in the specifications and not shown on the drawings, or shown on the drawings and not mentioned in the specifications, shall be of like effect as if shown or mentioned in both. In case of difference between drawings and specifications, the specifications shall govern. In case of discrepancy in the figures, in the drawings, or in the specifications, the matter shall be

promptly submitted to the Contracting Officer, who shall promptly make a determination in writing. Any adjustment by the Contractor without such a determination shall be at its own risk and expense. The Contracting Officer shall furnish from time to time such detailed drawings and other information as considered necessary, unless otherwise provided.

- (b) Wherever in the specifications or upon the drawings the words "directed", "required", "ordered", "designated", "prescribed", or words of like import are used, it shall be understood that the "direction", "requirement", "order", "designation", or "prescription", of the Contracting Officer is intended and similarly the words "approved", "acceptable", "satisfactory", or words of like import shall mean "approved by", or "acceptable to", or "satisfactory to" the Contracting Officer, unless otherwise expressly stated.
- (c) Where "as shown" "as indicated", "as detailed", or words of similar import are used, it shall be understood that the reference is made to the drawings accompanying this contract unless stated otherwise. The word "provided" as used herein shall be understood to mean "provide complete in place" that is "furnished and installed".
- (d) "Shop drawings" means drawings, submitted to the PHA by the Contractor, subcontractor, or any lower tier subcontractor, showing in detail (1) the proposed fabrication and assembly of structural elements and (2) the installation (i.e., form, fit, and attachment details) of materials of equipment. It includes drawings, diagrams, layouts, schematics, descriptive literature, illustrations, schedules, performance and test data, and similar materials furnished by the Contractor to explain in detail specific portions of the work required by the contract. The PHA may duplicate, use, and disclose in any manner and for any purpose shop drawings delivered under this contract.
- (e) If this contract requires shop drawings, the Contractor shall coordinate all such drawings, and review them for accuracy, completeness, and compliance with other contract requirements and shall indicate its approval thereon as evidence of such coordination and review. Shop drawings submitted to the Contracting Officer without evidence of the Contractor's approval may be returned for resubmission. The Contracting Officer will indicate an approval or disapproval of the shop drawings and if not approved as submitted shall indicate the PHA's reasons therefore. Any work done before such approval shall be at the Contractor's risk. Approval by the Contracting Officer shall not relieve the Contractor from responsibility for any errors or omissions in such drawings, nor from responsibility for complying with the requirements of this contract, except with respect to variations described and approved in accordance with (f) below.
- (f) If shop drawings show variations from the contract requirements, the Contractor shall describe such variations in writing, separate from the drawings, at the time of submission. If the Architect approves any such variation and the Contracting Officer concurs, the Contracting Officer shall issue an appropriate modification to the contract, except that, if the variation is minor or does not involve a change in price or in time of performance, a modification need not be issued.
- (g) It shall be the responsibility of the Contractor to make timely requests of the PHA for such large scale and full size drawings, color schemes, and other additional information, not already in his possession, which shall be

required in the planning and production of the work. Such requests may be submitted as the need arises, but each such request shall be filed in ample time to permit appropriate action to be taken by all parties involved so as to avoid delay.

- (h) The Contractor shall submit to the Contracting Officer for approval four copies (unless otherwise indicated) of all shop drawings as called for under the various headings of these specifications. Three sets (unless otherwise indicated) of all shop drawings, will be retained by the PHA and one set will be returned to the Contractor. As required by the Contracting Officer, the Contractor, upon completing the work under this contract, shall furnish a complete set of all shop drawings as finally approved. These drawings shall show all changes and revisions made up to the time the work is completed and accepted.
- (i) This clause shall be included in all subcontracts at any tier. It shall be the responsibility of the Contractor to ensure that all shop drawings prepared by subcontractors are submitted to the Contracting Officer.

10. As-Built Drawings

- (a) "As-built drawings," as used in this clause, means drawings submitted by the Contractor or subcontractor at any tier to show the construction of a particular structure or work as actually completed under the contract. "As-built drawings" shall be synonymous with "Record drawings."
- (b) As required by the Contracting Officer, the Contractor shall provide the Contracting Officer accurate information to be used in the preparation of permanent as-built drawings. For this purpose, the Contractor shall record on one set of contract drawings all changes from the installations originally indicated, and record final locations of underground lines by depth from finish grade and by accurate horizontal offset distances to permanent surface improvements such as buildings, curbs, or edges of walks.
- (c) This clause shall be included in all subcontracts at any tier. It shall be the responsibility of the Contractor to ensure that all as-built drawings prepared by subcontractors are submitted to the Contracting Officer.

11. Material and Workmanship

- (a) All equipment, material, and articles furnished under this contract shall be new and of the most suitable grade for the purpose intended, unless otherwise specifically provided in this contract. References in the contract to equipment, material, articles, or patented processes by trade name, make, or catalog number, shall be regarded as establishing a standard of quality and shall not be construed as limiting competition. The Contractor may, at its option, use any equipment, material, article, or process that, in the judgment of, and as approved by the Contracting Officer, is equal to that named in the specifications, unless otherwise specifically provided in this contract.
- (b) Approval of equipment and materials.
- (1) The Contractor shall obtain the Contracting Officer's approval of the machinery and mechanical and other equipment to be incorporated into the work. When requesting approval, the Contractor shall furnish to the Contracting Officer the name of the manufacturer, the model number, and other information concerning the performance, capacity, nature, and rating of the

machinery and mechanical and other equipment. When required by this contract or by the Contracting Officer, the Contractor shall also obtain the Contracting Officer's approval of the material or articles which the Contractor contemplates incorporating into the work. When requesting approval, the Contractor shall provide full information concerning the material or articles. Machinery, equipment, material, and articles that do not have the required approval shall be installed or used at the risk of subsequent rejection.

- (2) When required by the specifications or the Contracting Officer, the Contractor shall submit appropriately marked samples (and certificates related to them) for approval at the Contractor's expense, with all shipping charges prepaid. The Contractor shall label, or otherwise properly mark on the container, the material or product represented, its place of origin, the name of the producer, the Contractor's name, and the identification of the construction project for which the material or product is intended to be used.
- (3) Certificates shall be submitted in triplicate, describing each sample submitted for approval and certifying that the material, equipment or accessory complies with contract requirements. The certificates shall include the name and brand of the product, name of manufacturer, and the location where produced.
- (4) Approval of a sample shall not constitute a waiver of the PHA right to demand full compliance with contract requirements. Materials, equipment and accessories may be rejected for cause even though samples have been approved.
- (5) Wherever materials are required to comply with recognized standards or specifications, such specifications shall be accepted as establishing the technical qualities and testing methods, but shall not govern the number of tests required to be made nor modify other contract requirements. The Contracting Officer may require laboratory test reports on items submitted for approval or may approve materials on the basis of data submitted in certificates with samples. Check tests will be made on materials delivered for use only as frequently as the Contracting Officer determines necessary to insure compliance of materials with the specifications. The Contractor will assume all costs of retesting materials which fail to meet contract requirements and/or testing materials offered in substitution for those found deficient.
- (6) After approval, samples will be kept in the Project office until completion of work. They may be built into the work after a substantial quantity of the materials they represent has been built in and accepted.
- (c) Requirements concerning lead-based paint. The Contractor shall comply with the requirements concerning lead-based paint contained in the Lead-Based Paint Poisoning Prevention Act (42 U.S.C. 4821-4846) as implemented by 24 CFR Part 35.

12. Permits and Codes

- (a) The Contractor shall give all notices and comply with all applicable laws, ordinances, codes, rules and regulations. Notwithstanding the requirement of the Contractor to comply with the drawings and specifications in the contract, all work installed shall comply with all applicable codes and regulations as amended by any

waivers. Before installing the work, the Contractor shall examine the drawings and the specifications for compliance with applicable codes and regulations bearing on the work and shall immediately report any discrepancy it may discover to the Contracting Officer. Where the requirements of the drawings and specifications fail to comply with the applicable code or regulation, the Contracting Officer shall modify the contract by change order pursuant to the clause entitled Changes herein to conform to the code or regulation.

- (b) The Contractor shall secure and pay for all permits, fees, and licenses necessary for the proper execution and completion of the work. Where the PHA can arrange for the issuance of all or part of these permits, fees and licenses, without cost to the Contractor, the contract amount shall be reduced accordingly.

13. Health, Safety, and Accident Prevention

- (a) In performing this contract, the Contractor shall:
- (1) Ensure that no laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his/her health and/or safety as determined under construction safety and health standards promulgated by the Secretary of Labor by regulation;
 - (2) Protect the lives, health, and safety of other persons;
 - (3) Prevent damage to property, materials, supplies, and equipment; and,
 - (4) Avoid work interruptions.
- (b) For these purposes, the Contractor shall:
- (1) Comply with regulations and standards issued by the Secretary of Labor at 29 CFR Part 1926. Failure to comply may result in imposition of sanctions pursuant to the Contract Work Hours and Safety Standards Act (Public Law 91-54, 83 Stat. 96), 40 U.S.C. 3701 et seq.; and
 - (2) Include the terms of this clause in every subcontract so that such terms will be binding on each subcontractor.
- (c) The Contractor shall maintain an accurate record of exposure data on all accidents incident to work performed under this contract resulting in death, traumatic injury, occupational disease, or damage to property, materials, supplies, or equipment, and shall report this data in the manner prescribed by 29 CFR Part 1904.
- (d) The Contracting Officer shall notify the Contractor of any noncompliance with these requirements and of the corrective action required. This notice, when delivered to the Contractor or the Contractor's representative at the site of the work, shall be deemed sufficient notice of the noncompliance and corrective action required. After receiving the notice, the Contractor shall immediately take corrective action. If the Contractor fails or refuses to take corrective action promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. The Contractor shall not base any claim or request for equitable adjustment for additional time or money on any stop order issued under these circumstances.
- (e) The Contractor shall be responsible for its subcontractors' compliance with the provisions of this clause. The Contractor shall take such action with respect to any subcontract as the PHA, the Secretary of Housing and Urban Development, or the Secretary of Labor shall direct as a means of enforcing such provisions.

14. Temporary Heating

The Contractor shall provide and pay for temporary heating, covering, and enclosures necessary to properly protect all work and materials against damage by dampness and cold, to dry out the work, and to facilitate the completion of the work. Any permanent heating equipment used shall be turned over to the PHA in the condition and at the time required by the specifications.

15. Availability and Use of Utility Services

- (a) The PHA shall make all reasonably required amounts of utilities available to the Contractor from existing outlets and supplies, as specified in the contract. Unless otherwise provided in the contract, the amount of each utility service consumed shall be charged to or paid for by the Contractor at prevailing rates charged to the PHA or, where the utility is produced by the PHA, at reasonable rates determined by the Contracting Officer. The Contractor shall carefully conserve any utilities furnished without charge.
- (b) The Contractor, at its expense and in a manner satisfactory to the Contracting Officer, shall install and maintain all necessary temporary connections and distribution lines, and all meters required to measure the amount of each utility used for the purpose of determining charges. Before final acceptance of the work by the PHA, the Contractor shall remove all the temporary connections, distribution lines, meters, and associated paraphernalia.

16. Protection of Existing Vegetation, Structures, Equipment, Utilities, and Improvements

- (a) The Contractor shall preserve and protect all structures, equipment, and vegetation (such as trees, shrubs, and grass) on or adjacent to the work site, which are not to be removed under this contract, and which do not unreasonably interfere with the work required under this contract.
- (b) The Contractor shall only remove trees when specifically authorized to do so, and shall avoid damaging vegetation that will remain in place. If any limbs or branches of trees are broken during performance of this contract, or by the careless operation of equipment, or by workmen, the Contractor shall trim those limbs or branches with a clean cut and paint the cut with a tree-pruning compound as directed by the Contracting Officer.
- (c) The Contractor shall protect from damage all existing improvements and utilities (1) at or near the work site and (2) on adjacent property of a third party, the locations of which are made known to or should be known by the Contractor. Prior to disturbing the ground at the construction site, the Contractor shall ensure that all underground utility lines are clearly marked.
- (d) The Contractor shall shore up, brace, underpin, secure, and protect as necessary all foundations and other parts of existing structures adjacent to, adjoining, and in the vicinity of the site, which may be affected by the excavations or other operations connected with the construction of the project.
- (e) Any equipment temporarily removed as a result of work under this contract shall be protected, cleaned, and replaced in the same condition as at the time of award of this contract.

- (f) New work which connects to existing work shall correspond in all respects with that to which it connects and/or be similar to existing work unless otherwise required by the specifications.
- (g) No structural members shall be altered or in any way weakened without the written authorization of the Contracting Officer, unless such work is clearly specified in the plans or specifications.
- (h) If the removal of the existing work exposes discolored or unfinished surfaces, or work out of alignment, such surfaces shall be refinished, or the material replaced as necessary to make the continuous work uniform and harmonious. This, however, shall not be construed to require the refinishing or reconstruction of dissimilar finishes previously exposed, or finished surfaces in good condition, but in different planes or on different levels when brought together by the removal of intervening work, unless such refinishing or reconstruction is specified in the plans or specifications.
- (i) The Contractor shall give all required notices to any adjoining or adjacent property owner or other party before the commencement of any work.
- (j) The Contractor shall indemnify and save harmless the PHA from any damages on account of settlement or the loss of lateral support of adjoining property, any damages from changes in topography affecting drainage, and from all loss or expense and all damages for which the PHA may become liable in consequence of such injury or damage to adjoining and adjacent structures and their premises.
- (k) The Contractor shall repair any damage to vegetation, structures, equipment, utilities, or improvements, including those that are the property of a third party, resulting from failure to comply with the requirements of this contract or failure to exercise reasonable care in performing the work. If the Contractor fails or refuses to repair the damage promptly, the Contracting Officer may have the necessary work performed and charge the cost to the Contractor.

17. Temporary Buildings and Transportation of Materials

- (a) Temporary buildings (e.g., storage sheds, shops, offices, sanitary facilities) and utilities may be erected by the Contractor only with the approval of the Contracting Officer and shall be built with labor and materials furnished by the Contractor without expense to the PHA. The temporary buildings and utilities shall remain the property of the Contractor and shall be removed by the Contractor at its expense upon completion of the work. With the written consent of the Contracting Officer, the buildings and utilities may be abandoned and need not be removed.
- (b) The Contractor shall, as directed by the Contracting Officer, use only established roadways, or use temporary roadways constructed by the Contractor when and as authorized by the Contracting Officer. When materials are transported in prosecuting the work, vehicles shall not be loaded beyond the loading capacity recommended by the manufacturer of the vehicle or prescribed by any federal, state, or local law or regulation. When it is necessary to cross curbs or sidewalks, the Contractor shall protect them from damage. The Contractor shall repair or pay for the repair of any damaged curbs, sidewalks, or roads.

18. Clean Air and Water

The contractor shall comply with the Clean Air Act, as amended, 42 USC 7401 et seq., the Federal Water Pollution Control Water Act, as amended, 33 U.S.C. 1251 et seq., and standards issued pursuant thereto in the facilities in which this contract is to be performed.

19. Energy Efficiency

The Contractor shall comply with mandatory standards and policies relating to energy efficiency which are contained in the energy conservation plan issued in compliance with the Energy Policy and Conservation Act (Pub.L. 94-163) for the State in which the work under the contract is performed.

20. Inspection and Acceptance of Construction

- (a) Definitions. As used in this clause -
 - (1) "Acceptance" means the act of an authorized representative of the PHA by which the PHA approves and assumes ownership of the work performed under this contract. Acceptance may be partial or complete.
 - (2) "Inspection" means examining and testing the work performed under the contract (including, when appropriate, raw materials, equipment, components, and intermediate assemblies) to determine whether it conforms to contract requirements.
 - (3) "Testing" means that element of inspection that determines the properties or elements, including functional operation of materials, equipment, or their components, by the application of established scientific principles and procedures.
- (b) The Contractor shall maintain an adequate inspection system and perform such inspections as will ensure that the work performed under the contract conforms to contract requirements. All work is subject to PHA inspection and test at all places and at all reasonable times before acceptance to ensure strict compliance with the terms of the contract.
- (c) PHA inspections and tests are for the sole benefit of the PHA and do not: (1) relieve the Contractor of responsibility for providing adequate quality control measures; (2) relieve the Contractor of responsibility for loss or damage of the material before acceptance; (3) constitute or imply acceptance; or, (4) affect the continuing rights of the PHA after acceptance of the completed work under paragraph (j) below.
- (d) The presence or absence of the PHA inspector does not relieve the Contractor from any contract requirement, nor is the inspector authorized to change any term or condition of the specifications without the Contracting Officer's written authorization. All instructions and approvals with respect to the work shall be given to the Contractor by the Contracting Officer.
- (e) The Contractor shall promptly furnish, without additional charge, all facilities, labor, and material reasonably needed for performing such safe and convenient inspections and tests as may be required by the Contracting Officer. The PHA may charge to the Contractor any additional cost of inspection or test when work is not ready at the time specified by the Contractor for inspection or test, or when prior rejection makes reinspection or retest necessary. The PHA shall perform all inspections and tests in a manner that will not unnecessarily delay the work. Special, full size, and performance tests shall be performed as described in the contract.

- (f) The PHA may conduct routine inspections of the construction site on a daily basis.
- (g) The Contractor shall, without charge, replace or correct work found by the PHA not to conform to contract requirements, unless the PHA decides that it is in its interest to accept the work with an appropriate adjustment in contract price. The Contractor shall promptly segregate and remove rejected material from the premises.
- (h) If the Contractor does not promptly replace or correct rejected work, the PHA may (1) by contract or otherwise, replace or correct the work and charge the cost to the Contractor, or (2) terminate for default the Contractor's right to proceed.
- (i) If any work requiring inspection is covered up without approval of the PHA, it must, if requested by the Contracting Officer, be uncovered at the expense of the Contractor. If at any time before final acceptance of the entire work, the PHA considers it necessary or advisable, to examine work already completed by removing or tearing it out, the Contractor, shall on request, promptly furnish all necessary facilities, labor, and material. If such work is found to be defective or nonconforming in any material respect due to the fault of the Contractor or its subcontractors, the Contractor shall defray all the expenses of the examination and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the contract, the Contracting Officer shall make an equitable adjustment to cover the cost of the examination and reconstruction, including, if completion of the work was thereby delayed, an extension of time.
- (j) The Contractor shall notify the Contracting Officer, in writing, as to the date when in its opinion all or a designated portion of the work will be substantially completed and ready for inspection. If the Architect determines that the state of preparedness is as represented, the PHA will promptly arrange for the inspection. Unless otherwise specified in the contract, the PHA shall accept, as soon as practicable after completion and inspection, all work required by the contract or that portion of the work the Contracting Officer determines and designates can be accepted separately. Acceptance shall be final and conclusive except for latent defects, fraud, gross mistakes amounting to fraud, or the PHA's right under any warranty or guarantee.

21. Use and Possession Prior to Completion

- (a) The PHA shall have the right to take possession of or use any completed or partially completed part of the work. Before taking possession of or using any work, the Contracting Officer shall furnish the Contractor a list of items of work remaining to be performed or corrected on those portions of the work that the PHA intends to take possession of or use. However, failure of the Contracting Officer to list any item of work shall not relieve the Contractor of responsibility for complying with the terms of the contract. The PHA's possession or use shall not be deemed an acceptance of any work under the contract.
- (b) While the PHA has such possession or use, the Contractor shall be relieved of the responsibility for (1) the loss of or damage to the work resulting from the PHA's possession or use, notwithstanding the terms of the clause entitled Permits and Codes herein; (2) all maintenance costs on the areas occupied; and, (3) furnishing heat, light, power, and water used in the areas

occupied without proper remuneration therefore. If prior possession or use by the PHA delays the progress of the work or causes additional expense to the Contractor, an equitable adjustment shall be made in the contract price or the time of completion, and the contract shall be modified in writing accordingly.

22. Warranty of Title

The Contractor warrants good title to all materials, supplies, and equipment incorporated in the work and agrees to deliver the premises together with all improvements thereon free from any claims, liens or charges, and agrees further that neither it nor any other person, firm or corporation shall have any right to a lien upon the premises or anything appurtenant thereto.

23. Warranty of Construction

- (a) In addition to any other warranties in this contract, the Contractor warrants, except as provided in paragraph (j) of this clause, that work performed under this contract conforms to the contract requirements and is free of any defect in equipment, material, or workmanship performed by the Contractor or any subcontractor or supplier at any tier. This warranty shall continue for a period of _____ (one year unless otherwise indicated) from the date of final acceptance of the work. If the PHA takes possession of any part of the work before final acceptance, this warranty shall continue for a period of (one year unless otherwise indicated) from the date that the PHA takes possession.
- (b) The Contractor shall remedy, at the Contractor's expense, any failure to conform, or any defect. In addition, the Contractor shall remedy, at the Contractor's expense, any damage to PHA-owned or controlled real or personal property when the damage is the result of—
 - (1) The Contractor's failure to conform to contract requirements; or
 - (2) Any defects of equipment, material, workmanship or design furnished by the Contractor.
- (c) The Contractor shall restore any work damaged in fulfilling the terms and conditions of this clause. The Contractor's warranty with respect to work repaired or replaced will run for (one year unless otherwise indicated) from the date of repair or replacement.
- (d) The Contracting Officer shall notify the Contractor, in writing, within a reasonable time after the discovery of any failure, defect or damage.
- (e) If the Contractor fails to remedy any failure, defect, or damage within a reasonable time after receipt of notice, the PHA shall have the right to replace, repair or otherwise remedy the failure, defect, or damage at the Contractor's expense.
- (f) With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and materials furnished under this contract, the Contractor shall:
 - (1) Obtain all warranties that would be given in normal commercial practice;
 - (2) Require all warranties to be executed in writing, for the benefit of the PHA; and,
 - (3) Enforce all warranties for the benefit of the PHA.
- (g) In the event the Contractor's warranty under paragraph (a) of this clause has expired, the PHA may bring suit at its own expense to enforce a subcontractor's, manufacturer's or supplier's warranty.

- (h) Unless a defect is caused by the negligence of the Contractor or subcontractor or supplier at any tier, the Contractor shall not be liable for the repair of any defect of material or design furnished by the PHA nor for the repair of any damage that results from any defect in PHA furnished material or design.
- (i) Notwithstanding any provisions herein to the contrary, the establishment of the time periods in paragraphs (a) and (c) above relate only to the specific obligation of the Contractor to correct the work, and have no relationship to the time within which its obligation to comply with the contract may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to its obligation other than specifically to correct the work.
- (j) This warranty shall not limit the PHA's rights under the Inspection and Acceptance of Construction clause of this contract with respect to latent defects, gross mistakes or fraud.

24. Prohibition Against Liens

The Contractor is prohibited from placing a lien on the PHA's property. This prohibition shall apply to all subcontractors at any tier and all materials suppliers.

Administrative Requirements

25. Contract Period

this contract within _____ calendar days of the effective date of the contract, or within the time schedule established in the notice to proceed issued by the Contracting Officer.

26. Order of Provisions

In the event of a conflict between these General Conditions and the Specifications, the General Conditions shall prevail. In the event of a conflict between the contract and any applicable state or local law or regulation, the state or local law or regulation shall prevail; provided that such state or local law or regulation does not conflict with, or is less restrictive than applicable federal law, regulation, or Executive Order. In the event of such a conflict, applicable federal law, regulation, and Executive Order shall prevail.

27. Payments

- (a) The PHA shall pay the Contractor the price as provided in this contract.
- (b) The PHA shall make progress payments approximately every 30 days as the work proceeds, on estimates of work accomplished which meets the standards of quality established under the contract, as approved by the Contracting Officer. The PHA may, subject to written determination and approval of the Contracting Officer, make more frequent payments to contractors which are qualified small businesses.
- (c) Before the first progress payment under this contract, the Contractor shall furnish, in such detail as requested by the Contracting Officer, a breakdown of the total contract price showing the amount included therein for each principal category of the work, which shall substantiate the payment amount requested in order to provide a

basis for determining progress payments. The breakdown shall be approved by the Contracting Officer and must be acceptable to HUD. If the contract covers more than one project, the Contractor shall furnish a separate breakdown for each. The values and quantities employed in making up this breakdown are for determining the amount of progress payments and shall not be construed as a basis for additions to or deductions from the contract price. The Contractor shall prorate its overhead and profit over the construction period of the contract.

- (d) 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

submitted not later than _____ days in advance of the date set for payment and are subject to correction and revision as required. The estimates must be approved by the Contracting Officer with the concurrence of the Architect prior to payment. If the contract covers more than one project, the Contractor shall furnish a separate progress payment estimate for each.

- (e) Along with each request for progress payments and the required estimates, the Contractor shall furnish the following certification, or payment shall not be made: 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:

- (f) Except as otherwise provided in State law, the PHA shall retain ten (10) percent of the amount of progress payments until completion and acceptance of all work under the contract; except, that if upon completion of 50 percent of the work, the Contracting Officer, after consulting with the Architect, determines that the Contractor's performance and progress are satisfactory, the PHA may make the remaining payments in full for the work subsequently completed. If the Contracting Officer subsequently determines that the Contractor's performance and progress are unsatisfactory, the PHA shall reinstate the ten (10) percent (or other percentage as provided in State law) retainage until such time as the Contracting Officer determines that performance and progress are satisfactory.
- (g) The Contracting Officer may authorize material delivered on the site and preparatory work done to be taken into consideration when computing progress payments.

Material delivered to the Contractor at locations other than the site may also be taken into consideration if the Contractor furnishes satisfactory evidence that (1) it has acquired title to such material; (2) the material is properly stored in a bonded warehouse, storage yard, or similar suitable place as may be approved by the Contracting Officer; (3) the material is insured to cover its full value; and (4) the material will be used to perform this contract. Before any progress payment which includes delivered material is made, the Contractor shall furnish such documentation as the Contracting Officer may require to assure the protection of the PHA's interest in such materials. The Contractor shall remain responsible for such stored material notwithstanding the transfer of title to the PHA.

- (h) All material and work covered by progress payments made shall, at the time of payment become the sole property of the PHA, but this shall not be construed as (1) relieving the Contractor from the sole responsibility for all material and work upon which payments have been made or the restoration of any damaged work; or, (2) waiving the right of the PHA to require the fulfillment of all of the terms of the contract. In the event the work of the Contractor has been damaged by other contractors or persons other than employees of the PHA in the course of their employment, the Contractor shall restore such damaged work without cost to the PHA and to seek redress for its damage only from those who directly caused it.
- (i) The PHA shall make the final payment due the Contractor under this contract after (1) completion and final acceptance of all work; and (2) presentation of release of all claims against the PHA arising by virtue of this contract, other than claims, in stated amounts, that the Contractor has specifically excepted from the operation of the release. Each such exception shall embrace no more than one claim, the basis and scope of which shall be clearly defined. The amounts for such excepted claims shall not be included in the request for final payment. A release may also be required of the assignee if the Contractor's claim to amounts payable under this contract has been assigned.
- (j) Prior to making any payment, the Contracting Officer may require the Contractor to furnish receipts or other evidence of payment from all persons performing work and supplying material to the Contractor, if the Contracting Officer determines such evidence is necessary to substantiate claimed costs.
- (k) The PHA shall not; (1) determine or adjust any claims for payment or disputes arising there under between the Contractor and its subcontractors or material suppliers; or, (2) withhold any moneys for the protection of the subcontractors or material suppliers. The failure or refusal of the PHA to withhold moneys from the Contractor shall in no wise impair the obligations of any surety or sureties under any bonds furnished under this contract.

28. Contract Modifications

- (a) Only the Contracting Officer has authority to modify any term or condition of this contract. Any contract modification shall be authorized in writing.
- (b) The Contracting Officer may modify the contract unilaterally (1) pursuant to a specific authorization stated in a contract clause (e.g., Changes); or (2) for administrative matters which do not change the rights or

responsibilities of the parties (e.g., change in the PHA address). All other contract modifications shall be in the form of supplemental agreements signed by the Contractor and the Contracting Officer.

- (c) When a proposed modification requires the approval of HUD prior to its issuance (e.g., a change order that exceeds the PHA's approved threshold), such modification shall not be effective until the required approval is received by the PHA.

29. Changes

- (a) The Contracting Officer may, at any time, without notice to the sureties, by written order designated or indicated to be a change order, make changes in the work within the general scope of the contract including changes:
 - (1) In the specifications (including drawings and designs);
 - (2) In the method or manner of performance of the work;
 - (3) PHA-furnished facilities, equipment, materials, services, or site; or,
 - (4) Directing the acceleration in the performance of the work.
- (b) Any other written order or oral order (which, as used in this paragraph (b), includes direction, instruction, interpretation, or determination) from the Contracting Officer that causes a change shall be treated as a change order under this clause; provided, that the Contractor gives the Contracting Officer written notice stating (1) the date, circumstances and source of the order and (2) that the Contractor regards the order as a change order.
- (c) Except as provided in this clause, no order, statement or conduct of the Contracting Officer shall be treated as a change under this clause or entitle the Contractor to an equitable adjustment.
- (d) If any change under this clause causes an increase or decrease in the Contractor's cost of, or the time required for the performance of any part of the work under this contract, whether or not changed by any such order, the Contracting Officer shall make an equitable adjustment and modify the contract in writing. However, except for an adjustment based on defective specifications, no proposal for any change under paragraph (b) above shall be allowed for any costs incurred more than 20 days (5 days for oral orders) before the Contractor gives written notice as required. In the case of defective specifications for which the PHA is responsible, the equitable adjustment shall include any increased cost reasonably incurred by the Contractor in attempting to comply with the defective specifications.
- (e) The Contractor must assert its right to an adjustment under this clause within 30 days after (1) receipt of a written change order under paragraph (a) of this clause, or (2) the furnishing of a written notice under paragraph (b) of this clause, by submitting a written statement describing the general nature and the amount of the proposal. If the facts justify it, the Contracting Officer may extend the period for submission. The proposal may be included in the notice required under paragraph (b) above. No proposal by the Contractor for an equitable adjustment shall be allowed if asserted after final payment under this contract.
- (f) The Contractor's written proposal for equitable adjustment shall be submitted in the form of a lump sum proposal supported with an itemized breakdown of all increases and decreases in the contract in at least the following details:

- (1) Direct Costs. Materials (list individual items, the quantity and unit cost of each, and the aggregate cost); Transportation and delivery costs associated with materials; Labor breakdowns by hours or unit costs (identified with specific work to be performed); Construction equipment exclusively necessary for the change; Costs of preparation and/ or revision to shop drawings resulting from the change; Worker's Compensation and Public Liability Insurance; Employment taxes under FICA and FUTA; and, Bond Costs when size of change warrants revision.
- (2) Indirect Costs. Indirect costs may include overhead, general and administrative expenses, and fringe benefits not normally treated as direct costs.
- (3) Profit. The amount of profit shall be negotiated and may vary according to the nature, extent, and complexity of the work required by the change. The allowability of the direct and indirect costs shall be determined in accordance with the Contract Cost Principles and Procedures for Commercial Firms in Part 31 of the Federal Acquisition Regulation (48 CFR 1-31), as implemented by HUD Handbook 2210.18, in effect on the date of this contract. The Contractor shall not be allowed a profit on the profit received by any subcontractor. Equitable adjustments for deleted work shall include a credit for profit and may include a credit for indirect costs. On proposals covering both increases and decreases in the amount of the contract, the application of indirect costs and profit shall be on the net-change in direct costs for the Contractor or subcontractor performing the work.
- (g) The Contractor shall include in the proposal its request for time extension (if any), and shall include sufficient information and dates to demonstrate whether and to what extent the change will delay the completion of the contract in its entirety.
- (h) The Contracting Officer shall act on proposals within 30 days after their receipt, or notify the Contractor of the date when such action will be taken.
- (i) Failure to reach an agreement on any proposal shall be a dispute under the clause entitled Disputes herein. Nothing in this clause, however, shall excuse the Contractor from proceeding with the contract as changed.
- (j) Except in an emergency endangering life or property, no change shall be made by the Contractor without a prior order from the Contracting Officer.

30. Suspension of Work

- (a) The Contracting Officer may order the Contractor in writing to suspend, delay, or interrupt all or any part of the work of this contract for the period of time that the Contracting Officer determines appropriate for the convenience of the PHA.
- (b) If the performance of all or any part of the work is, for an unreasonable period of time, suspended, delayed, or interrupted (1) by an act of the Contracting Officer in the administration of this contract, or (2) by the Contracting Officer's failure to act within the time specified (or within a reasonable time if not specified) in this contract an adjustment shall be made for any increase in the cost of performance of the contract (excluding profit) necessarily caused by such unreasonable suspension, delay, or interruption and the contract modified in writing accordingly. However, no adjustment shall be made under this clause for any suspension, delay, or interruption to the extent that performance would have

- been so suspended, delayed, or interrupted by any other cause, including the fault or negligence of the Contractor or for which any equitable adjustment is provided for or excluded under any other provision of this contract.
- (c) A claim under this clause shall not be allowed (1) for any costs incurred more than 20 days before the Contractor shall have notified the Contracting Officer in writing of the act or failure to act involved (but this requirement shall not apply as to a claim resulting from a suspension order); and, (2) unless the claim, in an amount stated, is asserted in writing as soon as practicable after the termination of the suspension, delay, or interruption, but not later than the date of final payment under the contract.

31. Disputes

- (a) "Claim," as used in this clause, means a written demand or written assertion by one of the contracting parties seeking, as a matter of right, the payment of money in a sum certain, the adjustment or interpretation of contract terms, or other relief arising under or relating to the contract. A claim arising under the contract, unlike a claim relating to the contract, is a claim that can be resolved under a contract clause that provides for the relief sought by the claimant. A voucher, invoice, or other routine request for payment that is not in dispute when submitted is not a claim. The submission may be converted to a claim by complying with the requirements of this clause, if it is disputed either as to liability or amount or is not acted upon in a reasonable time.
- (b) Except for disputes arising under the clauses entitled Labor Standards - Davis Bacon and Related Acts, herein, all disputes arising under or relating to this contract, including any claims for damages for the alleged breach thereof which are not disposed of by agreement, shall be resolved under this clause.
- (c) All claims by the Contractor shall be made in writing and submitted to the Contracting Officer for a written decision. A claim by the PHA against the Contractor shall be subject to a written decision by the Contracting Officer.
- (d) The Contracting Officer shall, within 60 (unless otherwise indicated) days after receipt of the request, decide the claim or notify the Contractor of the date by which the decision will be made.
- (e) The Contracting Officer's decision shall be final unless the Contractor (1) appeals in writing to a higher level in the PHA in accordance with the PHA's policy and procedures, (2) refers the appeal to an independent mediator or arbitrator, or (3) files suit in a court of competent jurisdiction. Such appeal must be made within (30 unless otherwise indicated) days after receipt of the Contracting Officer's decision.
- (f) The Contractor shall proceed diligently with performance of this contract, pending final resolution of any request for relief, claim, appeal, or action arising under or relating to the contract, and comply with any decision of the Contracting Officer.

32. Default

- (a) If the Contractor refuses or fails to prosecute the work, or any separable part thereof, with the diligence that will insure its completion within the time specified in this contract, or any extension thereof, or fails to complete said work within this time, the Contracting Officer may, by written notice to the Contractor, terminate the right to

proceed with the work (or separable part of the work) that has been delayed. In this event, the PHA may take over the work and complete it, by contract or otherwise, and may take possession of and use any materials, equipment, and plant on the work site necessary for completing the work. The Contractor and its sureties shall be liable for any damage to the PHA resulting from the Contractor's refusal or failure to complete the work within the specified time, whether or not the Contractor's right to proceed with the work is terminated. This liability includes any increased costs incurred by the PHA in completing the work.

- (b) The Contractor's right to proceed shall not be terminated or the Contractor charged with damages under this clause if—
- (1) The delay in completing the work arises from unforeseeable causes beyond the control and without the fault or negligence of the Contractor. Examples of such causes include (i) acts of God, or of the public enemy, (ii) acts of the PHA or other governmental entity in either its sovereign or contractual capacity, (iii) acts of another contractor in the performance of a contract with the PHA, (iv) fires, (v) floods, (vi) epidemics, (vii) quarantine restrictions, (viii) strikes, (ix) freight embargoes, (x) unusually severe weather, or (xi) delays of subcontractors or suppliers at any tier arising from unforeseeable causes beyond the control and without the fault or negligence of both the Contractor and the subcontractors or suppliers; and
 - (2) The Contractor, within days (10 days unless otherwise indicated) from the beginning of such delay (unless extended by the Contracting Officer) notifies the Contracting Officer in writing of the causes of delay. The Contracting Officer shall ascertain the facts and the extent of the delay. If, in the judgment of the Contracting Officer, the findings of fact warrant such action, time for completing the work shall be extended by written modification to the contract. The findings of the Contracting Officer shall be reduced to a written decision which shall be subject to the provisions of the Disputes clause of this contract.
- (c) If, after termination of the Contractor's right to proceed, it is determined that the Contractor was not in default, or that the delay was excusable, the rights and obligations of the parties will be the same as if the termination had been for convenience of the PHA.

33. Liquidated Damages

- (a) 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 \$ _____ [Contracting Officer insert amount] for each day of delay. 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.
- (b) If the PHA terminates the Contractor's right to proceed, the resulting damage will consist of liquidated damages until such reasonable time as may be required for final

completion of the work together with any increased costs occasioned the PHA in completing the work.

- (c) If the PHA does not terminate the Contractor's right to proceed, the resulting damage will consist of liquidated damages until the work is completed or accepted.

34. Termination for Convenience

- (a) The Contracting Officer may terminate this contract in whole, or in part, whenever the Contracting Officer determines that such termination is in the best interest of the PHA. Any such termination shall be effected by delivery to the Contractor of a Notice of Termination specifying the extent to which the performance of the work under the contract is terminated, and the date upon which such termination becomes effective.
- (b) If the performance of the work is terminated, either in whole or in part, the PHA shall be liable to the Contractor for reasonable and proper costs resulting from such termination upon the receipt by the PHA of a properly presented claim setting out in detail: (1) the total cost of the work performed to date of termination less the total amount of contract payments made to the Contractor; (2) the cost (including reasonable profit) of settling and paying claims under subcontracts and material orders for work performed and materials and supplies delivered to the site, payment for which has not been made by the PHA to the Contractor or by the Contractor to the subcontractor or supplier; (3) the cost of preserving and protecting the work already performed until the PHA or assignee takes possession thereof or assumes responsibility therefore; (4) the actual or estimated cost of legal and accounting services reasonably necessary to prepare and present the termination claim to the PHA; and (5) an amount constituting a reasonable profit on the value of the work performed by the Contractor.
- (c) The Contracting Officer will act on the Contractor's claim within days (60 days unless otherwise indicated) of receipt of the Contractor's claim.
- (d) Any disputes with regard to this clause are expressly made subject to the provisions of the Disputes clause of this contract.

35. Assignment of Contract

The Contractor shall not assign or transfer any interest in this contract, except that claims for monies due or to become due from the PHA under the contract may be assigned to a bank, trust company, or other financial institution. Such assignments of claims shall only be made with the written concurrence of the Contracting Officer. If the Contractor is a partnership, this contract shall inure to the benefit of the surviving or remaining member(s) of such partnership as approved by the Contracting Officer.

36. Insurance

- (a) Before commencing work, the Contractor and each subcontractor shall furnish the PHA with certificates of insurance showing the following insurance is in force and will insure all operations under the Contract:
- (1) Workers' Compensation, in accordance with state or Territorial Workers' Compensation laws.
 - (2) Commercial General Liability with a combined single limit for bodily injury and property damage of not less than \$ _____ [Contracting Officer insert amount]

per occurrence to protect the Contractor and each subcontractor against claims for bodily injury or death and damage to the property of others. This shall cover the use of all equipment, hoists, and vehicles on the site(s) not covered by Automobile Liability under (3) below. If the Contractor has a "claims made" policy, then the following additional requirements apply: the policy must provide a "retroactive date" which must be on or before the execution date of the Contract; and the extended reporting period may not be less than five years following the completion date of the Contract.

- (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 \$ _____ [Contracting Officer insert amount] per occurrence.
- (b) Before commencing work, the Contractor shall furnish the PHA with a certificate of insurance evidencing that Builder's Risk (fire and extended coverage) Insurance on all work in place and/or materials stored at the building site(s), including foundations and building equipment, is in force. The Builder's Risk Insurance shall be for the benefit of the Contractor and the PHA as their interests may appear and each shall be named in the policy or policies as an insured. The Contractor in installing equipment supplied by the PHA shall carry insurance on such equipment from the time the Contractor takes possession thereof until the Contract work is accepted by the PHA. The Builder's Risk Insurance need not be carried on excavations, piers, footings, or foundations until such time as work on the superstructure is started. It need not be carried on landscape work. Policies shall furnish coverage at all times for the full cash value of all completed construction, as well as materials in place and/or stored at the site(s), whether or not partial payment has been made by the PHA. The Contractor may terminate this insurance on buildings as of the date taken over for occupancy by the PHA. The Contractor is not required to carry Builder's Risk Insurance for modernization work which does not involve structural alterations or additions and where the PHA's existing fire and extended coverage policy can be endorsed to include such work.
- (c) All insurance shall be carried with companies which are financially responsible and admitted to do business in the State in which the project is located. If any such insurance is due to expire during the construction period, the Contractor (including subcontractors, as applicable) shall not permit the coverage to lapse and shall furnish evidence of coverage to the Contracting Officer. All certificates of insurance, as evidence of coverage, shall provide that no coverage may be canceled or non-renewed by the insurance company until at least 30 days prior written notice has been given to the Contracting Officer.

37. Subcontracts

- (a) Definitions. As used in this contract -
- (1) "Subcontract" means any contract, purchase order, or other purchase agreement, including modifications and change orders to the foregoing, entered into by a subcontractor to furnish supplies, materials, equipment, and services for the performance of the prime contract or a subcontract.

(2) "Subcontractor" means any supplier, vendor, or firm that furnishes supplies, materials, equipment, or services to or for the Contractor or another subcontractor.

- (b) The Contractor shall not enter into any subcontract with any subcontractor who has been temporarily denied participation in a HUD program or who has been suspended or debarred from participating in contracting programs by any agency of the United States Government or of the state in which the work under this contract is to be performed.
- (c) The Contractor shall be as fully responsible for the acts or omissions of its subcontractors, and of persons either directly or indirectly employed by them as for the acts or omissions of persons directly employed by the Contractor.
- (d) The Contractor shall insert appropriate clauses in all subcontracts to bind subcontractors to the terms and conditions of this contract insofar as they are applicable to the work of subcontractors.
- (e) Nothing contained in this contract shall create any contractual relationship between any subcontractor and the PHA or between the subcontractor and HUD.

38. Subcontracting with Small and Minority Firms, Women's Business Enterprise, and Labor Surplus Area Firms

The Contractor shall take the following steps to ensure that, whenever possible, subcontracts are awarded to small business firms, minority firms, women's business enterprises, and labor surplus area firms:

- (a) Placing qualified small and minority businesses and women's business enterprises on solicitation lists;
- (b) Ensuring that small and minority businesses and women's business enterprises are solicited whenever they are potential sources;
- (c) Dividing total requirements, when economically feasible, into smaller tasks or quantities to permit maximum participation by small and minority businesses and women's business enterprises;
- (d) Establishing delivery schedules, where the requirements of the contract permit, which encourage participation by small and minority businesses and women's business enterprises; and
- (e) Using the services and assistance of the U.S. Small Business Administration, the Minority Business Development Agency of the U.S. Department of Commerce, and State and local governmental small business agencies.

39. Equal Employment Opportunity

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

- (a) The Contractor/Seller shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, disability, or national origin.
- (b) The Contractor/Seller shall take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, sexual orientation, gender identity, disability, or national origin. Such action shall include, but not be limited to, (1) employment, (2) upgrading, demotion, (4) transfer, (5) recruitment or recruitment advertising, (6) layoff or termination, (7) rates of pay or other forms of compensation, and (8) selection for training including apprenticeship.

(c) The Contractor/Seller agrees to post in conspicuous places available to employees and applicants for employment the notices to be provided by the Contracting Officer setting forth the provisions of this nondiscrimination clause.

(d) The Contractor/Seller shall, in all solicitations or advertisements for employees placed by or on behalf of the Contractor/Seller, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

(e) The Contractor/Seller shall send, to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, the notice to be provided by the Contracting Officer advising the labor union or workers' representative of the Contractor's commitments under this clause, and post copies of the notice in conspicuous places available to employees and applicants for employment.

(f) The Contractor/Seller shall comply with Executive Order 11246, as amended, and the rules, regulations, and orders of the Secretary of Labor.

(g) The Contractor/Seller shall furnish all information and reports required by Executive Order 11246, as amended, Section 503 of the Rehabilitation Act of 1973, as amended, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto. The Contractor/Seller shall permit access to its books, records, and accounts by the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(h) In the event of a that the Contractor/Seller is in non-compliance with the nondiscrimination clauses of this contract or with any of such rules, regulations, or orders, this contract may be canceled, terminated or suspended in whole or in part and the contractor/seller may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(i) The contractor/seller will include the provisions of paragraphs (a) through (h) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each sub[contractor/seller] or vendor. The [contractor/seller] will take such action with respect to any subcontract or purchase order as may be directed by the Secretary of Labor as a means of enforcing such provisions including sanctions for noncompliance: Provided, however, that in the event the [contractor/seller] becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction, the [contractor/seller] may request the United States to enter into such litigation to protect the interests of the United States.

(j) Compliance with the requirements of this clause shall be to the maximum extent consistent with, but not in derogation of, compliance with section 7(b) of the Indian Self-Determination and Education Assistance Act and the Indian Preference clause of this contract.

40. Employment, Training, and Contracting Opportunities for Low-Income Persons, Section 3 of the Housing and Urban Development Act of 1968.

(a) The work to be performed under this contract is subject to the requirements of section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. 1701u (section 3). The purpose of section 3 is to ensure that employment and other economic opportunities generated by HUD assistance or HUD-assisted projects covered by section 3, shall, to the greatest extent feasible, be directed to low- and very low-income persons, particularly persons who are recipients of HUD assistance for housing.

(b) The parties to this contract agree to comply with HUD's regulations in 24 CFR Part 135, which implement section 3. As evidenced by their execution of this contract, the parties to this contract certify that they are under no contractual or other impediment that would prevent them from complying with the Part 135 regulations.

(c) The contractor agrees to send to each labor organization or representative of workers with which the contractor has a collective bargaining agreement or other understanding, if any, a notice advising the labor organization or workers' representative of the contractor's commitments under this section 3 clause, and will post copies of the notice in conspicuous places at the work site where both employees and applicants for training and employment positions can see the notice. The notice shall describe the section 3 preference, shall set forth minimum number and job titles subject to hire, availability of apprenticeship and training positions, the qualifications for each; and the name and location of the person(s) taking applications for each of the positions; and the anticipated date the work shall begin.

(d) The contractor agrees to include this section 3 clause in every subcontract subject to compliance with regulations in 24 CFR Part 135, and agrees to take appropriate action, as provided in an applicable provision of the subcontract or in this section 3 clause, upon a finding that the subcontractor is in violation of the regulations in 24 CFR Part 135. The contractor will not subcontract with any subcontractor where the contractor has notice or knowledge that the subcontractor has been found in violation of the regulations in 24 CFR Part 135.

(e) The contractor will certify that any vacant employment positions, including training positions, that are filled (1) after the contractor is selected but before the contract is executed, and (2) with persons other than those to whom the regulations of 24 CFR Part 135 require employment opportunities to be directed, were not filled to circumvent the contractor's obligations under 24 CFR Part 135.

(f) Noncompliance with HUD's regulations in 24 CFR Part 135 may result in sanctions, termination of this contract for default, and debarment or suspension from future HUD assisted contracts.

(g) With respect to work performed in connection with section 3 covered Indian housing assistance, section 7(b) of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450e) also applies to the work to be performed under this contract. Section 7(b) requires that to the greatest extent feasible (i) preference and opportunities for training and employment shall be given to Indians, and (ii) preference in the award of contracts and subcontracts shall be given to Indian organizations and Indian-owned Economic Enterprises. Parties to this contract that are subject to the provisions of section 3 and section 7(b) agree to comply with section 3 to the maximum extent feasible, but not in derogation of compliance with section 7(b).

41. Interest of Members of Congress

No member or delegate to the Congress of the United States of America shall be admitted to any share or part of this contract or to any benefit that may arise therefrom.

42. Interest of Members, Officers, or Employees and Former Members, Officers, or Employees

No member, officer, or employee of the PHA, no member of the governing body of the locality in which the project is situated, no member of the governing body of the locality in which the PHA was activated, and no other public official of such locality or localities who exercises any functions or responsibilities with respect to the project, shall, during his or her tenure, or for one year thereafter, have any interest, direct or indirect, in this contract or the proceeds thereof.

43. Limitations on Payments made to Influence Certain Federal Financial Transactions

- (a) The Contractor agrees to comply with Section 1352 of Title 31, United States Code which prohibits the use of Federal appropriated funds to pay any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, and officer or employee of Congress, or an employee of a Member of Congress in connection with any of the following covered Federal actions: the awarding of any Federal contract; the making of any Federal grant; the making of any Federal loan; the entering into of any cooperative agreement; or the modification of any Federal contract, grant, loan, or cooperative agreement.
- (b) The Contractor further agrees to comply with the requirement of the Act to furnish a disclosure (OMB Standard Form LLL, Disclosure of Lobbying Activities) 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 in connection with a Federal contract, grant, loan, or cooperative agreement.

44. Royalties and Patents

The Contractor shall pay all royalties and license fees. It shall defend all suits or claims for infringement of any patent rights and shall save the PHA harmless from loss on account thereof; except that the PHA shall be responsible for all such loss when a particular design, process or the product of a particular manufacturer or manufacturers is specified and the Contractor has no reason to believe that the specified design, process, or product is an infringement. If, however, the Contractor has reason to believe that any design, process or product specified is an infringement of a patent, the Contractor shall promptly notify the Contracting Officer. Failure to give such notice shall make the Contractor responsible for resultant loss.

45. Examination and Retention of Contractor's Records

- (a) The PHA, HUD, or Comptroller General of the United States, or any of their duly authorized representatives shall, until 3 years after final payment under this contract, have access to and the right to examine any of the Contractor's directly pertinent books, documents, papers, or other records involving transactions related to this contract for the purpose of making audit, examination, excerpts, and transcriptions.
- (b) The Contractor agrees to include in first-tier subcontracts under this contract a clause substantially the same as paragraph (a) above. "Subcontract," as used in this clause, excludes purchase orders not exceeding \$10,000.
- (c) The periods of access and examination in paragraphs (a) and (b) above for records relating to (1) appeals under the Disputes clause of this contract, (2) litigation or settlement of claims arising from the performance of this contract, or (3) costs and expenses of this contract to which the PHA, HUD, or Comptroller General or any of their duly authorized representatives has taken exception shall continue until disposition of such appeals, litigation, claims, or exceptions.

46. Labor Standards - Davis-Bacon and Related Acts

If the total amount of this contract exceeds \$2,000, the Federal labor standards set forth in the clause below shall apply to the development or construction work to be performed under the contract.

- (a) Minimum Wages.
 - (1) All laborers and mechanics employed under this contract in the development or construction of the project(s) involved will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the Contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of 29 CFR 5.5(a)(1)(iv); also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the regular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits in the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein; provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under 29 CFR 5.5(a)(1)(ii) and the Davis-Bacon poster (WH-1321) shall

be posted at all times by the Contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

- (2) (i) Any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. HUD shall approve an additional classification and wage rate and fringe benefits therefor only when all the following criteria have been met: (A) The work to be performed by the classification requested is not performed by a classification in the wage determination; and (B) The classification is utilized in the area by the construction industry; and (C) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.
- (ii) If the Contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and HUD or its designee agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by HUD or its designee to the Administrator of the Wage and Hour Division, Employee Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary.
- (iii) In the event the Contractor, the laborers or mechanics to be employed in the classification or their representatives, and HUD or its designee do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), HUD or its designee shall refer the questions, including the views of all interested parties and the recommendation of HUD or its designee, to the Administrator of the Wage and Hour Division for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary.
- (iv) The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraphs (a)(2)(ii) or (iii) of this clause shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in classification.
- (3) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the Contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.
- (4) If the Contractor does not make payments to a trustee or other third person, the Contractor may consider as part of the wages of any laborer or mechanic the

amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program; provided, that the Secretary of Labor has found, upon the written request of the Contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the Contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

- (b) Withholding of funds. HUD or its designee shall, upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the Contractor under this contract or any other Federal contract with the same prime Contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime Contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the Contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working in the construction or development of the project, all or part of the wages required by the contract, HUD or its designee may, after written notice to the Contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased. HUD or its designee may, after written notice to the Contractor, disburse such amounts withheld for and on account of the Contractor or subcontractor to the respective employees to whom they are due.
- (c) Payrolls and basic records.
- (1) Payrolls and basic records relating thereto shall be maintained by the Contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working in the construction or development of the project. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made, and actual wages paid. Whenever the Secretary of Labor has found, under 29 CFR 5.5(a)(1)(iv), that the wages of any laborer or mechanic include the amount of costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the Contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

- (2) (i) The Contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the Contracting Officer for transmission to HUD or its designee. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under subparagraph (c)(1) of this clause. This information may be submitted in any form desired. Optional Form WH-347 (Federal Stock Number 029-005-00014-1) is available for this purpose and may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. The Contractor is responsible for the submission of copies of payrolls by all subcontractors. (Approved by the Office of Management and Budget under OMB Control Number 1214-0149.)
- (ii) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the Contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:
- (A) That the payroll for the payroll period contains the information required to be maintained under paragraph (c) (1) of this clause and that such information is correct and complete;
- (B) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR Part 3; and
- (C) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.
- (iii) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirements for submission of the "Statement of Compliance" required by subparagraph (c)(2)(ii) of this clause.
- (iv) The falsification of any of the above certifications may subject the Contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 3729 of Title 31 of the United States Code.
- (3) The Contractor or subcontractor shall make the records required under subparagraph (c)(1) available for inspection, copying, or transcription by authorized representatives of HUD or its designee, the Contracting Officer, or the Department of Labor and shall permit such representatives to interview employees during working hours on the job. If the Contractor or subcontractor fails to submit the required records or to make them available, HUD or its designee may, after written notice to the Contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to

make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

- (d) (1) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship and Training, Employer and Labor Services (OATELS), or with a State Apprenticeship Agency recognized by OATELS, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by OATELS or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the Contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated in this paragraph, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the Contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator of the Wage and Hour Division determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event OATELS, or a State Apprenticeship Agency recognized by OATELS, withdraws approval of an apprenticeship program, the Contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.
- (2) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under

the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed in the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate in the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate in the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate in the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the Contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

- (3) Equal employment opportunity. The utilization of apprentices, trainees, and journeymen under this clause shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.
- (e) Compliance with Copeland Act requirements. The Contractor shall comply with the requirements of 29 CFR Part 3, which are hereby incorporated by reference in this contract.
- (f) Contract termination; debarment. A breach of this contract clause may be grounds for termination of the contract and for debarment as a Contractor and a subcontractor as provided in 29 CFR 5.12.
- (g) Compliance with Davis-Bacon and related Act requirements. All rulings and interpretations of the Davis-Bacon and related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this contract.
- (h) Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this clause shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the Contractor (or any of its subcontractors) and the PHA, HUD, the U.S. Department of Labor, or the employees or their representatives.
- (i) Certification of eligibility.
 - (1) By entering into this contract, the Contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the Contractor'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).

- (2) No part of this contract shall be subcontracted to any person or firm ineligible for award of a United States Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).
 - (3) The penalty for making false statements is prescribed in the U. S. Criminal Code, 18 U.S.C. 1001.
- (j) Contract Work Hours and Safety Standards Act. As used in this paragraph, the terms "laborers" and "mechanics" include watchmen and guards.
- (1) Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics, including watchmen and guards, shall require or permit any such laborer or mechanic in any workweek in which the individual is employed on such work to work in excess of 40 hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of 40 hours in such workweek.
 - (2) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the provisions set forth in subparagraph (j)(1) of this clause, the Contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such Contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic (including watchmen and guards) employed in violation of the provisions set forth in subparagraph (j)(1) of this clause, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of 40 hours without payment of the overtime wages required by provisions set forth in subparagraph (j)(1) of this clause.
 - (3) Withholding for unpaid wages and liquidated damages. HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the Contractor or subcontractor under any such contract or any Federal contract with the same prime Contractor, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime Contractor, such sums as may be determined to be necessary to satisfy any liabilities of such Contractor or subcontractor for unpaid wages and liquidated damages as provided in the provisions set forth in subparagraph (j)(2) of this clause.
- (k) Subcontracts. The Contractor or subcontractor shall insert in any subcontracts all the provisions contained in this clause, and such other clauses as HUD or its designee may by appropriate instructions require, and also a clause requiring the subcontractors to include these provisions in any lower tier subcontracts. The prime Contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all these provisions.

47. Non-Federal Prevailing Wage Rates

- (a) Any prevailing wage rate (including basic hourly rate and any fringe benefits), determined under State or tribal law to be prevailing, with respect to any employee in any trade or position employed under the contract, is inapplicable to the contract and shall not be enforced against the Contractor or any subcontractor, with respect to employees engaged under the contract whenever such non-Federal prevailing wage rate exceeds:
 - (1) The applicable wage rate determined by the Secretary of Labor pursuant to the Davis-Bacon Act (40 U.S.C. 3141 et seq.) to be prevailing in the locality with respect to such trade;
- (b) An applicable apprentice wage rate based thereon specified in an apprenticeship program registered with the U.S. Department of Labor (DOL) or a DOL-recognized State Apprenticeship Agency; or
- (c) An applicable trainee wage rate based thereon specified in a DOL-certified trainee program.

48. Procurement of Recovered Materials.

- (a) In accordance with Section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act, the Contractor shall procure items designated in guidelines of the Environmental Protection Agency (EPA) at 40 CFR Part 247 that contain the highest percentage of recovered materials practicable, consistent with maintaining a satisfactory level of competition. The Contractor shall procure items designated in the EPA guidelines that contain the highest percentage of recovered materials practicable unless the Contractor determines that such items: (1) are not reasonably available in a reasonable period of time; (2) fail to meet reasonable performance standards, which shall be determined on the basis of the guidelines of the National Institute of Standards and Technology, if applicable to the item; or (3) are only available at an unreasonable price.
- (b) Paragraph (a) of this clause shall apply to items purchased under this contract where: (1) the Contractor purchases in excess of \$10,000 of the item under this contract; or (2) during the preceding Federal fiscal year, the Contractor: (i) purchased any amount of the items for use under a contract that was funded with Federal appropriations and was with a Federal agency or a State agency or agency of a political subdivision of a State; and (ii) purchased a total of in excess of \$10,000 of the item both under and outside that contract.

SPECIAL CONDITIONS

The following clauses are added to Document 00715, General Conditions for Construction Contracts—Public Housing Programs (form HUD-5370) and the General Conditions (document 00715) included in this Project Manual, as follows:

1. CLAUSE 2: Paragraph (C), add the following sub-paragraph

- (1) Superintendent

- The superintendent (as required in Clause 2 (c) of the General Conditions) shall be a full-time "non-working" supervisor, i.e. the superintendent shall not be involved in the actual physical work in such a way that interferes with his role as planner, organizer, and inspector. A "working" Superintendent that is not fully accessible to the PHA is not acceptable.

2. CLAUSE 2: Paragraph (d), add the following sub-paragraphs:

- (1) The Contractor shall be responsible for all damage to any property of the PHA and to all property of the tenants when this damage is caused by the Contractor in his compliance with the work as set forth in the Project Manual.

- (2) Should the Contractor, in the course of his Contract work, find additional repairs or replacements are needed, it shall be brought to the attention of the Contracting Officer.

3. CLAUSE 2: Paragraph (f), add the following sub-paragraph:

- (1) Sites available for storage of equipment and job trailers shall be designated by, and coordinated with, the PHA. Storage and protection of material and equipment shall be solely the responsibility of the Contractor.

4. CLAUSE 2: Paragraph (g), add the following sub-paragraphs:

- (5) Contractor shall remove all debris, crates, cartons, packaging, and similar items, resulting from removal of existing items of work or from installation of new items of work and/or accessories and shall not be allowed to accumulate and shall be removed from the project site at the end of each work day;

- (6) The Owner's dumpster shall not be used for the disposal of debris, trash, cartons, packaging, and similar items resulting from work of this Contract.

5. CLAUSE 5: Add the following paragraph:

- (c) Material or equipment will not be permitted to be delivered to the project site until a formal Notice to Proceed has been issued by the Public Housing Authority to the Contractor.

- (d) The Contractor shall furnish and install all necessary equipment and services for organized work to start no later than seven (7) calendar days after the date of the Notice to Proceed.
6. CLAUSE 6: Add the following paragraphs:
- (d) The Contractor shall prepare a daily schedule to coincide, as closely as possible, with the normal daily work schedule of the PHA, which is Monday through Friday, 8:00 a.m. to 5:00 p.m. No work shall be started on any building unless that building can be secured and dried-in for overnight or over a weekend.
- (e) Progress Meetings will be held monthly. These meetings must be attended by the Contractor, the Architect and representatives of the Housing Authority. The monthly meetings will provide an opportunity for the Contractor, Subcontractors, PHA, Management Consultant and the Architect to review progress and discuss any problems, situations or modifications relative to the construction process.
7. CLAUSE 7: Add the following paragraph:
- (c) The Contractor shall be responsible for checking all existing conditions, exact dimensions, quantities, material and other items required to complete the work indicated on the Drawings and specified in the Project Manual to complete the Work of the Contract.
8. CLAUSE 9: Paragraph (d), for clarification, shop drawings required by subcontractors and sub-subcontractors are to be submitted to the General Contractor who then submits shop drawings to the A/E. All shop drawings should be submitted to the A/E. The A/E will review/comment and forward to the PHA for final approval unless otherwise noted.
9. CLAUSE 9: Add the following paragraph:
- (j) Where the individual specification sections call for a named product or one that meets it or exceeds it in quality, the decision of the A/E as to the acceptability of any product offered by the Contractor shall be binding.
10. CLAUSE 11: Subparagraph (b), add the following subparagraph:
- (7) Where indicated, samples of all materials to be installed on this project will be submitted to the Public Housing Authority (PHA) for approval a minimum of 14 calendar days prior to installation and must be approved by the PHA prior to installation. Samples will not be returned to the Contractor, unless specifically indicated.
11. CLAUSE 11: Add the following paragraph:
- (d) All requests for substitutions shall be submitted in writing in accordance with procedures outlined in Section 01600 - Material Equipment and Substitutions.
12. CLAUSE 15: Paragraph (a), note the following:
- The requirements for utilities specified in Section 01500, Construction Facilities and Temporary Controls shall govern over the requirements noted in this paragraph.

13. CLAUSE 25: Refer to Section 01010 - Summary of Work for the number of calendar days to complete the Work.
14. CLAUSE 27: Paragraph (d), Each *Periodic Estimate for Partial Payment* should be submitted at the scheduled *Progress Meeting*. A preliminary copy must be received (via fax, e-mail or mail) a minimum of two (2) business days prior to the Progress Meeting. Payment shall not be expected for up to fifteen (15) calendar days from acceptance by the Contracting Officer.
15. CLAUSE 27: Paragraph (e), the *Certificate of Progress Payment* Form (Document 00914 in the Project Manual) must accompany each request for payment beginning with No. 2.
16. CLAUSE 27: Add the following paragraph:
 - (l) Requests for payment by the Contractor will not be accepted by the Owner unless all required payrolls or statements of no work are current and approved by the Owner through the end of the week preceding the end of the period covered by the Request for Payment.
17. CLAUSE 29: Subparagraphs (f)(2) and (f)(3): Overhead and Profit shall be limited as follows:

	All Not to Exceed		
	Overhead	Profit	Commission
To General Contractor on work performed by other than its own forces	-	-	5%
To first tier Subcontractor on work performed by its Subcontractor	-	-	5%
To General Contractor and/or the Subcontractor for that portion of the work performed with their respective forces	5%	10%	-

Any Contractor submitted a bid for this project accepts these limitations for the base contract and any potential modifications to the contract.

18. CLAUSE 29: add the following paragraph (k):
 - (k) All time delays encountered during the construction process caused by adverse weather conditions shall be determined utilizing the following methodology.

The following schedule of monthly anticipated adverse weather delays is based on National Oceanic and Atmospheric Administration (NOAA) or similar data for the project location and will constitute the base line for monthly weather time evaluations. The Contractor's progress schedule must reflect these anticipated adverse weather delays in all weather dependent activities.

Monthly Anticipated Adverse Weather Delay
Work Days Based on 5-Day Work Week

JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
11	8	6	6	5	4	5	4	4	4	4	6

Upon acknowledgement of the Notice to Proceed and continuing throughout the contract, the Contractor will record on the daily report, the occurrence of adverse weather and resultant impact to normally scheduled work. Actual adverse weather delay days must prevent work on critical activities for 50 percent or more of the Contractor's scheduled work day. The number of actual adverse weather delay days shall include days impacted by actual adverse weather (even if adverse weather occurred in previous month), be calculated chronologically for the first to the last day of each month, and be recorded as full days. If the number of actual adverse weather delay days exceeds the number of days anticipated in the previous paragraph, above, the contracting Officer will convert any qualifying delays to calendar days, giving full consideration for equivalent fair weather work days, and issue a modification in accordance with the appropriate contract clause.

19. CLAUSE 33: Paragraph (d), add the following paragraph:
- (d) If the actual damages for any delay in completion of the Work which the Contractor is required to perform under this Contract are impossible to determine, the Contractor and his Sureties shall be liable for and shall pay to the Public Housing Authority as liquidated damages the fixed and agreed sum stipulated in Article 5 of Document 00502 - Form of Contract, the stipulated sum for each consecutive calendar day of delay from *Contract Date of Completion* or as modified in accordance with Article 29, *Changes in the Work* in Document 00715 - General Conditions, until such work is satisfactorily completed and accepted. (The *Contract Date of Completion* is the date established in a *Notice to Proceed* and issued to the Contractor by the PHA.) Refer to Section 01010 - Scope of Work, Paragraph 1.4(B) for contract period.
20. CLAUSE 36: Paragraph (a) Provide insurance coverage with limits of liability as follows (refer to respective subparagraph):
- Subparagraph (2)- Commercial General Liability: \$500,000
Subparagraph (3)- Automobile Liability: \$500,000
21. CLAUSE 36: Paragraph (b), revise the last sentence to read as follows:
- "The Contractor will be required to carry Builder's Risk fire and extended coverage, vandalism and malicious mischief Insurance on the Work to be installed under the Contract.
22. CLAUSE 41: This CLAUSE does not apply to the Contract.
23. CLAUSE 46: Paragraph (a), Add the following: Except for concrete, landscaping and similar trades, the ratio of laborers to mechanics should not exceed 1:1. A higher ratio of laborers to mechanics normally indicates misclassification. That is, the workers classified and paid as laborers are, instead, performing the work of a mechanic which requires a wage higher than that of a laborer. Therefore, those workers are underpaid.

24. CLAUSE 49: Add CLAUSE 49 as follows:

CLAUSE 49: TAXES ON OWNER-FURNISHED ITEMS

- (a) The Contractor will be responsible for paying all applicable taxes on new Owner-furnished items included in the Work of the Contract. Items that are reused are excluded from this requirement.

END OF DOCUMENT

**SUPPLEMENTARY CONDITIONS
TO THE CONSTRUCTION
CONTRACT**

U.S. Department of Housing
and Urban Development
Office of Housing

OMB Approval No. 2502-0598
(Exp. 9/30/2021)

Public Reporting Burden for this collection of information is estimated to average 0.2 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. Response to this request for information is required in order to receive the benefits to be derived. 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. While no assurance of confidentiality is pledged to respondents, HUD generally discloses this data only in response to a Freedom of Information Act request.

Warning: Federal law provides that anyone who knowingly or willfully submits (or causes to submit) a document containing any false, fictitious, misleading, or fraudulent statement/certification or entry may be criminally prosecuted and may incur civil administrative liability. Penalties upon conviction can include a fine and imprisonment, as provided pursuant to applicable law, which includes, but is not limited to, 18 U.S.C. 1001, 1010, 1012; 31 U.S.C. 3729, 3802, 24 C.F.R. Parts 25, 28 and 30, and 2 C.F.R. Parts 180 and 2424.

Article 1: Labor Standards

A. Applicability. The Project or program to which the construction work covered by this Contract pertains is being assisted or insured by the United States of America, and the following Federal Labor Standards Provisions are included in this Contract or related instrument pursuant to the provisions applicable to such Federal assistance or insurance. Any statute or regulation contained herein shall also include any subsequent amendment or successor statute or regulation. The terms of this Supplementary Conditions to the Construction Contract (HUD-92554M) takes precedence over all provisions of the "General Conditions of the Contract for Construction" (AIA Document A201) inconsistent with said Supplementary Conditions.

B. Minimum Wages. Pursuant to Section 212 of the National Housing Act, as amended, 12 U.S.C. 1715c, the minimum wage provisions contained in this paragraph B do not apply to those projects with Security Instruments insured under Section 221(h)(1) designed for less than 9 families and they do not apply to those projects with Security Instruments insured under either Section 220 or 233 designed for less than 12 families.

1. (i) All laborers and mechanics employed or working upon the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the Project) shall be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the Contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1 (b)(2) of the Davis-Bacon Act (40 U.S.C. 3141(2)(B)(ii)) on behalf of laborers or mechanics are considered wages paid to such laborers or

mechanics, subject to the provisions of 29 CFR 5.5(a)(1)(iv); also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: *Provided*, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under 29 CFR 5.5(a)(1)(ii)) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the Contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

(ii) (a) Any class of laborers or mechanics that is not listed in the wage determination and that is to be employed under this Contract shall be classified in conformance with the wage determination. HUD shall approve an additional classification and wage rate and fringe benefits only when the following criteria have been met:

- (1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and
- (2) The classification is utilized in the area by the construction industry; and
- (3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(b) If the Contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and HUD or its designee agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by HUD or its designee to the Administrator of the Wage and Hour Division, U.S. Department of Labor, Washington, D.C. 20210 ("Administrator"). The Administrator, or an authorized representative, shall approve, modify, or disapprove every additional classification action within thirty (30) days of receipt and so advise HUD or its designee or shall notify HUD or its designee within the thirty (30) day period that additional time is necessary.

(c) In the event the Contractor, the laborers or mechanics to be employed in the classification or their representatives and HUD or its designee do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), HUD or its designee shall refer the questions, including the views of all interested parties and the recommendation of HUD or its designee, to the Administrator for determination. The Administrator, or an authorized representative, shall issue a determination within thirty (30) days of receipt and so advise HUD or its

designee or shall notify HUD or its designee within the thirty (30) day period that additional time is necessary.

(d) The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraphs B.1.(ii)(b) or (c) of this Article, shall be paid to all workers performing work in the classification under this Contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the Contract for a class of laborers or mechanics includes a fringe benefit that is not expressed as an hourly rate, the Contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the Contractor does not make payments to a trustee or other third person, the Contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, *Provided*, That the Secretary of Labor has found, upon the written request of the Contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the Contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

2. Withholding. HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the Contractor under this Contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees and helpers, employed by the Contractor or any subcontractor the full amount of wages required by the Contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee or helper, employed or working on the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the Project), all or part of the wages required by the Contract, HUD or its designee may, after written notice to the Contractor, sponsor, applicant, or Owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased. HUD or its designee may, after written notice to the Contractor, disburse such amounts withheld for and on account of the Contractor or subcontractor to the respective employees to whom they are due.

3. Payrolls, records, and certifications.

(i) Payrolls and basic records relating thereto shall be maintained by the Contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work (or under the United States Housing Act of 1937, or under the Housing Act of 1949, in the construction or development of the Project). Such records shall contain the name, address, and social security number of each such worker, his or her correct

classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in Section 1 (b)(2)(B) of the Davis-Bacon Act (40 U.S.C. 3141(2)(B)(ii))), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section 1 (b)(2)(B) of the Davis-Bacon Act (40 U.S.C. 3141(2)(B)(ii)), the Contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(ii)(a) The Contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to HUD or its designee if the agency is a party to the Contract, but if the agency is not such a party, the Contractor shall submit the payrolls to the applicant, sponsor, or Owner, as the case may be, for transmission to HUD or its designee. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired, whether paper (Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/whd/forms/wh347.pdf> or its successor site), or electronically pursuant to Program Obligations. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to HUD or its designee if the agency is a party to the Contract, but if the agency is not such a party, the Contractor will submit the payrolls to the applicant sponsor, or Owner, as the case may be, for transmission to HUD or its designee, the Contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this subparagraph for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to HUD or its designee.

(b) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the Contractor or subcontractor or his or her agent who pays or

supervises the payment of the persons employed under the Contract and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be provided under 29 CFR 5.5(a)(3)(ii), the appropriate information is being maintained under 29 CFR 5.5(a)(3)(i), and that such information is correct and complete.

(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the Contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR Part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the Contract.

(c) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by subparagraph B.3.(ii)(b) of this Article.

(d) The falsification of any of the above certifications may subject the Contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Sections 3801 et seq of Title 31 of the United States Code.

(iii) The Contractor or subcontractor shall make the records required under subparagraph B.3.(i) of this Article available for inspection, copying, or transcription by authorized representatives of HUD or its designee or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the Contractor or subcontractor fails to submit the required records or to make them available, HUD or its designee may, after written notice to the Contractor, sponsor, applicant, or Owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and Trainees.

(i) **Apprentices.** Apprentices shall be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship, or with a State Apprenticeship Agency recognized by such Office, or if a person is employed in his or her first ninety (90) days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the

program, but who has been certified by the Office of Apprenticeship, or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the Contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where the Contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the Contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship, or a State Apprenticeship Agency recognized by such Office, withdraws approval of an apprenticeship program, the Contractor shall no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) **Trainees.** Except as provided in 29 CFR 5.16, trainees shall not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman's hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on

the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the Contractor shall no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) **Equal employment opportunity.** The utilization of apprentices, trainees and journeymen under 29 CFR Part 5 shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

5. Compliance with Copeland Act Requirements. The Contractor shall comply with the requirements of 29 CFR Part 3, which are incorporated by reference in this Contract.

6. Subcontracts. The Contractor or subcontractor shall insert in any subcontracts the clauses set forth in subparagraphs 1 through 10 of this paragraph B and such other clauses as HUD or its designee may by appropriate instructions require, and a copy of the applicable prevailing wage determination, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all Contract clauses referenced in this subparagraph.

7. Contract termination and debarment. A breach of the Contract clauses in 29 CFR 5.5 may be grounds for termination of the Contract, and for debarment as a contractor or a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act Requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this Contract.

9. Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this Contract shall not be subject to the general disputes clause of this Contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the Contractor (or any of its subcontractors) and HUD or its designee, the U.S. Department of Labor, or the employees or their representatives.

10. Certification of Eligibility.

(i) By entering into this Contract, the Contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the Contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of Section 3(a) of the Davis-Bacon Act (40 U.S.C. 3144(b)(2)) or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

(ii) No part of this Contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of Section 3(a) of the Davis-Bacon Act (40 U.S.C. 3144(b)(2)) or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001. Additionally, U.S. Criminal Code, Section 1010, Title 18, U.S.C., "Federal Housing Administration transactions", provides in part: "Whoever, for the purpose of . . . influencing in any way the action of such Department . . . makes, passes, utters or publishes any statement, knowing the same to be false . . . shall be fined under this title or imprisoned not more than two years, or both."

C. Contract Work Hours and Safety Standards Act.

1. Applicability and Definitions. This paragraph C of Article 1 is applicable only if a direct form of federal assistance is involved, such as Section 8, Section 202/811 Capital Advance, grants etc., and is applicable only where the prime contract is in an amount greater than \$100,000. As used in this paragraph C, the terms "laborers" and "mechanics" include watchmen and guards.

2. Overtime requirements. No contractor or subcontractor contracting for any part of the Contract work that may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty (40) hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty (40) hours in such workweek.

3. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the immediately preceding subparagraph C.2, the Contractor and any subcontractor responsible therefore shall be liable for the unpaid wages. In addition, the Contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory) for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of such subparagraph, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty (40) hours without payment of the overtime wages required by the clause set forth in such subparagraph.

4. Withholding for unpaid wages and liquidated damages. HUD or its designee shall, upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from any moneys payable on account of work performed by the Contractor or subcontractor under any such contract, or under any other Federal contract with the same prime contractor, or under any other Federally-assisted contract subject to the Contract Work

Hours and Safety Standards Act which is held by the same prime contractor such sums as may be determined to be necessary to satisfy any liabilities of such Contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in subparagraph 3 of this paragraph C.

5. Subcontracts. The Contractor or subcontractor shall insert in any subcontracts the clauses set forth in subparagraphs 1 through 5 of this paragraph C and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in such subparagraphs 1 through 5.

D. Certification.

For projects with Security Instruments insured under the National Housing Act, as amended, that are subject to paragraph B of this Article 1, the Contractor is required to execute the Contractor's Prevailing Wage Certificate within HUD-92448 as a condition precedent to insurance by HUD of the Loan, or an advance thereof, made or to be made by the Lender in connection with the construction of the Project.

Article 2: Equal Employment Opportunity

A. Applicability. This Article 2 applies to any contract for construction work, or modification thereof, as defined in the regulations of the Secretary of Labor at 41 CFR Chapter 60, which is paid for in whole or in part with funds obtained from the Federal Government or borrowed on the credit of the Federal Government pursuant to a grant, contract, loan insurance, or guarantee, or undertaken pursuant to any Federal program involving such grant, contract, loan, insurance, or guarantee.

B. The Contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, disability, or national origin. The Contractor shall take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, sexual orientation, gender identity, disability or national origin. Such action shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training including apprenticeship. The Contractor agrees to post in conspicuous places available to employees and applicants for employment notices to be provided setting forth the provisions of this nondiscrimination clause.

C. The Contractor shall, in all solicitations or advertisements for employees placed by or on behalf of the Contractor state that all qualified applicants shall receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, disability, or national origin.

D. The Contractor shall send to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding a

notice to be provided advising the said labor union or workers representatives of the Contractor's commitments hereunder, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

E. The Contractor shall comply with all provisions of Executive Order 11246 of September 24, 1965 and of the rules, regulations, and relevant orders of the Secretary of Labor.

F. The Contractor shall furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and shall permit access to its books, records, and accounts by the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

G. In the event of the Contractor's noncompliance with the nondiscrimination clauses of this Contract or with any of the said rules, regulations, or orders, this Contract may be canceled, terminated, or suspended in whole or in part and Contractor may be declared ineligible for further government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulations or order of the Secretary of Labor, or as otherwise provided by law.

H. The Contractor shall include the provisions of paragraphs A through H of this Article 2 in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order 11246 of September 24, 1965, so that such provisions shall be binding upon each subcontractor or vendor. The Contractor shall take such action with respect to any subcontract or purchase order as HUD or the Secretary of Labor may direct as a means of enforcing such provisions, including sanctions for noncompliance. *Provided, however,* that in the event the Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by HUD or the Secretary of Labor, the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

Article 3: Equal Opportunity for Businesses and Lower Income Persons Located Within the Project Area

A. This Article 3 is applicable to projects covered by Section 3, as defined in 24 CFR Part 135.

B. The work to be performed under this Contract is on a project assisted under a program providing Federal financial assistance from HUD and is subject to the requirements of Section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. 1701u. Section 3 requires that to the greatest extent feasible opportunities for training and employment be given to low and very-low income residents of the unit of local government or the metropolitan area (or non-metropolitan county) as determined by HUD in which the Project is located and contracts for work in connection with the Project be awarded to business concerns which are located in, or owned in substantial part by persons residing in the same metropolitan area (or non-metropolitan county) as the Project.

Article 4: Health and Safety

A. This Article 4 is applicable only where the prime contract is in an amount greater than \$100,000.

B. No laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his or her health and safety as determined under construction safety and health standards promulgated by the Secretary of Labor by regulation.

C. The Contractor shall comply with all regulations issued by the Secretary of Labor pursuant to 29 CFR Part 1926, and failure to comply may result in imposition of sanctions pursuant to the Contract Work Hours and Safety Standards Act, 40 USC 3701 et seq.

D. The Contractor shall include the provisions of this Article 4 in every subcontract so that such provisions shall be binding on each subcontractor. The Contractor shall take such action with respect to any subcontract as HUD or the Secretary of Labor shall direct as a means of enforcing such provisions.

EXHIBIT V
NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION
TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY
(EXECUTIVE ORDER 11246)

1. The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.
2. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

Timetables	Goals for minority participation for each trade **12%	Goals for female participation in each trade ** 6.9%
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These goals are applicable to all the Contractor's construction work performed in the covered area, whether or not it is federally assisted.

The Contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60.4.3(a), and its efforts to meet the goals established for the geographical area where the contract resulting from this solicitation is to be performed. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within 10 working days of award of any construction subcontract in excess of \$10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address and telephone number of the subcontractor; employer identification number; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the contract is to be performed.
4. As used in this Notice, and in the contract resulting from this solicitation, the "covered area" is (insert description of the geographical areas where the contract is to be performed giving the state, county and city, if any).

END OF DOCUMENT

WAGE RATES

MINIMUM WAGE RATES

- A. There shall be paid to each employee engaged in work under this contract at the site of the project in the trade or occupation listed in this section not less than the wage rate set opposite same.
- B. Except for concrete, landscaping and similar trades, the ratio of laborers to mechanics shall not exceed 1:1.
- C. Wage rates are bound in this document.

General Decision Number: KY20240004 01/05/2024

Superseded General Decision Number: KY20230004

State: Kentucky

Construction Type: Residential

Counties: Anderson, Boyle, Breckinridge, Carroll, Franklin, Grayson, Green, Marion, Mercer, Owen, Taylor and Washington Counties in Kentucky.

RESIDENTIAL CONSTRUCTION PROJECTS (consisting of single family homes and apartments up to and including 4 stories).

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(1).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:	. Executive Order 14026 generally applies to the contract. . The contractor must pay all covered workers at least \$17.20 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2024.
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:	. Executive Order 13658 generally applies to the contract. . The contractor must pay all covered workers at least \$12.90 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2024.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker

protections under the Executive Orders is available at
<http://www.dol.gov/whd/govcontracts>.

Modification Number Publication Date
 0 01/05/2024

PLAS0132-012 06/01/2020

OWEN COUNTY

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER...	\$ 27.54	18.59

PLAS0692-014 04/01/2021

ANDERSON, BOYLE, CARROLL, FRANKLIN, GRAYSON, GREEN, MARION,
 MERCER, TAYLOR & WASHINGTON COUNTIES

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER...	\$ 27.80	18.71

PLAS0692-037 04/01/2021

BRECKENRIDGE COUNTY

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER...	\$ 27.80	18.56

SUKY2010-038 07/21/2010

	Rates	Fringes
CARPENTER.....	\$ 14.15 **	0.26
ELECTRICIAN.....	\$ 15.25 **	0.00
LABORER: Common or General.....	\$ 10.00 **	0.00
PAINTER: Brush and Roller.....	\$ 12.50 **	0.00
PLUMBER.....	\$ 16.33 **	0.00

WELDERS - Receive rate prescribed for craft performing
 operation to which welding is incidental.

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 ** Workers in this classification may be entitled to a higher
 minimum wage under Executive Order 14026 (\$17.20) or 13658
 (\$12.90). Please see the Note at the top of the wage
 determination for more information. Please also note that the
 minimum wage requirements of Executive Order 14026 are not
 currently being enforced as to any contract or subcontract to

which the states of Texas, Louisiana, or Mississippi, including their agencies, are a party.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year.

Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at

<https://www.dol.gov/agencies/whd/government-contracts>.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour National Office because National Office has responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

END OF DOCUMENT

Construction Progress Schedule

U.S. Department of Housing and Urban Development
Office of Public and Indian Housing

OMB Approval No. 2577-0157 (Exp. 11/30/2023)

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. HUD may not conduct or sponsor, and an applicant is not required to respond to a collection of information unless it displays a currently 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.

1. Name of Public Housing Agency/Indian Housing Authority (PHA/IHA) Housing Authority of Frankfort			3. State KY	5. Project Name KY36P003-501(22)
2. City Frankfort	4. Location Franklin County		6. Project Number KY36P003-501(22)	
7. Contract For CFP Modernization			8. Contract Time (Days)	
9. From (mm/dd/yyyy)		To (mm/dd/yyyy)		10. Contract Price \$
11. Number of Buildings	12. Number of Dwelling Units		13. Number of Rooms	

(Submit as many pages as necessary to cover the construction period.)	Year (yyy)						
	Month						
Actual Monthly Value, Work in Place	(\$)						
Actual Accumulated Progress	(%)						
Anticipated Monthly Value	(\$)						
Accumulated Scheduled Progress	(%)						

Submitted by	Contractor's Name		
	Title	Signature	Date (mm/dd/yyyy)
Approved by	PHAIHA		
	Title Executive Director / Contacting Officer		Date (mm/dd/yyyy)
Approved by	Architect		Date (mm/dd/yyyy)

**Instructions for Preparation of Construction Progress Schedule
Form HUD-5372**

General. The information required for items 1 through 6 can be obtained from the contract documents. (7.) Enter the type of work awarded by the PHA/IHA. This may be "general construction," "plumbing," "heating," "electrical," etc., depending upon prime contract awards. (8.) Enter the contract time in calendar days (unless otherwise stated). (9.) Enter the starting and completion dates as established by the Notice to Proceed.

Year and Month. At the top of the Schedule, space is provided for inserting the "Year" and "Month" to identify the times during which the work is to be performed.

Year. Enter the year when the Notice to Proceed was issued. If the starting date of the contract is such that the time assigned for completion will be carried into a succeeding year, two yearly designations will be shown, each centered over the applicable spread of time for each year.

Month. The body of the Schedule is divided into Columns, each representing a period of one month. Starting in the Column with the month stated in the Notice to Proceed, enter at the top of each column the successive months corresponding to the entire spread of the total contract time. The Schedule must contain monthly columns to cover the entire active period of contract, with extra columns for possible overruns in contract time.

Computation of Anticipated Monthly Value of Work in Place

Before presenting the form for approval, enter in each monthly column the dollar value (omit cents) of the increment of work anticipated to be put in place during that interval of time. This shall be the Contractor's best estimate of the rate of progress for each month. This section contains a suggested guide for the elapsed contract time vs. progress percentages.

The horizontal total of the monthly dollars shown for "Anticipated Monthly Value" must equal the contract price shown in the heading.

Accumulated Scheduled Progress – %

Entries on this line shall show in percentage of total completion the cumulative stage of progress that is scheduled to be reached at the end of each monthly interval. It is generally sufficient to state this anticipated progress to the nearest tenth of one percent, but for very large contracts it may be advisable to extend computations to the nearest hundredth.

The entry for the first month's column should be the % obtained by the anticipated monthly dollar value of work in place at the close of the first month being divided by the contract price.

The entry for the second month's column is obtained by the sum of the anticipated monthly dollar values of work in place for Columns 1 and 2 being divided by the contract price.

Enter in the third month's column the percentage computed similarly, using the sum of dollar values of work in place for Columns 1, 2, and 3. Continue in this manner for the succeeding monthly columns until "100" is reached in the final column.

Charting Actual Progress. The horizontal space extending through the monthly columns is divided into "Actual Monthly Value of Work in Place – \$" and "Actual Accumulated Progress – %." In each monthly column show the actual accumulated % of progress and the actual value of work in place for that month, as the work progresses. An anticipated complete shutdown at some stage in the work because of adverse seasonal weather or otherwise, as may occur in road work, excavation (grading), etc., is readily shown by a gap.

The Contractor's name shall be placed in the lower left-hand corner of the form, together with the signature and title of the employee who prepared the Schedule and the date. The form then shall be sent to the Architect for review. If the Architect considers that changes are necessary to make the Schedule more realistic, it will withhold approval and so advise the Contractor. When the form is acceptable and approved by the Architect, and the PHA/ IHA, it will be returned to the Contractor, who shall reproduce and submit the number and style of prints required by the PHA/ IHA.

Normal building construction experience has proved that the rate of overall progress (as measured by work in place) accelerates slowly at the start, reaches its peak in the middle third of the construction period, and tapers down at the close. The data following illustrate the general average expectancy of a well-balanced operation and may be used as a guide. If the proposed progress lies within reasonable range of these check points, the Schedule may be considered satisfactory insofar as the time-performance feature is involved.

% of Contract Time	% of Accumulated Progress
0	0
10	2
20	8
30	20
40	37
50	57
60	75
70	89
80	96
90	99
100	100

The foregoing percentages must be tempered by consideration of seasonal weather conditions and other known conditions which may affect the progress of the work. These percentages are offered for information only.

Schedule of Amounts for Contract Payments

U.S. Department of Housing and Urban Development
Office of Public and Indian Housing

OMB Approval No. 2577-0157
(Exp. 11/30/2023)

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. HUD may not conduct or sponsor, and an applicant is not required to respond to a collection of information unless it displays a currently 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 Housing Authority of Frankfort, Franklin County, KY	Project Number KY36P003-501(22)
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Name, Address, and Zip Code of Contractor

Nature of Contract CFP Modernization	Contract Number KY36P003-501(22)	
Approved for Contractor by	Title	Date (mm/dd/yyyy)
Approved for Architect by	Title Architect	Date (mm/dd/yyyy)
Approved for Owner by	Title Executive Director / Contracting Officer	Date (mm/dd/yyyy)

Item No. (1)	Description of Item (2)	Quantity (3)	Unit of Measure (4)	Unit Price in Place (5)	Amount of Sub-Item (6)	Amount of Principal Item (7)

Total Amount of Contract or Carried Forward \$

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)

Signature of authorized representative	Date signed (mm/dd/yyyy)
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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/BM," "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

Item No.	Division of Work	Item No.	Division of Work	Item No.	Division of Work
1	Bond	20	Rough Carpentry		Site Improvements
2	General Conditions	21	Metal Bucks	44	Retaining Walls
3	Demolition & Clearing	22	Caulking	45	Storm Sewers
		23	Weatherstripping	46	Sanitary Sewers
	Structures	24	Lath & Plastering-Drywall	47	Water Distribution System
4	General Excavation	25	Stucco	48	Gas Distribution System
5	Footing Excavation	26	Finish Carpentry	49	Electrical Distribution System
6	Backfill	27	Finish Hardware	50	Street & Yard Lighting
7	Foundation Piles & Caissons	28	Glass & Glazing	51	Fire & Police Alarm System
8	Concrete Foundations	29	Metal Doors	52	Fire Protection System
9	Concrete Superstructures	30	Metal Base & Trim	53	Street Work
10	Reinforcing Steel	31	Toilet Partitions	54	Yard Work
11	Waterproofing & Dampproofing	32	Floors	55	(Other)
12	Spandrel Waterproofing	33	Painting & Decorating	56	(Other)
13	Structural Steel	34	Screens		Equipment
14	Masonry	35	Plumbing	57	Shades & Drapery Rods
15	Stonework	36	Heating	58	Ranges
16	Miscellaneous & Ornamental Metal	37	Ventilating System	59	Refrigerators
17	Metal Windows	38	Electrical	60	Kitchen Cabinets & Work Tables
18	Roofing	39	Elevators	61	Laundry Equipment
19	Sheet Metal	40	Elevator Enclosures—Metal	62	(Other)
		41	Incinerators—Masonry & Parts	63	Punch List 1/2
		42	(Other)	64	Lawns & Planting
		43	(Other)		

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.

COST BREAKDOWN
 PROPOSAL REQUEST NO. _____
 Date: _____

CS Design Project No. 19003-22

<i>Project Title:</i>	Housing Authority of Frankfort				
<i>Program No.:</i>	KY36P003-501(22)				
<i>Contractor:</i>					
Item No.	<input type="text"/>	Addition	<input type="text"/>	Deduction	<input type="text"/>
<i>Description:</i>					
Material/Equipment					
Description	Unit	Quantity	Unit Cost	Total	
Total Materials					
Labor					
Classification	Hours	Quantity	Rate	Total	
Total Labor					
A: Subtotal Materials and Labor					
Overhead @ 5% of Line "A"					
Profit @ 10% of Line "A"					
General Contractor's Commission on Subcontractor @ 5% of Line "A"					
TOTAL COST					

Note: Complete this form for each individual trade item which changes the dollar amount of the contract as a part of this proposed change order.

Periodic Estimate for Partial Payment

**U.S. Department of Housing
and Urban Development**
Office of Public and Indian Housing

OMB Approval No. 2577-0157
(exp. 11/30/2023)

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. HUD may not conduct or sponsor, and an applicant is not required to respond to a collection of information unless it displays a currently 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 cost s, 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.

Name of Public Housing Agency Housing Authority of Frankfort	Periodic Estimate Number	Period From (mm/dd/yyyy) To (mm/dd/yyyy)
Location of Project Franklin County, KY		Project Number KY36P003-501(22)
Name of Contractor		Contract Number KY36P003-501(22)

Item Number (1)	Description of Item (2)	Completed to Date (3)
		\$
Value of Contract Work Completed to Date (Transfer this total to line 5 on back of this sheet)		\$

Instructions

Headings. 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.

Certification of the Contractor or Duly Authorized Representative

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) Housing Authority of Frankfort 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 "Balance Due This Payment" has been received.

1. Original Contract Amount			\$ _____
Approved Change Orders:			
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, <u>10</u> %	\$ _____		
10. Net amount earned to date (line 8 less line 9)		\$ _____	
11. Less: Previously earned (line 10, last Periodic Estimate)		\$ _____	
12. <u>Net</u> 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)
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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, all applicable accessibility requirements (including Section 504 and Title II of the Americans with Disabilities Act; and the Fair Housing Act and Title III of the Americans with Disabilities Act, if applicable), 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)
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I certify the information on this form and in any accompanying documentation is true and accurate. I acknowledge making, presenting, or submitting a false, fictitious, or fraudulent statement, representation, or certification may result in criminal, civil, and/or administrative sanctions, including fines, penalties, and confinement for up to 5 years, (18 U.S.C. §§ 287, 1001 and 31 U.S.C. §3729)

Schedule of Change Orders

U.S. Department of Housing and Urban Development
Office of Public and Indian Housing

OMB Approval No. 2577-0157
(exp. 11/30/2023)

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. HUD may not conduct or sponsor, and an applicant is not required to respond to a collection of information unless it displays a currently 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: 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.

Name of Public Housing Agency Housing Authority of Frankfort		Supporting Periodic Estimate for Partial Payment Number	Period From (mm/dd/yyyy) to (mm/dd/yyyy)
Location of Project Franklin County, KY			Project Number KY36P003-501(22)
Name of Contractor			Contract Number KY36P003-501(22)

Approved Change Orders		Additions		Deductions
Change Order Number (1)	Dated (mm/dd/yyyy) (2)	Total Amount of Change Order (3)	Value of Work Completed to Date (4)	Total Amount of Change Order (5)
		\$	\$	\$
Totals		\$	\$	\$

Authorized Project Representative	Date (mm/dd/yyyy)
-----------------------------------	-------------------

I certify that the information provided on this form and in any accompanying documentation is true and accurate. I acknowledge that making, presenting, or submitting a false, fictitious, or fraudulent statement, representation, or certification may result in criminal, civil, and/or administrative sanctions, including fines, civil penalties, and confinement for up to 5 years, (18 U.S.C. §§ 287, 1001 and 31 U.S.C. §3729)

Schedule of Materials Stored

U.S. Department of Housing
and Urban Development
Office of Public and Indian Housing

OMB Approval No. 2577-0157
(exp. 11/30/2023)

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. HUD may not conduct or sponsor, and an applicant is not required to respond to a collection of information unless it displays a currently 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.

Name of Public Housing Agency	Supporting Periodic Estimate for Partial Payment Number	Period From (mm/dd/yyyy) To (mm/dd/yyyy)	
Housing Authority of Frankfort			
Name and Location of Project		Project Number	
Franklin County, KY		KY36P003-501(22)	
Name of General Contractor		Contract Number	
		KY36P003-501(22)	
Name of Subcontractor		Subcontract Number	

Item Number*	Description and Quality	Quantity	Unit of Measure	Unit Price at Site	Total Price
Amount Carried Forward					\$

Total Amount or Amount Carried Forward **\$**

Prepared by (Contractor's Representative)	Date (mm/dd/yyyy)	Checked by (Owner's Representative)	Date (mm/dd/yyyy)

I certify that the information provided on this form and in any accompanying documentation is true and accurate. I acknowledge that making, presenting, or submitting a false, fictitious, or fraudulent statement, representation, or certification may result in criminal, civil, and/or administrative sanctions, including fines, penalties, and imprisonment.

Summary of Materials Stored

U.S. Department of Housing
and Urban Development
Office of Public and Indian Housing

OMB Approval No. 2577-0157
(exp. 11/30/2023)

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. HUD may not conduct or sponsor, and an applicant is not required to respond to a collection of information unless it displays a currently 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 Housing Authority of Frankfort	Supporting Periodic Estimate for Partial Payment Number	Period From (mm/dd/yyyy)	To (mm/dd/yyyy)	
Location of Project Franklin County, KY			Project Number KY36P003-501(22)	
Name of General Contractor			Contract Number KY36P003-501(22)	
Name of General Contractor or Subcontractor			Amounts	
General Contractor			\$	
Subcontractors			\$	
			Total	\$
			Less 10%	\$
			Net	\$

Prepared by	Date (mm/dd/yyyy)	Checked by	Date (mm/dd/yyyy)
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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 Housing Authority of Frankfort	By (Authorized Representative)	Title Architect	Date (mm/dd/yyyy)
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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)

form HUD-51004 (01/2011)



U.S. Department of Labor
 Wage and Hour Division

PAYROLL

(For Contractor's Optional Use; See Instructions at www.dol.gov/whd/forms/wh347instr.htm)

Persons are not required to respond to the collection of information unless it displays a currently valid OMB control number.

U.S. Wage and Hour Division
 Rev. Dec. 2008

NAME OF CONTRACTOR OR SUBCONTRACTOR

OMB No.: 1235-0008
 Expires: 07/31/2024

PAYROLL NO. PROJECT AND LOCATION PROJECT OR CONTRACT NO.
 Housing Authority of Frankfort KY36P003-501(22)

(1) NAME AND INDIVIDUAL IDENTIFYING NUMBER (e.g., LAST FOUR DIGITS OF SOCIAL SECURITY NUMBER) OF WORKER	(2) EXEMPTIONS WITH HOLDING	(3) WORK CLASSIFICATION	(4) DAY AND DATE	FOR WEEK ENDING			(7) GROSS AMOUNT EARNED	(8) DEDUCTIONS			(9) NET WAGES PAID FOR WEEK	
				(5) TOTAL HOURS				FICA	WITH- HOLDING TAX	OTHER		TOTAL DEDUCTIONS
				HOURS WORKED EACH DAY	OT OR ST.	RATE OF PAY						
						/						
						/						
						/						
						/						
						/						
						/						
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						/						

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 laborer 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 it 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 S3502, 200 Constitution Avenue, N.W., Washington, D.C. 20210

Date _____

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 _____ day of _____, and ending the _____ day of _____, that during the payroll period commencing on the _____ (Building or Work)

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) _____ from the full

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

EXCEPTION (CRAFT)

EXPLANATION

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 3729 OF TITLE 31 OF THE UNITED STATES CODE.

Instructions For Completing Payroll Form, WH-347

- OMB Control No. 1235-0008, Expires 07/31/2024.

General: Form WH-347 has been made available for the convenience of contractors and subcontractors required by their Federal or Federally-aided construction-type contracts and subcontracts to submit weekly payrolls. Properly filled out, this form will satisfy the requirements of Regulations, Parts 3 and 5 (29 C.F.R., Subtitle A), as to payrolls submitted in connection with contracts subject to the Davis-Bacon and related Acts.

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) requires 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 laborer 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.

Under the Davis-Bacon and related Acts, the contractor is required to pay not less than prevailing wage, including fringe benefits, as predetermined by the Department of Labor. The contractor's obligation to pay fringe benefits may be met either by payment of the fringe benefits to bona fide benefit plans, funds or programs or by making payments to the covered workers (laborers and mechanics) as cash in lieu of fringe benefits.

This payroll provides for the contractor to show on the face of the payroll all monies to each worker, whether as basic rates or as cash in lieu of fringe benefits, and provides for the contractor's representation in the statement of compliance on the payroll (as shown on page 2) that he/she is paying for fringe benefits required by the contract and not paid as cash in lieu of fringe benefits. Detailed instructions concerning the preparation of the payroll follow:

Contractor or Subcontractor: Fill in your firm's name and check appropriate box.

Address: Fill in your firm's address.

Payroll No.: Beginning with the number "1", list the payroll number for the submission.

For Week Ending: List the workweek ending date.

Project and Location: Self-explanatory.

Project or Contract No.: Self-explanatory.

Column 1 - Name and Individual Identifying Number of Worker: Enter each worker's full name and an individual identifying number (e.g., last four digits of worker's social security number) on each weekly payroll submitted.

Column 2 - No. of Withholding Exemptions: This column is merely inserted for the employer's convenience and is not a requirement of Regulations, Part 3 and 5.

Column 3 - Work Classifications: List classification descriptive of work actually performed by each laborer or mechanic. Consult classification and minimum wage schedule set forth in contract specifications. If additional classifications are deemed necessary, see Contracting Officer or Agency representative. An individual may be shown as having worked in more than one classification provided an accurate breakdown of hours worked in each classification is maintained and shown on the submitted payroll by use of separate entries.

Column 4 - Hours worked: List the day and date and straight time and overtime hours worked in the applicable boxes. On all contracts subject to the Contract Work Hours Standard Act, enter hours worked in excess of 40 hours a week as "overtime".

Column 5 - Total: Self-explanatory

Column 6 - Rate of Pay (Including Fringe Benefits): In the "straight time" box for each worker, list the actual hourly rate paid for straight time worked, plus cash paid in lieu of fringe benefits paid. When recording the straight time hourly rate, any cash paid in lieu of fringe benefits may be shown separately from the basic rate. For example, "\$12.25/.40" would reflect a \$12.25 base hourly rate plus \$0.40 for fringe benefits. This is of assistance in correctly computing overtime. See "Fringe Benefits" below. When overtime is worked, show the overtime hourly rate paid plus any cash in lieu of fringe benefits paid in the "overtime" box for each worker; otherwise, you may skip this box. See "Fringe Benefits" below. Payment of not less than time and one-half the basic or regular rate paid is required for overtime under the Contract Work Hours Standard Act of 1962 if the prime contract exceeds \$100,000. In addition to paying no less than the predetermined rate for the classification which an individual works, the contractor must pay amounts predetermined as fringe benefits in the wage decision made part of the contract to approved fringe benefit plans, funds or programs or shall pay as cash in lieu of fringe benefits. See "FRINGE BENEFITS" below.

Column 7 - Gross Amount Earned: Enter gross amount earned on this project. If part of a worker's weekly wage was earned on projects other than the project described on this payroll, enter in column 7 first the amount earned on the Federal or Federally assisted project and then the gross amount earned during the week on all projects, thus "\$163.00/\$420.00" would reflect the earnings of a worker who earned \$163.00 on a Federally assisted construction project during a week in which \$420.00 was earned on all work.

Column 8 - Deductions: Five columns are provided for showing deductions made. If more than five deduction are involved, use the first four columns and show the balance deductions under "Other" column; show actual total under "Total Deductions" column; and in the attachment to the payroll describe the deduction(s) contained in the "Other" column. All deductions must be in accordance with the provisions of the Copeland Act Regulations, 29 C.F.R., Part 3. If an individual worked on other jobs in addition to this project, show actual deductions from his/her weekly gross wage, and indicate that deductions are based on his gross wages.

Column 9 - Net Wages Paid for Week: Self-explanatory.

Totals - Space has been left at the bottom of the columns so that totals may be shown if the contractor so desires.

Statement Required by Regulations, Parts 3 and 5: While the "statement of compliance" need not be notarized, the statement (on page 2 of the payroll form) is subject to the penalties provided by 18 U.S.C. § 1001, namely, a fine, possible imprisonment of not more than 5 years, or both. Accordingly, the party signing this statement should have knowledge of the facts represented as true.

Items 1 and 2: Space has been provided between items (1) and (2) of the statement for describing any deductions made. If all deductions made are adequately described in the

"Deductions" column above, state "See Deductions column in this payroll." See "FRINGE BENEFITS" below for instructions concerning filling out paragraph 4 of the statement.

Item 4 FRINGE BENEFITS - Contractors who pay all required fringe benefits: If paying all fringe benefits to approved plans, funds, or programs in amounts not less than were determined in the applicable wage decision of the Secretary of Labor, show the basic cash hourly rate and overtime rate paid to each worker on the face of the payroll and check paragraph 4(a) of the statement on page 2 of the WH-347 payroll form to indicate the payment. Note any exceptions in section 4(c).

Contractors who pay no fringe benefits: If not paying all fringe benefits to approved plans, funds, or programs in amounts of at least those that were determined in the applicable wage decision of the Secretary of Labor, pay any remaining fringe benefit amount to each laborer and mechanic and insert in the "straight time" of the "Rate of Pay" column of the payroll an amount not less than the predetermined rate for each classification plus the amount of fringe benefits determined for each classification in the application wage decision. Inasmuch as it is not necessary to pay time and a half on cash paid in lieu of fringe benefits, the overtime rate shall be not less than the sum of the basic predetermined rate, plus the half time premium on basic or regular rate, plus the required cash in lieu of fringe benefits at the straight time rate. In addition, check paragraph 4(b) of the statement on page 2 the payroll form to indicate the payment of fringe benefits in cash directly to the workers. Note any exceptions in section 4(c).

Use of Section 4(c), Exceptions

Any contractor who is making payment to approved plans, funds, or programs in amounts less than the wage determination requires is obliged to pay the deficiency directly to the covered worker as cash in lieu of fringe benefits. Enter any exceptions to section 4(a) or 4(b) in section 4(c). Enter in the Exception column the craft, and enter in the Explanation column the hourly amount paid each worker as cash in lieu of fringe benefits and the hourly amount paid to plans, funds, or programs as fringe benefits. The contractor must pay an amount not less than the predetermined rate plus cash in lieu of fringe benefits as shown in section 4(c) to each such individual for all hours worked (unless otherwise provided by applicable wage determination) on the Federal or Federally assisted project. Enter the rate paid and amount of cash paid in lieu of fringe benefits per hour in column 6 on the payroll. See paragraph on "Contractors who pay no fringe benefits" for computation of overtime rate.

Public Burden Statement: We estimate that it will take an average of 55 minutes to complete this collection of information, 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 of information, including suggestions for reducing this burden, send them to the Administrator, Wage and Hour Division, U.S. Department of Labor, Room S3502, 200 Constitution Avenue, N.W., Washington, D.C. 20210.

Note: In order to view, fill out, and print PDF forms, you need Adobe® Acrobat® Reader® version 5 or later, which you may download for free at www.adobe.com/products/acrobat/readstep2.html.

END OF DOCUMENT

DOCUMENT 00909

CERTIFICATE AND RELEASE

Modernization No. **KY36P003-501(22)**

FROM: _____
Contractor's Name

TO: **Housing Authority of Frankfort** _____
Public Housing Agency

REFERENCE: Contract No(s). KY36P003-501(22) _____

entered into the _____ day of _____, _____,

between the **Housing Authority of Frankfort** _____,
Public Housing Agency

of Frankfort _____ Kentucky _____
City State

hereinafter called the LOCAL AUTHORITY,

and _____
Contractor's Name

of _____
City State

hereinafter called the CONTRACTOR, for the construction of

Administration Building Renovations _____

Project Sites No(s). KY003-04 _____

located in _____ Frankfort _____ Kentucky _____
City State

KNOW ALL MEN BY THESE PRESENTS:

1. The undersigned hereby certifies that there is due and payable under the contract and duly-approved Change Orders and modifications the undisputed balance of \$ _____.
2. The undersigned further certifies that, in addition to the amount set forth in Paragraph 1 hereof, there are outstanding and unsettled the following items which he claims are just and due and owing by the Local Authority to the Contractor:
 - a) _____
 - b) _____
 - c) _____
3. The undersigned further certifies that all work required under this contract has been performed in accordance with the terms thereof, and that there are no claims of laborers or mechanics for unpaid wages arising out of the performance of this contract, and that the wage rates paid by the contractor and all subcontractors were in conformity with the contract provisions relating to said wage rates.
4. Except for the amounts stated in Paragraphs 1 and 2 hereof, the undersigned has received from the Local Authority all sums of money payable to the undersigned under or pursuant to the aforementioned contract or any change or modification thereof.
5. That in consideration of the payment of the amount stated in Paragraph 1 hereof, the undersigned does hereby release the Local Authority from any and all claims arising under or by virtue of this contract except the amounts listed in Paragraph 2 hereof; provided, however, that if for any reason the Local Authority does not pay in full the amount stated in paragraph 1 hereof, said deduction shall not affect the validity of this release, but the amount so deducted shall be automatically included under Paragraph 2 as an amount which the Contractor has not released but will release upon payment thereof. The Contractor further certifies that upon payment of the amounts listed in Paragraph 2 hereof, and of any amount which may be deducted from Paragraph 1 hereof, he will release the Local Authority from any and all claims of any nature whatsoever arising out of said contract or modification thereof, and will execute such further releases of assurances as the Local Authority may request.

IN WITNESS WHEREOF, the undersigned has signed and sealed this instrument this

_____ day of _____, 20_____.

Contractor

Signature

(Seal Above)

_____, being first duly sworn on oath, deposes and says, first, that they
are the _____ of _____,
(Title) (Company Name)

and, second, that they have read the foregoing Certificate and Release by them subscribed as

_____ of _____.
(Title) (Company Name)

Affiant further states that the matters and things stated herein are, to the best of their
knowledge and belief, true.

Signature of Affiant

Subscribed and sworn to before me this _____ day of _____, 20_____.

_____, *Notary Public*

My commission expires _____.

END OF DOCUMENT

CERTIFICATE OF COMPLETION - CONSOLIDATED

Modernization No(s). KY36P003-501(22)

THIS IS TO CERTIFY that all work and materials have been carefully inspected by duly authorized representatives or agents of **The Housing Authority of Frankfort**, hereinafter called the *Local Authority*, and that _____, hereinafter called the *Contractor*, has furnished all labor, material, and services required for the Contract for the general modernization under Grant No. KY36P003-501(22), located in Frankfort, Kentucky, in accordance with the requirements of the Specifications and Drawings and Contract dated _____, between the Local Authority and the Contractor.

THIS IS TO CERTIFY:

1. That all work covered by this contract, originally required to be completed on _____, was actually substantially completed on _____;
2. That all changes permitted or required to be made, except minor modifications and field adjustments, have been authorized by written and duly approved Change Orders, and all stop orders have been confirmed and lifted in writing;
3. That all Proceed Orders have been supported by approved Change Orders equitably adjusting the contract price and/or time, where adjustment is indicated;
4. That Change Orders, No(s). _____, constitute the only amendments to the contract price and/or time;
5. That all certificates, bonds, guaranties, warranties, insurance, and tests required under the contract have been furnished or performed;
6. That the Local Authority has obtained from the Contractor the attached *Certificate and Release*, releasing the Local Authority in full for all further claims under this contract;
7. That all laborers and mechanics have been paid not less than the minimum wage rates as established in said contract, and that there have been no claims made for infringement of any patent;
8. That no claims of any nature by any laborer, mechanic, subcontractor, materialman, or vendor are outstanding against the Local Authority; and

9. That:

Date for completion fixed in the contract	_____
Date for completion as extended by Change Order	_____
Actual completion date of contract work	_____
Original contract price	\$ _____
Authorized additions	\$ _____
Sub Total	\$ _____
Authorized deductions excluding liquidated damages	\$ _____
ADJUSTED CONTRACT	\$ _____
Less: Total payments to Contractor	\$ _____
Total amount of Liquidated Damages	\$ _____
Total amount of Escrow	\$ _____
BALANCE DUE	\$ _____

10. That voucher for final payment in the amount of _____ (\$ _____), is due and payable.

Architect: C S Design, Inc.

Housing Authority of Frankfort

BY: _____
TITLE: _____
DATE: _____

BY: _____
TITLE: Executive Director
DATE: _____

Contractor: _____

BY: _____
TITLE: _____
DATE: _____

SCHEDULE OF PAYMENTS

<u>Request No.</u>	<u>Date</u>	<u>Amount</u>
1.	_____	\$ _____
2.	_____	\$ _____
3.	_____	\$ _____
4.	_____	\$ _____
5.	_____	\$ _____
6.	_____	\$ _____
7.	_____	\$ _____
8.	_____	\$ _____
9.	_____	\$ _____
10.	_____	\$ _____
TOTAL PAYMENTS TO CONTRACTOR		\$ _____

SCHEDULE OF CHANGE ORDERS

<u>Change Order No.</u>	<u>Date</u>	<u>Amount</u>
1. (ADD) (DEDUCT)	_____	\$ _____
2. (ADD) (DEDUCT)	_____	\$ _____
3. (ADD) (DEDUCT)	_____	\$ _____
4. (ADD) (DEDUCT)	_____	\$ _____
5. (ADD) (DEDUCT)	_____	\$ _____
BALANCE OF CHANGE ORDERS		\$ _____

END OF DOCUMENT

CERTIFICATE OF PROGRESS PAYMENT

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)

END OF DOCUMENT

DIVISION 1

GENERAL REQUIREMENTS

SECTION 01010

SUMMARY OF WORK

PART 1 GENERAL

1.1 REQUIREMENTS INCLUDED

- A. Title of Work and Type of Contract.
- B. Use of Premises.
- C. Owner Occupancy.
- D. Method of Contracting.
- E. Order and Timing of the Work.
- F. General Completion.
- G. Inspection Procedures.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- A. Work of this contract includes general construction renovations at one [1] development site within The Housing Authority of Frankfort. These sites are located in Frankfort, Kentucky. The general scope of work includes:

Administration Building Renovations

1.3 OWNER

- A. The Owner shall be The Housing Authority of Frankfort, as represented by David Small, Executive Director.

1.4 CONTRACT METHOD, CONTRACT TIME AND LIQUIDATED DAMAGES

- A. Construct the work under a lump sum bid contract.
- B. The contract period shall be 180 calendar days, beginning the date of the Notice to Proceed.
- C. If the Contractor fails to complete the Work within the time specified in the Contract, or any extension, the Contractor shall pay to the PHA as liquidated damages, Two Hundred Fifty Dollars [\$250.00] per calendar day of delay until such work is satisfactorily completed and accepted.

1.5 METHOD OF CONTRACT AWARD

- A. The contract will be awarded based on the lowest evaluated bid* following the application of deductive alternates in the manner specified in the Contractor's Proposal and Bid Form.
 - * If responsive bid is received by a Section 3 Business Concern refer to Document 00483, Section 3 Plan Materials.
- B. The Owner reserves the right to accept any bid, and to reject any and all bids, in accordance with applicable laws.
- C. Each Bidder shall be prepared, if so requested by the Owner, to present evidence of his experience, qualifications, and financial ability to carry out the terms of the contract. A bidder may be rejected if he does not have the experience or qualifications or financial ability necessary.
- D. The successful bidder shall be prepared to furnish bonds and insurance certificates, and to execute the Contract within ten [10] days after Notice of Award and return it to the A/E.

1.6 CONTRACTORS USE OF PREMISES

- A. The Contractor shall have complete and exclusive use of the existing garage area where the majority of the renovations are scheduled.
- B. Assume full responsibility for protection and safekeeping of products and materials stored on the site under this contract.
- C. Obtain and pay for use of additional storage or work areas needed for operations under this Contract.
- D. Daily work may not begin before 8:00 a.m. nor proceed beyond 5:00 p.m. inside the dwelling units. Outside work is not restricted to these hours. No work is permitted on weekends without PHA approval.
- E. Contractor is responsible for providing all storage areas and restroom facilities.
- F. All vehicles on-site must be company insured.

1.7 OWNER OCCUPANCY OF PREMISES

- A. Owner will occupy a portion of premises during entire construction period for conduct of his normal operations. Cooperate with Owner in scheduling operations to minimize conflict and to facilitate Owner usage.

1.8 ORDER AND TIMING OF THE WORK

A. General Renovations

1. Beginning with the Notice to Proceed, the Owner will turn over to the Contractor the existing garage area of the Administration Building scheduled for major renovations. The Contractor should immediately inspect the area to determine if any substantial change shall be made to the scope of work. At this time, the Contractor will assume all liabilities including security. If Contractor begins work before inspection is made, he will be responsible for correcting all deficiencies identified at final inspection regardless of whether or not they were included as part of the bid.
2. Upon completion and turnover of the renovated area, the Owner will make available to the Contractor the existing Administration Areas for minor renovations.
3. Exterior work (if applicable) is to be undertaken and completed by the Contractor in a timely manner and within the total contract time allowed.

B. General Construction Procedures:

1. Superintendent shall report daily to the PHA's main office and advise PHA of:
 - a. Number of Contractor's crew members present.
 - b. Subcontractor's on-site.
 - c. Materials delivered and/or to be delivered.
 - d. Work to be done that day.
2. Contractor shall give sufficient written notice to the PHA of its intention to turn over a particular unit to the PHA. Sufficient time shall be given to allow the PHA to in turn give sufficient notice to the tenants that will be moved. (A ten [10] day prior written notice to the PHA is recommended.)
3. Units will be accepted as they are completed. Contractor will give written notice to the PHA when all work in or on a given building or dwelling is complete. PHA and its architect will then conduct a pre-closeout review to develop a list of deficiencies. Contractor will then have one [1] week to correct items on the list of deficiencies at which time a final review will be conducted.

NOTE: All utilities must be in operation before a pre-closeout or final Review is performed.

1.9 GENERAL COMPLETION

- A. Following completion of the renovation work and prior to inspection of renovation areas by the Owner, the Contractor shall:

FOR INTERIOR RENOVATIONS:

1. Clean all glass (interior and exterior) in renovated areas.
2. Install light bulbs in all fixtures in renovated areas.
3. Broom clean and damp mop, new tile and plank vinyl floors in renovated areas.
4. Vacuum clean new carpeting in renovated areas.

5. Clean all new equipment and new plumbing fixtures.
6. Replace filters in all HVAC equipment.

FOR EXTERIOR RENOVATIONS/SITE IMPROVEMENTS:

1. Remove all on-site construction-related debris.
 2. Complete all finish grading and seeding.
 3. Clean all surfaces (including, but not limited to, buildings, walks, drives, parking areas, etc.) blemished as a result of construction.
- B. This work is not a separate pay item on the Bid Form, but must be incorporated as general overhead by the Contractor into his total bid.

1.10 UNIT REVIEW PROCEDURE

- A. When the renovated area is ready for final review, the Contractor shall notify the A/E by telephone and in writing, one [1] week in advance of each final review. The A/E will conduct the final review accompanied by a representative of the Contractor's staff and Owner's staff.
- B. Water, gas, and electrical service must be in operation during the final review. The Contractor will bear the cost of providing these services.
- C. Upon completion of the final review, a copy of the list of deficiencies will be given to the Owner and the Contractor. The Contractor will be notified and a follow up review of deficient items will be conducted no earlier than three [3] days after the final review. The Contractor will not be allowed additional time for delays as a result of the A/E's inability to conduct a final review, unless the time delay between the Contractor's notification (written) and the A/E's reviews exceeds five [5] working days.
- D. A Certificate of Completion for the building areas satisfactorily completed will be issued by the Owner to the Contractor. This will serve as his release of liability for security of the unit and as the document that establishes the final completion date for any determination regarding liquidated damages. This Certificate will not be issued until the Contractor has completed all items on the list of deficiencies to the satisfaction of the A/E.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF DOCUMENT

SECTION 01040

COORDINATION

PART 1 GENERAL

1.1 REQUIREMENTS INCLUDED

- A. Coordination of Work of the Contract.

1.2 RELATED REQUIREMENTS

- A. Section 01010 - Summary of Work.
- B. Section 01045 - Cutting and Patching.
- C. Section 01600 - Material and Equipment: Product options and substitutions.
- D. Section 01700 - Contract Closeout: Closeout submittals

1.3 DESCRIPTION

- A. Coordinate scheduling, submittals, and work of the various Sections of Specifications to assure efficient and orderly sequence of installation of construction elements, with provisions for accommodating items to be installed later.
- B. Coordinate sequence of work to accommodate Owner occupancy as specified in Section 01010 when applicable.

1.4 MEETINGS

- A. Hold coordination meetings and pre-installation conferences with personnel and subcontractors to assure coordination of work.

1.5 COORDINATION OF SUBMITTALS

- A. Schedule and coordinate submittals specified in Section 01300.
- B. Coordinate work of various Sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- C. Coordinate requests for substitutions to assure compatibility of space, of operating elements, and affect on work of other Sections.

1.6 COORDINATION OF SPACE

- A. Coordinate use of Project space and sequence of installation of mechanical, plumbing, and electrical work which is indicated diagrammatically on Drawings. Follow routings shown for pipes, ducts, and conduits as closely as practicable, with due allowance for available physical space; make runs parallel with lines of building. Utilize space efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

- SECTION 01040
- B. In finished areas (except as otherwise shown) conceal pipes, ducts, and wiring in the construction. Coordinate locations of fixtures and outlets with finish elements.

1.7 COORDINATION OF CONTRACT CLOSEOUT

- A. Coordinate completion and cleanup of work of separate sections in preparation for Substantial Completion, and, if applicable, portions of work designated for Owner partial occupancy designated in Section 01010.
- B. After Owner occupancy of premises, coordinate access to site by various sections for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.
- C. Assemble and coordinate closeout submittals specified in Section 01700.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01045

CUTTING AND PATCHING

PART 1 GENERAL

1.1 REQUIREMENTS INCLUDED

- A. Requirements and limitations for cutting and patching of Work.

1.2 RELATED REQUIREMENTS

- A. Section 01010 - Summary of Work: Work by Owner or by separate contractors.
- B. Section 01600 - Materials and Equipment: Substitutions.
- C. Individual Specifications Sections:
 - 1. Cutting and patching incidental to work of the Section.
 - 2. Advance notification to other Sections of openings required in work of those Sections.
 - 3. Limitations on cutting structural members.

1.3 DESCRIPTION

- A. "Cutting and patching" is hereby defined to include, but is not necessarily limited to, the cutting and patching of nominally completed and previously existing work, in order to accommodate the coordination of work, or the installation of other work, or to uncover other work for access or inspection, or to obtain samples for testing, or for similar purposes; and is defined to exclude integral cutting and patching during the manufacturing, fabricating, erecting and installing process for individual units of work. Drilling the work to install fasteners and similar operations is excluded from the definition of cutting and patching.
- B. Refer to other sections of these specifications for specific cutting and patching requirements and limitations applicable to individual areas of work.
- C. Do not cut and patch structural work in a manner resulting in a reduction of load carrying capacity or load/deflection ratio.
- D. Do not cut and patch operational elements and safety-related components in a manner resulting in a reduction of capacities to perform in the manner intended or resulting in decreased operational life, increased maintenance, or decreased safety.
- E. Do not cut and patch work which is exposed on the exterior or exposed in occupied spaces of the building, in a manner resulting in a reduction of visual qualities or resulting in substantial evidence of the cut and patch work, but as judged solely by the Architect. Remove and replace work judged by the Architect to be cut and patched in a visually unsatisfactory manner.

1.4 SUBMITTALS

- A. Submit written request in advance of cutting or alteration which affects:
1. Structural integrity of any element of Project.
 2. Integrity of weather-exposed or moisture-resistant element.
 3. Efficiency, maintenance, or safety of any operational element.
 4. Visual qualities of sight-exposed elements.
 5. Work of Owner or separate contractor.
- B. Include in written request:
1. Identification of Project.
 2. Location and description of affected work.
 3. Necessity for cutting or alteration.
 4. Affect on other work on structural integrity of the project.
 5. In the description of proposed work, designate:
 - a. Scope of cutting and patching.
 - b. Contractor and trades to execute work.
 - c. Products to be used.
 - d. Extent of refinishing.
 6. Alternatives to cutting and patching.
 7. Designation of party responsible for cost of cutting and patching.
 8. Effect on work of Owner or separate contractor.
 9. Written permission of affected separate contractor.
 10. Date and time work will be executed to provide for observation.
 11. Submit cost estimate prior to cutting and patching done on instruction of the A/E.

1.5 PAYMENT FOR COSTS

- A. The Contractor shall be responsible for costs caused by ill-timed or defective work, or work not complying with the Contract Documents, including costs for additional services of the A/E at a rate of \$100.00 per hour and all travel related expenses.
- B. The Owner shall be responsible for work at the instruction of the A/E, other than defective or nonconforming work.

PART 2 PRODUCTS

2.1 MATERIALS

- A. For Replacement of Work Removed: Comply with the specifications for type of work to be done.
- B. Existing Work Being Placed or Repaired: Match existing.
- C. For Any Change in Materials: Submit request for substitution under provisions of Section 01600.

PART 3 EXECUTION

3.1 GENERAL

- A. Execute cutting, fitting, and patching including excavation and fill, to complete Work, and to:
 - 1. Fit the several parts together, to integrate with other work.
 - 2. Uncover work to install ill-timed work.
 - 3. Remove and replace defective work.
 - 4. Remove samples of installed work as specified for testing.
 - 5. Remove and replace work not conforming with the requirements of the Contract Documents.
 - 6. Provide openings in elements of Work for penetrations of mechanical and electrical work.
 - 7. Install specified work in existing construction.
- B. In addition to contract requirements, upon written instructions of the A/E:
 - 1. Uncover work to provide for the A/E's observation of covered work.
 - 2. Remove samples of installed materials for testing.
 - 3. Remove work to provide for alteration of existing work.
- C. Do not endanger any work by cutting or altering work or any part of it.
- D. Do not cut or alter work of another Contractor without written consent of the A/E.

3.2 INSPECTION

- A. Inspect existing conditions, including elements subject to damage or movement during:
 - 1. Cutting and patching.
 - 2. Excavating and backfilling.
- B. After uncovering, inspect conditions affecting performance of work and installation of new materials.
- C. Beginning of cutting or patching means acceptance of existing conditions.

3.3 PREPARATION

- A. Provide shoring, bracing, and supports to assure structural integrity of surroundings, devices, and methods to protect other portions of Project from damage.
- B. Provide protection from elements for areas which may be exposed by uncovering work; maintain excavations free of water.

3.4 PERFORMANCE

- A. Execute work by methods to avoid damage to other work, and which will provide proper surfaces to receive patching and finishing and prevent settlement.

- B. Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements and sight-exposed surfaces.
- C. Cut rigid materials using masonry saw or core drill. Pneumatic tools shall not be allowed without prior approval.
- D. Restore work with new products in accordance with requirements of Contract Documents.
- E. Fit work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- F. At penetrations of fire-rated wall, ceiling, or floor construction, completely seal voids with fire-rated material, full thickness of the construction element.
- G. Execute fitting and adjustment of products to provide finished installation to comply with specified tolerances and finishes.
- H. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for an assembly, refinish entire area.

END OF SECTION

SECTION 01300

SUBMITTALS

PART 1 GENERAL

1.1 REQUIREMENTS INCLUDED

- A. Procedures.
- B. Construction Progress Schedules.
- C. Schedule of Values.
- D. Shop Drawings.
- E. Product Data.
- F. Samples.
- G. Manufacturers' Instructions.
- H. Manufacturers' Certificates.

1.2 RELATED REQUIREMENTS

- A. Section 01010 - Summary of Work
- B. Section 01600 - Material and Equipment: Contractor's list of Products.
- C. Section 01700 - Contract Closeout: Closeout submittals.

1.3 QUALITY ASSURANCE

- A. Description of Work Included
 - 1. Wherever possible throughout the Contract Documents, the minimum acceptable quality of workmanship and materials has been defined by a manufacturer's name and catalogue number, reference to recognized industry and government standards, or description of required attributes and performance.
 - 2. To ensure that the specified products are furnished and installed in accordance with the design intent, procedures have been established for advance submittal of design data and for their review by the A/E.
 - 3. Make all submittals required by the Contract Documents, and revise and resubmit as necessary to establish compliance with the specified requirements.

B. Coordination of Submittals

1. Prior to each submittal, carefully review and coordinate all aspects of each item being submitted, and verify that each item and the submittal for it conforms in all respects with the requirements of the bidding instruments.
2. Shop drawings and submittals shall bear the stamp of approval of the Contractor as evidence that this coordination has been performed. Submittals without this stamp of approval will not be considered but will be returned for proper resubmission.

C. Certificates of Compliance

1. Certify that all materials used in the work comply with all specified provisions thereof. Certification shall not be construed as relieving the Contractor from the responsibility to furnish satisfactory materials if, after tests are performed on selected samples, the material is found not to meet specified requirements.
2. Show on each certification the name and location of the work, the name and address of the Contractor, the quantity and date or dates of shipment or delivery to which the certificate applies, and the name of the manufacturing or fabricating company. Certification shall be in the form of a letter or company-standard forms containing all required data. Certificates shall be signed by an officer of the manufacturing or fabricating company.
3. In addition to the above information, all laboratory test reports submitted with certificates of compliance shall show the date or dates of testing, the specified requirements for which testing was performed, and the results of the test or tests.

1.4 PROCEDURES

A. Hand Deliver, mail or email submittals to:

C S Design, Inc.
1088 Wellington Way
Lexington, Kentucky 40513

Attention: Mr. Wayne L. Clayton
wlclayton@csdesigninc.com

B. Transmit each item under Submittal Form (See Section 01310). Identify Project, Contractor, subcontractor, major supplier; identify pertinent Drawing sheet and detail number, and Specification Section number, as appropriate. Identify deviations from Contract Documents.

C. **Submittals sent by facsimile will not be accepted.**

D. Within ten (10) days of notification of award of the Contract, submit the following:

1. Document 00620 - Performance Bond (must be submitted before contract will be executed).
2. Document 00621 - Payment Bond (must be submitted before contract will be executed).

3. Document 00901 – Schedule of Amounts for Contract Payments, as described elsewhere in this section.
 4. Document 02080 – Asbestos Abatement Procedures, if required.
 5. Before beginning any on-site construction, submit insurance certificates.
- E. Within twenty (20) days after execution of the Contract between Owner and General Contractors submit:
1. Complete construction progress schedule as described elsewhere in this section.
 2. Two copies of the schedule of shop drawing submittals as described elsewhere in this section.
 3. The job sign, if required by the Contract Documents.
- F. Within thirty (30) days after execution of the Contract between Owner and General Contractor, submit:
1. All required samples for color selection under 1 cover letter or transmittal letter.
 2. Comparative literature and samples required for architectural product substitutions.
 3. Any mock-up or model of the work to be built that may be required by the Contract Documents.
- G. Comply with progress schedule for submittals related to work progress. Coordinate submittal of related items.
- H. After A/E review of submittal, revise and resubmit as required, identifying changes made since previous submittal.
- I. Distribute copies of reviewed submittals to concerned persons. Instruct recipients to promptly report any inability to comply with provisions.

1.5 CONSTRUCTION PROGRESS SCHEDULES

- A. Submit horizontal bar chart with separate bar for each major trade or operation, identifying first work day of each week.
- B. Show complete sequence of construction by activity, identifying work of separate stages and other logically grouped activities. Show projected percentage of completion for each item of work as of time of each Application for Progress Payment.
- C. Show submittal dates required for shop drawings, product data, and samples, and product delivery dates, including those furnished by Owner and those under Allowances.

1.6 SCHEDULE OF AMOUNTS FOR CONTRACT PAYMENTS

- A. Submit typed schedule on Document 00901, bound in this manual.
- B. Format: Table of Contents of this Project Manual. Identify each line item with number and title of the major Specification Sections.

- C. Include in each line item amount of Allowances specified in Section 01021 if applicable. For unit cost Allowances, give quantities measured from Contract Documents multiplied by the unit cost equal to the total for the item.
- D. Include separate line items for amounts of Contractor's Bonds & Insurance, and General Conditions.
- E. Provide a sub-schedule for each separate stage of work specified in Section 01010 when applicable.
- F. Revise schedule to list change orders, for each application for payment.
- G. Show columns for labor, material, overhead and profit, and freight for each line item of work.

1.7 PRODUCT DATA

- A. Mark each copy to identify applicable products, models, options, and other data; supplement manufacturers' standard data to provide information unique to the work.
- B. Submit the number of copies which Contractor requires, plus 2 original copies which will be retained by A/E.
- C. Submit 2 copies, minimum, of originals. Photo copying of manufacturer's literature to provide required number of submittals is permitted. Photo copying from facsimiles of manufacturer's literature will not be permitted.

1.8 MANUFACTURER'S INSTRUCTIONS

- A. When required in individual specification section, submit manufacturer's printed instructions for delivery, storage, assembly, installation start-up, adjusting, and finishing, in quantities specified for product data.

1.9 SAMPLES

- A. Submit full range of manufacturers' standard colors, textures, and patterns for A/E's selection.
- B. Submit samples to illustrate functional characteristics of the product, with integral parts and attachment devices. Coordinate submittal of different categories for interfacing work.
- C. Include identification on each sample, giving full information.
- D. Submit the number specified in respective specification section; one (1) will be retained by A/E. Reviewed samples which may be used in the work are indicated in the Specification Section.

1.10 FIELD SAMPLES

- A. Provide field samples of finishes at Project as required by individual Specifications section. Install sample complete and finished. Acceptable samples in place may be retained in completed work.

PART 2 PRODUCTS

2.1 SUBMITTAL SCHEDULE

- A. **General:** Compile a complete and comprehensive schedule of all submittals anticipated to be made during the progress of the work. Include a list of each type of item from which the Contractor's drawings, shop drawings, certificates of compliance, material samples, guarantees, or other types of submittals are required. Upon approval by the A/E, this schedule will become part of the Contract, and the Contractor will be required to adhere to the schedule except when specifically otherwise permitted.
- B. **Coordination:** Coordinate the schedule with all necessary subcontractors and materials suppliers to ensure their understanding of the importance of adhering to the approved schedule and their ability to so adhere. Coordinate as required to ensure the grouping of submittals as described in 3.2.
- C. **Revisions:** Revise and update the schedule on a monthly basis as necessary to reflect conditions and sequences. Promptly submit the revised schedules to the A/E for review and comment.

2.2 SHOP DRAWINGS AND COORDINATION OF DRAWINGS

- A. **Shop Drawings**
 - 1. **Scale and Measurements:** Make all shop drawings accurately to a scale large enough to show all pertinent aspects of the item and its method of connection to the work.
 - 2. **Type of Prints** Submit the number of opaque reproductions which the Contractor requires plus two (2) copies which will be retained by A/E.
 - 3. **Reproduction of Review Shop Drawings:** The printing and distribution of review shop drawings for the A/E's use will be by the A/E. All review comments of the A/E will be shown when it is returned to the Contractor. The Contractor shall make and distribute all copies required for his purposes.
 - 4. **Shop drawings prepared from facsimiles will not be permitted.** However electronic documents (.pdf format) will be accepted as long as information is limited only to information relative to this project.

2.3 MANUFACTURERS' LITERATURE

- A. **General:** Where the contents of submitted literature from the manufacturer includes data not pertinent to the submittal, clearly indicate which portion of the contents is being submitted for review.
- B. **Number of Copies Required:** Submit the number of copies that are required to be returned plus 2 copies to be retained by the A/E.

2.4 SAMPLES

- A. Accuracy of Samples: Samples shall be of the precise article proposed to be furnished.
- B. Number of Samples Required: Unless otherwise specified, submit all samples in the quantity that is required to be returned plus 1 copy to be retained by the A/E.
- C. Reuse of Samples: In situations specifically so approved by the A/E, the A/E's retained sample may be used in the construction as one of the installed items.

2.5 COLORS AND PATTERNS

- A. Unless the precise color and pattern are specifically described in the Contract Documents, and whenever a choice of color or pattern is available in a specified product, submit accurate color and pattern charts to the A/E for review and selection.

PART 3 EXECUTION

3.1 IDENTIFICATION OF SUBMITTALS

- A. General: Consecutively number all submittals as well as reference specification section numbers. Each submittal shall be accompanied with a Submittal Form, section 01310, that itemizes all data transmitted and that contains all pertinent information required for identification and checking of submittals.
- B. Internal Identification: On at least the first page of each copy of each submittal, and elsewhere as required for positive identification, clearly indicate the submittal number in which the item was included.
- C. Resubmittals: When material is resubmitted for any reason, transmit under a new Submittal Form and with a new submittal number.
- D. Submittal Log: Maintain an accurate submittal log for the duration of the Contract that shows the current status of all submittals at all times. Make the submittal log available for the A/E's review upon request.

3.2 COORDINATION OF SUBMITTALS

- A. General:
 - 1. Prior to submittal for approval, use all means necessary to coordinate fully all material, including but not necessarily limited to the following:
 - 2. Determine and verify all interface conditions, catalogue numbers, and similar data.
 - 3. Coordinate with other trades as required.
 - 4. Submittals shall contain rating data on equipment and accessories. Features shall be described as specified herein, and capacities shall be stated in the same terms as those specified.
 - 5. Note deviations from the Contract Documents on the submittal so that, if acceptable, suitable action may be taken for proper adjustment. If no

deviations are noted, it is assumed that the material fully meets the specified requirements; therefore, the Contractor shall not be relieved of the responsibility for executing the work in accordance with the contract.

- B. **Grouping of Submittals:** Unless otherwise specified, make all submittals in groups containing all associated items to ensure that information is available for checking each item when it is received. Partial submittals may be rejected as not complying with the provisions of the Contract Documents, and the Contractor shall be strictly liable for all delays so occasioned.

3.3 TIMING OF SUBMITTALS

- A. **General:**
 - 1. Make all submittals far enough in advance of scheduled dates for installation to provide all time required for reviews, for securing necessary approvals, for possible revisions and resubmittals, and for placing orders and securing delivery.
 - 2. Submit shop drawings in accordance with the approved schedule of shop drawing submittals.
- B. **A/E's Review Time:** In scheduling, allow at least ten (10) working days for review by the A/E following his receipt of the submittal.
- C. **Delays:** Delays caused by tardiness in receipt of submittals will not be an acceptable basis for extension of the Contract completion date.

3.4 A/E'S REVIEW

- A. **Revisions:**
 - 1. Make all revisions required by the A/E, including those relating to artistic effort. If the Contractor considers any required revision to be a change, he shall so notify the A/E as provided for under "Changes" in the General Conditions. Show each drawing revision by number, date, and subject in a revision block on the drawing. Make only those revisions directed or approved by the A/E.
 - 2. After making the corrections required by the A/E, file five (5) corrected copies with the A/E, and furnish additional copies as needed.
 - 3. The A/E's approval of submittals does not relieve the Contractor from responsibility for their correctness.
- B. **Revisions After Approval:** When a submittal has been reviewed by the A/E, resubmittal for substitutions of materials or equipment will not be considered unless accompanied by an acceptable explanation as to why the substitution is necessary. Review of substitutions under these conditions shall be considered an "Additional Service" under the provisions of the "Model Form of Agreement Between Owner and Design Professional". The Contractor may be required to reimburse the Owner for all costs associated with review of submittals for substituted materials.

END OF DOCUMENT

SECTION 01310

SUBMITTAL FORM

Submittal No. _____

Date of Transmittal: _____

Job Name: Housing Authority of Frankfort

Job Number: KY36P003-501(22)

Number of Copies: _____

Spec Section No.: _____

Description: _____

This Submittal has been reviewed by Contractor By: _____ Date: _____

Signature: _____

Subcontractor's Name: _____

Contractor's Name: _____

Address: _____

Address: _____

Phone: _____ Fax: _____

Phone: _____ Fax: _____

Supplier's Name: _____

Manufacturer's Name: _____

Address: _____

Address: _____

Phone: _____ Fax: _____

Phone: _____ Fax: _____

- REVIEWED
- REVISE & RESUBMIT
- REJECTED
- FURNISH AS CORRECTED

- APPROVED BY A/E.
- DISAPPROVED BY A/E.

Corrections or Comments made on the shop drawings during this review do not relieve contractor from compliance with requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction coordinating his work with that of all other trades and performing his work in a safe and satisfactory manner.

BY: _____

DATE: _____

END OF DOCUMENT

SECTION 01500

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 GENERAL

1.1 REQUIREMENTS INCLUDED

- A. Electricity, Lighting
- B. Heat, Ventilation
- C. Telephone Service
- D. Water
- E. Sanitary Facilities
- F. Barriers
- G. Enclosures
- H. Protection of Installed Work
- I. Water Control
- J. Cleaning During Construction
- K. Field Offices and Sheds

1.2 RELATED REQUIREMENTS

- A. Section 01010 - Summary of Work: Work sequence and Contractor's use of premises.
- B. Section 01710 - Construction and Final Cleaning.

1.3 ELECTRICITY, LIGHTING

- A. Electric power may be used in area where work is being performed. If usage is deemed excessive by the Owner, adequate compensation will be requested of the Contractor. Provide service required for construction operations to allow service and lighting by means of construction-type power cords.
- B. Provide lighting for construction operations.

1.4 HEAT AND VENTILATION

- A. Provide as required to maintain specified conditions for construction operations, to protect materials and finishes from damage due to temperature or humidity. Follow any requirements set forth elsewhere in these specifications.

1. Whenever fixtures, water services or items subject to damage from cold have been installed, maintain the temperature above 50 degrees F.
 2. The use of temporary heating equipment producing carbon monoxide and carbon dioxide is prohibited.
- B. Prior to operation of permanent facilities for temporary purposes, verify that installation is approved for operation, and that filters are in place. Provide and pay for operation, maintenance, utilities, and fully service all equipment including cleaning filters, at the time the building is turned over to the Owner.
- C. Provide ventilation of enclosed areas to cure materials, to disperse humidity, and to prevent accumulations of dust, fumes, vapors, or gases.
- D. No open fires will be permitted.

1.5 VOICE COMMUNICATION

- A. Provide cellular telephone and/or pager to the Project Superintendent. Provide A/E and Owner with all contact numbers.

1.6 WATER

- A. Water may be used from source at Owner's administration/community building and/or maintenance facility by use of hoses (provided by Contractor). If usage is deemed excessive by the Owner, adequate compensation will be requested of the Contractor.
- B. Remove temporary water facilities when construction is completed.

1.7 SANITARY FACILITIES

- A. Provide and maintain required temporary facilities and enclosures for job personnel that:
1. Are weathertight, clean, and sanitary.
 2. Are provided with either natural light and ventilation or artificial light and mechanical ventilation.
 3. Are provided with toilet tissue in a suitable holder.
 4. Comply with applicable legal and health requirements.

Remove temporary toilet facilities when work is complete.

- B. The toilet facilities inside the Administration Offices cannot be used by the Contractor. If these toilet facilities are found to be used by the Contractors then the General Contractor must pay \$100.00 to the Owner for each occurrence that is discovered by the Owner's Project Manager.

1.8 BARRIERS

- A. Provide as required to prevent public entry to construction areas to provide for Owner's use of site, and to protect existing facilities and adjacent properties from damage from construction operations.
- B. Provide barriers around trees and plants designated to remain. Protect against vehicular traffic, stored materials, dumping, chemically injurious materials, and puddling or continuous running water.

1.9 ENCLOSURES

- A. Provide temporary weather-tight closures of openings in exterior surfaces to provide acceptable working conditions and protection for materials, to allow for temporary heating, and to prevent entry of unauthorized persons. Provide doors with self-closing hardware and locks.
- B. Provide temporary partitions and ceilings as required to separate work areas from Owner occupied areas, to prevent penetration of dust and moisture into Owner occupied areas, to prevent damage to existing areas and equipment. Construction: Framing and sheet materials with closed joints and sealed edges at intersections with existing surfaces.

1.10 TEMPORARY ACCESS DRIVES

- A. Provide temporary surfacing for access to all construction areas. Methods and equipment are the Contractor's option. Remove at the completion of the work.

1.11 TEMPORARY CONTROLS

- A. Coordinate, schedule, and perform work to cause the least practical interference with the public, fire protection service, public utility service, and Owner's operations. Coordinate all connections, cut-ins, alterations, or other interruption with the Owner's Project Manager and utility service. Notify the representative 48 hours in advance and cooperate with him in minimizing the interruptions.
- B. Comply with the local requirements of EPA, the health department, or other regulatory requirement for construction operations relating to noise, dust, and pollution controls.

1.12 PROTECTION OF INSTALLED WORK

- A. Provide temporary protection for installed products. Control traffic in immediate area to minimize damage.
- B. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings. Protect finished floors and stairs from traffic, movement of heavy objects, and storage.
- C. Prohibit traffic and storage on waterproofed and roofed surfaces, on lawn and landscaped areas.

1.13 WATER CONTROL

- A. Grade site to drain. Maintain excavations free of water. Provide and operate pumping equipment.

1.14 CLEANING DURING CONSTRUCTION

- A. Construction cleaning shall be as specified in Section 01710.

1.15 FIELD OFFICES AND SHEDS

- A. Offices: Due to the size of this project, the Contractor will not be required to provide a field office. However, the Contractor must comply with the following:
 - 1. Provide voice communication system to the Project Superintendent as outlined in Paragraph 1.5.
 - 2. Maintain shop drawing files in vehicle that is available on site.
 - 3. Maintain Record Drawings in vehicle that is available on site.
- B. Storage Sheds for Tools, Materials, and Equipment: Weather-tight, with heat and ventilation for Products requiring controlled conditions, with adequate space for organized storage and access, and lighting for inspection of stored materials.

1.16 REMOVAL

- A. Remove temporary materials, equipment, services, and construction prior to Substantial Completion inspection.
- B. Clean and repair damage caused by installation or use of temporary facilities. Remove underground installations to a depth of 2 feet; grade site as indicated. Restore existing facilities used during construction to specified, or to original, condition.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01546

SAFETY AND HEALTH

PART 1 GENERAL

1.1 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.
- B. Code of Federal Regulations (CFR):
 - 1. OSHA General Industry Safety and Health Standards (29 CFR 1910), Publication V2206; OSHA Construction Industry Standards (29 CFR 1926). One source of these regulations is OSHA Publication 2207, which includes a combination of both Parts 1910 and 1926 as they relate to construction safety and health. It is for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.
 - 2. National Emission Standards for Hazardous Air Pollutants (40 CFR, Part 61).
 - 3. Environmental Protection Agency (EPA) Final Rule (40 CFR Part 761) dated July 17, 1985.
- C. Federal Standard (Fed. Std.):
 - 1. 313A Material Safety Data Sheets, Preparation and the Submission of.

1.2 WORK COVERED BY THIS SECTION

- A. This section is applicable to all work covered by this contract.

1.3 DEFINITION OF HAZARDOUS MATERIALS

- A. Refer to hazardous and toxic materials/substances included in Subparts H and Z of 29 CFR 1910; and to others as additionally defined in Fed. Std. 313. Those most commonly encountered include asbestos and lead paint, but may include others. The most likely products to contain asbestos are sprayed-on fireproofing, insulation, boiler lagging, pipe covering and likely products to contain lead paint are window sills, door frames, doors, and exterior paint.

1.4 QUALITY ASSURANCE

- A. **Safety Meeting:** Representatives of the Contractor shall meet with the Owner and his/her representative(s) prior to the start of work under this contract for the purpose of reviewing the Contractor's safety and health programs and discussing implementation of all safety and health provisions pertinent to the work to be performed under the contract. The Contractor shall be prepared to discuss, in detail, the measures he/she intends to take in order to control any unsafe or unhealthy conditions associated with the work to be performed under the contract. If directed by the Owner, this meeting may be held in conjunction with other meetings which are scheduled to take place prior to start of work under this contract. The level of detail

for the safety meeting is dependent upon the nature of the work and the potential inherent hazards. The Contractor's principal onsite representative(s), the general superintendent and his/her safety representative(s) shall attend this meeting.

- B. **Compliance with Regulations:** All work, including contact with and handling of hazardous materials, the disturbance or dismantling of structures containing hazardous materials and/or the disposal of hazardous materials shall comply with the applicable requirements of 29 CFR 1926/1910 and 40 CFR 761. Work involving the disturbance, dismantling of asbestos or asbestos containing materials; the demolition of structures containing asbestos; and/or the disposal and removal of asbestos, shall also comply with the requirements of 40 CFR, Part 61, Subparts A and M. All work shall comply with applicable state and municipal safety and health requirements. Where there is a conflict between applicable regulations, the most stringent shall apply.
- C. **Contractor Responsibility:** The Contractor shall assume full responsibility and liability for compliance with all applicable regulations pertaining to the health and safety of personnel during the execution of work, and shall hold the Owner harmless for any action on his/her part or that of his/her employees or subcontractors, which results in illness, injury or death.

1.5 SUBMITTALS

- A. **Accident Reporting:** A copy of each accident report, which the Contractor or subcontractors submit to their insurance carriers, shall be forwarded through the Construction Engineer to the Owner as soon as possible, but in no event later than 7 calendar days after the day the accident occurred.
- B. **Permits:** If hazardous materials are disposed of off site, submit copies of permits from applicable, Federal, state, or municipal authorities and necessary certificates that the material has been disposed of in accordance with regulations.
- C. **Other Submittals:** If agreed to in writing at the safety meeting, other submittals shall be required. One such submittal which may be included is a plan of action for handling hazardous materials, which shall contain the following:
 - 1. Number, type, and experience of employees to be used for the work.
 - 2. Description of how applicable safety and health regulations and standards are to be met.
 - 3. Type of protective equipment and work procedures to be used.
 - 4. Emergency procedures for accidental spills or exposures.
 - 5. Procedures for disposing of or storing the toxic/ hazardous materials.
 - 6. Identification of possible hazards, problems, and proposed control mechanisms.
 - 7. Protection of public or others not related to the operation.
 - 8. Interfacing and control of subcontractors, if any.
 - 9. Identifications of any required analyses, test demonstrations, and validation requirements.
 - 10. Method of certification for compliance.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- A. Special facilities, devices, equipment, clothing, and similar items used by the Contractor in the execution of work shall comply with the applicable regulations.

2.2 HAZARDOUS MATERIALS

- A. The Contractor shall bring to the attention of the Owner any material suspected of being hazardous which he/she encounters during execution of the work. A determination will be made by the Owner as to whether the Contractor shall perform tests to determine if the material is hazardous. If the Owner directs the Contractor to perform tests, and/or if the material is found hazardous and additional protective measures are needed, a contract change may be required, subject to applicable provisions of this contract.

PART 3 EXECUTION

3.1 STOP WORK ORDERS

- A. When the Contractor or his/her subcontractors are notified by the Owner's Representative(s) of any noncompliance with the provisions of the contract and the action(s) to be taken, the Contractor shall immediately, if so directed, or within 48 hours after receipt of a notice of violation correct the unsafe or unhealthy condition. If the Contractor fails to comply promptly, all or any part of the work being performed may be stopped by the Owner or his/her representative(s) with a "Stop Work Order." When, in the opinion of the Owner or his/her representative(s), satisfactory corrective action has been taken to correct the unsafe and unhealthy condition, a start order will be given immediately. The Contractor shall not be allowed any extension of time or compensation for damages by reason of or in connection with such work stoppage.

3.2 PROTECTION

- A. The Contractor shall take all necessary precautions to prevent injury to the public, building occupants, or damage to property of others. For the purposes of this contract, the public or building occupants shall include all persons not employed by the Contract or a subcontractor working under his/her direction.
- B. Storing, positioning or use of equipment, tools, materials, scraps, and trash in a manner likely to present a hazard to the public or building occupants by its accidental shifting, ignition, or other hazardous qualities is prohibited.
- C. Obstructions: No corridor, aisle, stairway, door, or exit shall be obstructed or used in such a manner as to encroach upon routes of ingress or egress utilized by the public or building occupant, or to present unsafe or unhealthy condition to the public or building occupant.

- D. Work shall not be performed in any area occupied by the public or Federal employees unless specifically permitted by the contract or the Owner and unless adequate steps are taken for the protection of the public or Federal employees.
- E. Wherever practicable, the work area shall be fenced, barricaded, or otherwise blocked off from the public or building occupants to prevent unauthorized entry into the work area.
- F. Alternate Precautions: When the nature of the work prevents isolation of the work area and the public or building occupants may be in or pass through, under or over the work area, alternate precautions such as the posting of signs, the use of signal persons, the erection of barricades or similar protection around particularly hazardous operations shall be used as appropriate.
- G. Public Thoroughfare: When work is to be performed over a public thoroughfare such as a sidewalk, lobby, or corridor, the thoroughfare shall be closed, if possible, or other precautions taken such as the installation of screens or barricades. When the exposure to heavy falling objects exists, as during the erection of building walls or during demolition, special protection of the type detailed in 29 CFR 1910/1926 shall be provided.
- H. Fences and barricades shall be removed upon completion of the project, in accordance with local ordinance and to the satisfaction of the Owner or his/her representative(s).

3.3 COVID-19 JOB SITE SAFETY

- A. COVID-19 Exposure Control, Mitigation and Recovery Plan: Prior to commencing work all contractors are required to develop for each job site a comprehensive COVID-19 exposure control, mitigation, and recovery plan. The plan must include policies regarding the following control measures: PPE utilization; on-site social distancing; hygiene; sanitation; symptom monitoring; incident reporting; site decontamination procedures; COVID-19 safety training; exposure response procedures; and a post-exposure incident project wide recovery plan. The plan must also include a Job Hazard Analysis (JHA), including a list of engineering controls and proper Personal Protective Equipment (PPE), for all jobsite activities. A copy of the COVID-19 exposure control, mitigation, and recovery plan must be available on each job site during any construction activities and available for inspection by state and local authorities. Workers must be trained on the safety protocols listed below before the activity begins. All contractors have a general obligation to keep a safe and healthy worksite in accordance with state and federal law.

All contractors must specifically ensure operations protect workers, tenants and any visitors to the construction site by implementing the following procedures:

- Educate workers in the language they understand best about coronavirus and how to prevent transmission and the employer's COVID-19 policies.
- Maintain minimum six-foot separation between all employees, Housing Authority tenants, and/or visitors to the jobsite in all interactions at all times.

When strict physical distancing is not feasible for a specific task, other prevention measures are required, such as use of barriers, minimize staff or customers in narrow or enclosed areas, stagger breaks, and work shift starts.

- Provide personal protective equipment (PPE) such as gloves, goggles, face shields and face masks as appropriate or required to employees for the activity being performed. Cloth facial coverings must be worn by every employee not working alone (with no chance of human interaction) on the jobsite unless their exposure dictates a higher level of protection under CDC guidelines.
- Ensure frequent and adequate hand washing with adequate maintenance of supplies. Use disposable gloves where safe and applicable to prevent transmission on tools or other items that are shared.
- Establish a housekeeping schedule that includes frequent cleaning and sanitizing with a particular emphasis on commonly touched surfaces.
- Screen employees for signs/symptoms of COVID-19 at start of shift. Make sure sick employees stay home or immediately go home if they feel or appear sick. Cordon off any areas where an employee with probable or confirmed COVID-19 illness worked, touched surfaces, etc. until the area and equipment is cleaned and sanitized. Follow the cleaning guidelines set by the CDC to deep clean and sanitize. A worker may refuse to perform unsafe work, including hazards created by COVID-19. And, it is unlawful for their employer to take adverse action against a worker who has engaged in safety-protected activities under the law if their work refusal meets certain requirements. Employees who choose to remove themselves from a worksite because they do not believe it is safe to work due to the risk of COVID-19 exposure may have access to certain leave or unemployment benefits.

- B. COVID-19 Safety Training: An onsite safety training must be conducted on all job sites on the first day of work, and weekly thereafter, to explain the protective measures in place for all workers. Attendance will be communicated verbally and the superintendent shall sign in each attendee and cover the following topics:
1. Social distancing of at least 6 feet of separation must be maintained by every person on the worksite at all possible times. In instances where the 6 feet separation cannot be maintained, the Job Hazard Analysis shall be thoroughly reviewed by all workers performing the work prior to commencing those tasks.
 2. Gatherings of any size must be precluded by taking breaks and lunch in shifts. Any time two or more persons must meet, ensure minimum 6 feet of separation.
 3. Identify “choke points” and “high-risk areas” on job sites where workers typically congregate and control them so social distancing is always maintained.

4. Minimize interactions when picking up or delivering equipment or materials, ensure minimum 6-foot separation.
5. Appropriate eye protection for all hazards must be worn at all times by every employee while on the worksite. If appropriate PPE cannot be provided, the work is not authorized to commence, recommence, or the site must be shut down.
6. Hand-washing stations, with soap and running water, shall be abundantly provided on all job sites for frequent handwashing. When running water is not available, portable washing stations, with soap, are required. Workers should be encouraged to leave their workstations to wash their hands regularly, before and after going to the bathroom, before and after eating and after coughing, sneezing or blowing their nose. **Alcohol-based hand sanitizers with greater than 60% ethanol or 70% isopropanol may also be used in lieu of the water requirement.**
7. Post, in areas visible to all workers, required hygienic practices, including not to touch face with unwashed hands or with gloves; washing hands often with soap and water for at least 20 seconds; use hand sanitizer with at least 60% alcohol; cleaning and disinfecting frequently touched objects and surfaces such as workstations, keyboards, telephones, handrails, machines, shared tools, elevator control buttons, and doorknobs; covering the mouth and nose when coughing or sneezing as well as other hygienic recommendations by the U.S. Centers for Disease Control (CDC).
8. Make disinfectants available to workers throughout the worksite and ensure cleaning supplies are frequently replenished.
9. Frequently clean and disinfect high-touch surfaces on job sites and in offices, such as shared tools, machines, vehicles and other equipment, handrails, doorknobs, and portable toilets. If these areas cannot be cleaned and disinfected frequently, the jobsite shall be shut down until such measures can be achieved and maintained.
10. Shared tools and other equipment must be wipe sanitized between users.
11. When the worksite is an occupied apartment, workers should sanitize work areas upon arrival, throughout the workday and immediately before they leave, and occupants should keep a personal distance of at least 10 feet.
12. If an employee reports feeling sick and goes home, the area where that person worked should be immediately disinfected.
13. Create policies which encourage workers to stay home or leave the worksite when feeling sick or when they have been in close contact with a confirmed positive case. If they develop symptoms of acute respiratory illness, they must seek medical attention and inform their employer.
14. Have employees inform their supervisors if they have sick family member at home with COVID-19. If an employee has a family member sick with

COVID-19, that employee must follow the isolation/quarantine requirements as established by the State Department of Health.

15. Screen all workers at the beginning of their day by asking them if they have a fever, cough, shortness of breath, fatigue, muscle aches, or new loss of taste or smell. Ask employees to take their temperature at home prior to arriving at work or take their temperature when they arrive. Thermometers used shall be 'no touch' or 'no contact' to the greatest extent possible. If a 'no touch' or 'no contact' thermometer is not available, the thermometer must be properly sanitized between each use. Any worker with a temperature of 100.4°F or higher is considered to have a fever and must be sent home.
16. Instruct workers to report to their supervisor if they develop symptoms of COVID-19 (e.g., fever, cough, shortness of breath, fatigue, muscle aches, or new loss of taste or smell). If symptoms develop during a shift, the worker should be immediately sent home. If symptoms develop while the worker is not working, the worker should not return to work until they have been evaluated by a healthcare provider.
17. Failure of employees to comply will result in employees being sent home during the emergency actions. For example, if an employee refuses to wear the appropriate facial covering, they would be sent home.
18. If an employee is confirmed to have COVID-19 infection, employers should inform fellow employees and the PHA of their possible exposure to COVID-19 in the workplace but maintain confidentiality as required by the Americans with Disabilities Act (ADA). The employer should instruct fellow employees about how to proceed based on the CDC Public Health Recommendations for Community-Related Exposure.

No work may begin until such time the contractor can meet and maintain all requirements, including providing materials, schedules and equipment required to comply with these COVID-19 job site safety practices.

3.4 SMOKE-FREE POLICY

- A. The PHA has adopted a Smoke-Free Policy. No smoking is allowed inside any structure located on PHA property. In addition, no smoking is allowing within 25 Feet of any structure located on PHA property. All workers must strictly adhere to this Smoke-Free Policy.

END OF SECTION

SECTION 01600

MATERIAL, EQUIPMENT AND SUBSTITUTIONS

PART 1 GENERAL

1.1 REQUIREMENTS INCLUDED

- A. Products
- B. Transportation and Handling
- C. Storage and Protection
- D. Product Options
- E. Products List
- F. Substitutions
- G. Systems Demonstration

1.2 RELATED REQUIREMENTS

- A. Document 00150 - Instructions to Bidders: Times for submittal of request for substitutions during the bidding period
- B. Document 00715 - General Conditions
- C. Section 01010 - Summary of Work
- D. Section 01040 - Coordination: Coordination of Construction
- E. Section 01300 - Submittals: Product Data Submittals and Shop Drawings.
- F. Section 01700 - Contract Closeout: Operation and maintenance data; Warranties and Bonds; Record Documents.

1.3 QUALITY ASSURANCE

- A. Approval Required
 - 1. The contract is based on the standards of quality established in the Contract Documents.
 - 2. All products proposed for use, including those specified by required attributes and performance, shall require approval by the A/E before being incorporated into the work.
 - 3. Do not substitute materials, equipment, or methods unless such substitution has been specifically approved for this work by the A/E.

B. "Or Equal"

1. Where the phrase "or equal" or "or approved equal" occurs in the contract documents do not assume that materials, equipment, or methods will be approved as equal unless the item has been specifically approved for this work by the A/E during the Bidding Phase.
2. The decision of the A/E shall be final.
3. See pertinent portions of the Contract Documents for additional information relating to substitutions.

C. "No Equal"

1. Where the phrase "No Equal" occurs in the contract documents, no substitutions will be allowed. These items have been specified in conformance with the "Standardization Policy" adopted by the PHA Board of Commissioners.

1.4 ASBESTOS CONTAINING MATERIALS

- A. No asbestos containing materials or products shall be incorporated into the project. All products and materials shall be 100 percent asbestos free.
- B. The intent of the Contract Documents is to exclude all materials and products which contain asbestos in any form or amount. In studying the Contract Documents and at any time during execution of the work, the Contractor shall at once report to the Designer any asbestos containing materials or product that he may discover. Do not proceed with installation of asbestos containing materials or products.
- C. Where products are specified by reference standard or in descriptive manner without manufacturer's name, model number or trade name, the Contractor shall select materials or products meeting specified requirements which do not contain asbestos in any form or amount.
- D. In making requests for substitutions, the Contractor shall be responsible for determining that materials and products requested for substitution are 100 percent free of asbestos in any form.
- E. At the end of the project the Contractor shall provide the A/E with a letter stating that no asbestos materials were used on this project.

1.5 PRODUCTS

- A. Products include material, equipment, and systems.
- B. Comply with Specifications and referenced standards as minimum requirements.
- C. Components required to be supplied in quantity within a Specification section shall be the same, and shall be interchangeable.
- D. Do not use materials and equipment removed from existing structure, except as specifically required, or allowed, by Contract Documents.

1.6 TRANSPORTATION AND HANDLING

- A. Transport products by methods to avoid product damage; deliver in undamaged condition in manufacturer's unopened containers or packaging, dry.
- B. Provide equipment and personnel to handle products by methods to prevent soiling or damage.
- C. Promptly inspect shipments to assure that products comply with requirements, quantities are correct, and products are undamaged.

1.7 STORAGE AND PROTECTION

- A. Store products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weather-tight enclosures; maintain within temperature and humidity ranges required by manufacturer's instructions.
- B. For exterior storage of fabricated products, place on sloped supports above ground. Cover products subject to deterioration with impervious sheet covering; provide ventilation to avoid condensation.
- C. Store loose granular materials on solid surfaces in a well-drained area; prevent mixing with foreign matter.
- D. Arrange storage to provide access for inspection. Periodically inspect to assure products are undamaged, and are maintained under required conditions.

1.8 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards.
- B. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not specifically named. Submit separate request for each substitution outlined in Article 1.10 of this section.
- C. Products Specified by Naming Several Manufacturers Without a Provision for Substitutions: Products of named manufacturers meeting specifications: No options, no substitutions allowed.
- D. Products Specified by Naming Only One Manufacturer: No options, no substitutions allowed.

1.9 PRODUCTS LIST

- A. Within 15 days after date of Owner-Contractor Agreement, or established in Notice to Proceed, submit complete list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

1.10 SUBSTITUTIONS

- A. During bidding period, the Instructions to Bidders govern times for submitting requests for substitutions under requirements specified in this section.
- B. Only during the construction period will substitutions be considered when one of the following situations occur:
 - 1. Product becomes unavailable through no fault of the Contractor. Confirmation of unavailable products must be in writing and certified by the manufacturer that the product is no longer available.
 - 2. Extended delivery time for specified products might seriously delay the project.
 - 3. Significant monetary savings to the Owner can be offered without significant change in scope or quality. Review of substitutions under these conditions shall be considered an "Additional Service" under the provisions of the "Model Form of Agreement Between Owner and Design Professional". The Contractor may be required to reimburse the Owner for all costs associated with review of submittals for substituted materials.
- C. Submit separate request for each substitution using form included in this section. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.
- D. Request constitutes a representation that Contractor:
 - 1. Has investigated proposed product and determined that it meets or exceeds, in all respects, specified product.
 - 2. Will provide the same warranty for substitution as for specified product.
 - 3. Will coordinate installation and make other changes which may be required for work to be complete in all respects.
 - 4. Waives claims for additional costs which may subsequently become apparent.
- E. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals. Separate written request, must be submitted for any proposed substitutions or deviation from the Contract Documents.
- F. The A/E will determine acceptability of proposed substitution, and will notify Contractor of acceptance or rejection in writing within a reasonable time.
- G. Substitute products shall not be ordered or installed without written acceptance.
- H. Only one request for substitution will be considered for each product. When substitution is not accepted, provide specified product.
- I. The A/E will determine acceptability of substitutions.

1.11 SUBMITTAL PROCEDURES

- A. Submit 2 copies of request for substitution on form included in Section 01610.
- B. The A/E will review Contractor's requests for substitutions with reasonable promptness.
- C. During the bidding period, the A/E will record acceptable substitutions in Addenda.
- D. After Award of Contract, the A/E will notify the Contractor, in writing, of decision to accept or reject requested substitutions within 15 days.
- E. For accepted products, submit shop drawings, product data, and samples under provisions of Section 01300.

1.12 SYSTEMS DEMONSTRATION

- A. Prior to final inspection, demonstrate operation of each system to the Owner.
- B. Instruct Owner's personnel in operation, adjustment, and maintenance of equipment and systems, using the operation and maintenance data as the basis of instruction.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SUBSTITUTIONS REQUEST FORM

GENERAL: This form is part of the substitution requirements specified in Section 01600.

PROJECT TITLE & NO.: **Housing Authority of Frankfort**
Modernization Program No. KY36P003-501(22)

TO: C S Design, Inc.
1088 Wellington Way
Lexington, Kentucky 40513

ATTN: Wayne L. Clayton

SPECIFIED ITEM: _____
Section: _____ Paragraph _____

PROPOSED SUBSTITUTE: _____

Attach complete description, catalog, spec data, and laboratory tests, if applicable.

1. What effect will substitution have on dimensions, gauges, weights, etc., indicated in Contract Documents?

2. What effect will substitution have on wiring, piping, ductwork, etc., indicated in Contract Documents?

3. What effect will substitution have on other trades?

4. What effect will substitution have on construction schedule?

5. What are the differences in quality and performance between proposed substitute and specified product?

6. Manufacturer's guarantees of the specified products and proposed products are:

Same _____ Different _____ Explain _____

7. List (on separate sheet) the availability of maintenance services and replacement materials for proposed substitute.

8. List (on separate sheet) names, addresses and phone numbers of fabricators and suppliers for proposed substitutes.

9. If the substitution request is accepted, it will result in:

No cost impact _____ Credit (How Much) _____

10. There are _____ are no _____ license fees and royals pending on the proposed substitute.

(Explain) _____

11. The undersigned shall reimburse the owner for additional studies, investigations, submittals, redesign and/or analysis by the A/E resulting from the requested substitutions. Review of substitutions under these conditions shall be considered an "Additional Service" under the provisions of the "Model Form of Agreement Between Owner and Design Professional". The Contractor may be required to reimburse the Owner for all costs associated with review of submittals for substituted materials.

SUBMITTED BY: (Supplier or Subcontractor)

Firm: _____

Address: _____

Signature: _____

Print Name: _____

Telephone No. : _____ Date: _____

REVIEWED and Approved for Subcontractor by (General Contractor)

Date: _____

SUBSTITUTIONS REQUEST

AE's REVIEW COMMENTS:

- Accepted
- Accepted as Noted (see attached copy)
- Not Accepted
- Received Too Late
- Rejected Due to Incomplete Form. Resubmit

Signature: _____

Date: _____

Remarks: _____

END OF SECTION

SECTION 01700

CONTRACT CLOSEOUT

PART 1 GENERAL

1.1 REQUIREMENTS INCLUDED

- A. Closeout Procedures
- B. Final Cleaning
- C. Project Record Documents
- D. Operation and Maintenance Data
- E. Warranties and Bonds
- F. Spare Parts and Maintenance Materials

1.2 RELATED REQUIREMENTS

- A. Document 00715 - General Conditions: Fiscal provisions, legal submittals, and other administrative requirements
- B. Section 01010 - Summary of Work
- C. Section 01710 - Construction and Final Cleaning

1.3 CLOSEOUT PROCEDURES

- A. Comply with procedures stated in General Conditions of the contract and procedures specified in this Section for issuance of Certificate of Substantial Completion.
- B. Owner will occupy designated portion of Project for the purpose of installation of Owner furnished equipment, or conduct of business, under provision stated in Certificate of Substantial Completion.
- C. When Contractor considers work has reached final completion, submit written certification that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for A/E's inspection.
- D. In addition to submittals required by the Conditions of the Contract, provide submittals required by governing authorities, and submit a final statement of accounting, giving total adjusted Contract Sum, previous payments, and sum remaining due.
- E. A/E will issue a final Change Order reflecting approved adjustments to Contract Sum not previously made by Change Order.

1.4 SUBSTANTIAL COMPLETION

- A. When Contractor considers the Work or designated portion of the Work is substantially complete, submit written notice and provide the following items to the A/E. Once the A/E receives the written notice and all of the following items, the A/E will make a substantial completion inspection.
1. A letter stating that the Work is substantially complete.
 2. Prepare a comprehensive list of items to be completed or corrected and a schedule of completion for each item.
 3. Written certification that orientation and training for facility maintenance personnel is complete.
 4. Provide complete operating and maintenance data binders prior to inspection.
 5. Provide written certification that all local and state codes departments and the State Fire Marshal has inspected the project and approval has been issued by each department for the use and occupancy permit.
 6. The Certificate of Substantial Completion will not be issued until all of the above items have been complete to the satisfaction of the A/E.
- B. Should A/E inspection find the Work is not substantially complete, he will promptly notify Contractor in writing, listing observed deficiencies.
- C. Contractor shall remedy deficiencies and send a second written notice of substantial completion.
- D. When A/E finds Work is substantially complete, he will prepare a Certificate of Substantial Completion in accordance with provisions of General Conditions.

1.5 FINAL COMPLETION

- A. The final review at the job site will be done by the A/E once the following items are received from the General Contractor:
1. A letter stating that a qualified person authorized by the General Contractor has fully reviewed the Contract Document and inspected the Work and that they both agree.
 2. A letter stating that the Work is complete and in accordance with the Contract Documents and ready for final review.
 3. Work has been completed in accordance with Contract Documents, and deficiencies listed with Certificate of Substantial Completion have been corrected.
 4. Equipment and systems have been tested, adjusted, and balanced, and are fully operational.
 5. Operation of systems has been demonstrated to Owner's personnel.
 6. Added any additional materials necessary to complete the operating and maintenance data binders, and be provided to the A/E before final review.
 7. A letter stating that the Construction Record Documents are complete and be provided to the A/E before final review.
 8. Work is complete and ready for final review.
- B. Should A/E inspection find Work incomplete, he will promptly notify Contractor in writing listing observed deficiencies.

- C. Contractor shall remedy deficiencies and send a second certification of final completion.
- D. When A/E finds the Work is complete, he will consider closeout submittals.

1.6 REVIEW FEES

- A. Should status of completion of Work, for either substantial completion or final review, require additional reviews by A/E due to failure of work to comply with Contractor's claims on initial review, additional reviews under these conditions shall be considered an "Additional Service" under the provisions of the "Model Form of Agreement Between Owner and Design Professional". The Contractor may be required to reimburse the Owner for all costs associated with additional reviews.

1.7 CLOSEOUT SUBMITTALS

- A. Before issuance of Certificate of Payment for Final Payment, deliver to the A/E the following:
- B. Project Record Documents:
 - 1. Store documents separate from those used for construction.
 - 2. Keep documents current; do not permanently conceal any work until required information has been recorded.
 - 3. At Contract closeout, submit documents with transmittal letter containing dated, project title, Contractor's name and address, list of documents, and signature of Contractor.
- C. Closeout Documents - Volume One
 - 1. Submit 2 sets bound in 8-1/2 by 11 inch 3 ring side binder with durable plastic covers, minimum 1/2 inch larger than thickness of contents, of the following:
 - 2. Directory listing names, addresses, and telephone numbers of the A/E and Contractor.
 - 3. Directory listing names, addresses, and telephone numbers of sub-contractors and suppliers.
 - 4. Contractor's letter that is notarized providing 1-year warranty.
 - 5. Contractor's letter that is notarized that non-asbestos materials have been used. (Section 01300, Paragraph 1.3).
 - 6. Letter certifying that all materials used comply with the specifications (Section 01300).
 - 7. Evidence of Payment and Release of Liens: Waivers of Lien in accordance with Conditions of the contract; Certificate of Release (Document 00909).
 - 8. Certificate of Completion – Consolidated (Document 00910)
 - 9. Affidavit of Payment of Debts and Claims: AIA Document G706.
 - 10. Consent of Surety to Final Payment: AIA Document G707.
 - 11. Certificates of Insurance for Products and Completed Operations: In accordance with Supplementary Conditions.
 - 12. Warranties and Bonds
 - a. Provide duplicate, notarized copies as called for in each specification section. Execute Contractor's submittals and assemble documents executed by subcontractors, suppliers, and manufacturers with all blanks filled in. Provide table of contents and assemble in binder.

- b. Submit material prior to final application for payment. For equipment put into use with Owner's permission during construction, submit within fifteen (15) days after first operation. For items of work delayed materially beyond Date of Substantial Completion, provide updated submittal within 10 days after acceptance, listing date of acceptance as start of warranty period.
13. Directory listing name, addresses, and telephone numbers of party to contact for maintenance, service, and replacement parts.
14. Spare Parts and Maintenance Materials
 - a. Provide products, spare parts, and maintenance materials in quantities specified in each section, in addition to that used for construction of work. Coordinate with Owner, deliver to Project site and obtain receipt prior to final payment. Provide letter listing each spare part turned over to the Owner.
15. Submit 1 copy of each shop drawing submittal of the entire project. Arrange each submittal in numerical order of submission. Provide a table of contents of each submittal listing submittal number, title, and specification section number.
16. Label each binder with label marked "Closeout Documents". Contents of second binder may be photo copies of first binder.

1.8 STATEMENT OF ADJUSTMENT OF ACCOUNTS

- A. Submit final statement reflecting adjustments to Contract Sum indicating:
 1. Original Contract Sum.
 2. Previous change orders.
 3. Changes under allowances.
 4. Changes under unit prices.
 5. Deductions for uncorrected work.
 6. Penalties and bonuses.
 7. Deductions for liquidated damages.
 8. Other adjustments to Contract Sum.
 9. Total Contract Sum as adjusted.
 10. Previous payments.
 11. Sum remaining due.
- B. A/E will issue a final Change Order reflecting approved adjustments to Contract Sum not previously made by change orders.

1.9 APPLICATION FOR FINAL PAYMENT

- A. Submit application for final payment in accordance with provisions of Conditions of the Contract.

END OF SECTION

SECTION 01710

CONSTRUCTION AND FINAL CLEANING

PART 1 GENERAL

1.1 REQUIREMENTS INCLUDED

- A. Cleaning and disposal of waste materials, debris, and rubbish during construction.
- B. Final cleaning of exterior and interior of project.

1.2 RELATED REQUIREMENTS

- A. Document 00715 - General Conditions: Cleaning Up.
- B. Section 01700 - Contract Closeout: Closeout procedures.
- C. Individual Specifications Sections: Specific cleaning for product or work.

1.3 DESCRIPTION

- A. Work Included: Throughout the construction period, maintain the building(s) and site in a standard of cleanliness as determined by the A/E.
- B. Execute thorough cleaning prior to review for Substantial Completion and Final Review of the work.

1.4 QUALITY ASSURANCE

- A. Inspection: Conduct inspection daily, and more often if necessary, to verify that requirements for cleanliness are being met.
- B. Codes and Standards: In addition to the standards described in this Section, comply with all pertinent requirements of government agencies having jurisdiction.

PART 2 PRODUCTS

2.1 EQUIPMENT

- A. Provide covered containers for deposit of waste materials debris, and rubbish.

2.2 CLEANING MATERIALS AND EQUIPMENT

- A. Provide all required personnel, equipment, and materials needed to maintain the specified standard of cleanliness.
- B. Use materials which will not create hazards to health or property, and which will not damage surfaces.

2.3 COMPATIBILITY

- A. Use only materials, equipment, and methods on surfaces being cleaned as recommended by manufacturer of material being cleaned, or as approved by A/E.

PART 3 EXECUTION

3.1 CONSTRUCTION CLEANING

A. General

1. Retain all stored items in an orderly arrangement allowing maximum access, not impeding drainage or traffic, and providing the required protection of materials.
2. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to closing the space.
3. Control cleaning operations so that dust and other particulates will not adhere to wet or newly coated surfaces.

B. Disposal:

1. Remove waste materials, debris, and rubbish from site weekly and dispose of off-site.
2. For items awaiting disposal, observe all requirements for protection and protection of the ecology.

C. Site:

1. Daily, and more often if necessary, inspect the site and pick up all scrap, debris, and waste material. Remove all such items to the place designated for their storage.
2. Daily, and more often if necessary, inspect all arrangements of materials stored on the site. Restack, tidy, or otherwise service all arrangements to meet the requirements of 3.1.A.1.
3. Maintain the site in a neat and orderly condition at all times as determined by the A/E.

D. Structures:

1. Daily, and more often if necessary, inspect the structures and pick up all scrap, debris, and waste material. Remove all such items to the place designated for their storage.
2. Daily, and more often if necessary, sweep all interior spaces clean. "Clean," for the purposes of this paragraph, shall be interpreted as meaning free from dust and other material capable of being removed by use of reasonable effort and a hand held broom as determined by the A/E.
3. As required preparatory to the installation of succeeding materials, clean the structures or pertinent portions thereof to the degree of cleanliness recommended by the manufacturer of the succeeding material, using all equipment and materials required to achieve the required cleanliness.

4. Following the installation of finish floor materials, clean the finish floor daily (and more often if necessary) at times while work is being performed in the space in which finish materials have been installed. "Clean", for the purpose of this paragraph, shall be interpreted as meaning free from all foreign material that, in the opinion of the A/E, may be injurious to the finish floor material.

3.2 FINAL CLEANING

- A. Definition: Except as otherwise specifically provided, "clean" (for the purpose of all paragraphs under 3.2) shall be interpreted as meaning the level of cleanliness generally provided by skilled cleaners using commercial quality building maintenance equipment and materials.
- B. General:
 1. Prior to the completion of the work, remove from the job site all tools, surplus materials, equipment, scrap, debris, and waste. Conduct final construction cleaning as described under 3.1, above.
 2. Remove temporary protection and labels not required to remain.
 3. Clean transparent and glossy materials to a polished condition; remove foreign substances. Polish reflective surfaces to a clear shine.
 4. Vacuum clean tiled, carpeted and similar surfaces.
 5. Clean, damp mop, wax, and polish resilient and hard-surfaced floors as specified.
 6. Clean surfaces of equipment; remove excess lubrication.
 7. Clean plumbing fixtures to a sanitary condition.
 8. Clean permanent filters of ventilating equipment and replace disposable filters when units have been operated during construction; in addition, clean ducts, blowers, and coils when units have been operated without filters during construction.
 9. Clean light fixtures and lamps.
 10. Maintain cleaning until final review or agreed upon date of Owner occupancy.
 11. Remove waste, foreign matter, and debris from roofs, gutters, area ways, and drainage systems.
 12. Remove waste, debris, and surplus materials from site. Clean grounds; remove stains, spills, and foreign substances from paved areas and sweep clean. Rake clean other exterior surfaces.
- C. Site: Unless otherwise specifically directed by the A/E, broom clean all paved areas on the site and all public paved areas directly adjacent to the site. Completely remove all resultant debris.
- D. Structure
 1. Exterior: Visually inspect all exterior surfaces, and remove all traces of soil, waste material, smudges, and other foreign matter. Remove all traces of splashed materials from adjacent surfaces. If necessary to achieve a uniform degree of exterior cleanliness, hose down the exterior of the structure. In the event of stubborn stains not removable with water, the A/E may require light sandblasting or other cleaning at no additional cost to the Owner.

2. Interior: Visually inspect all interior surfaces, and remove all traces of soil, waste material, smudges, and other foreign matter. Remove all traces of splashed materials from adjacent surfaces. Remove all paint droppings, spots, stains, and dirt from finished surfaces. Use only the specified cleaning materials and equipment.
 3. Glass: Clean all glass inside and outside.
 4. Polished Surfaces: To all surfaces requiring the routine application of buffed polish, apply the polish recommended by the manufacturer of the material being polished.
- E. Timing: Schedule final cleaning as approved by the A/E to enable the Owner to accept a completely clean project.

3.3 CLEANING DURING THE OWNER'S OCCUPANCY

- A. Should the Owner occupy the work or any portion thereof prior to its completion by the Contractor and acceptance by the Owner, responsibilities for interim and final cleaning of the occupied spaces shall be by the Contractor.

END OF SECTION

SECTION 01900

EXTRA MATERIALS AND MAINTENANCE STOCK

PART 1 GENERAL

1.1 ITEMS COVERED BY THIS SECTION

- A. This section identifies the nature and extent of extra materials and maintenance stock requirements included in this contract. Specific specification sections indicate the type of equipment or furnishings required under this contract; this section indicates the number and type of spare parts, extra materials and/or maintenance stock required to be submitted in addition to that used for construction of the work.
- B. Submit materials/maintenance stock under the provisions of Section 01700. Coordinate with Owner, deliver to project site, and obtain receipt prior to final payment and Contract Closeout.

1.2 PRODUCT DELIVERY

- A. Deliver required extra materials/maintenance stock to the Owner's designated storage space, properly packaged (paper wrapped) and identified. Obtain receipt from Owner.

1.3 SCHEDULE OF REQUIRED EXTRA MATERIALS

- a. Submit extra materials as indicated in following schedule.

Schedule of Required Extra Materials/Maintenance Stock		
Spec. Section	Product/Item of Work	Extra Materials Required
093315	Ceramic Tile	[50] S.F. of Ceramic Floor Tile
196352	Plank Vinyl Flooring	[50] S.F. of Plank Vinyl Flooring
094682	Carpeting	[100] S.F. of Carpeting

END OF DOCUMENT

DIVISION 2

SITE IMPROVEMENTS

SECTION 024072

MINOR DEMOLITION FOR REMODELING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Removal of designated building equipment and fixtures.
- B. Removal of designated construction.
- C. Disposal of materials.
- D. Identification of utilities.
- E. Refer to items scheduled at end of section.

1.2 RELATED SECTIONS

- A. Section 01010 - Summary of Work: Work sequence.
- B. Section 01700 - Contract Closeout: Project record documents.

1.3 SUBMITTALS FOR CLOSEOUT

- A. Section 01700 - Contract Closeout: Procedures for submittals.
- B. Project Record Documents: Accurately record actual locations of capped utilities and subsurface obstructions.

1.4 REGULATORY REQUIREMENTS

- A. Conform to applicable code for demolition work, dust control, products requiring electrical disconnection and re-connection.
- B. Obtain required permits from authorities.
- C. Do not close or obstruct egress width to any building or site exit.
- D. Do not disable or disrupt building fire or life safety systems without 3 days prior written notice to Owner.
- E. Conform to procedures applicable when hazardous or contaminated materials are discovered.
- F. Conform to "Certified Renovator" regulations as described in 40 CFR 745.85.

1.5 SCHEDULING

- A. Section 01300 - Submittals: Work schedule.

- B. Schedule Work to coincide with new construction.

1.6 PROJECT CONDITIONS

- A. Conduct demolition to minimize interference with adjacent building areas.
- B. Cease operations immediately if structure appears to be in danger and notify A/E. Do not resume operations until directed.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 PREPARATION

- A. Provide, erect, and maintain temporary barriers at locations indicated.
- B. Erect and maintain weatherproof closures for exterior openings.
- C. Erect and maintain temporary partitions to prevent spread of dust, odors, and noise to permit continued Owner occupancy.
- D. Protect existing materials and surfaces which are not to be demolished.
- E. Prevent movement of structure; provide bracing and shoring.
- F. Notify affected utility companies before starting work and comply with their requirements.
- G. Mark location and termination of utilities.
- H. Perform pre-renovation testing to identify all hazards related to construction as outlined in 40 CFR 745.85.

3.2 DEMOLITION

- A. Disconnect cap and identify designated utilities within demolition areas.
- B. Demolish in an orderly and careful manner. Protect existing supporting structural members.
- C. Remove and properly dispose of demolished materials from site except where specifically noted otherwise. Do not burn or bury materials on site.
- D. Remove materials as Work progresses. Upon completion of Work, leave areas in clean condition.
- E. Remove temporary Work.

- F. Perform or direct workers who perform all of the work practices described in 40 CFR 745.85

END OF SECTION

SECTION 024105

PROTECTION

PART 1 GENERAL

- 1.1 The general intent of this section is to establish both the extent of protection which the Contractor and his subcontractors are required to provide beyond that considered normal or specified above, and the penalties if such protection is not provided.
- 1.2 Personally caution subcontractors before they move on the site as to the protection required for their work and the penalties involved.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

- 3.1 Adequately mark all existing construction, utilities, trees, or plant life that the Drawings indicate are to remain before any work is started. The A/E will verify all trees, etc., that are to be removed.
- 3.2 Box in all trees that are to remain. Then cut and remove from the site all trees that are to be removed.
- 3.3 Completely remove all stumps and roots from cut trees.
- 3.4 Any trees that are to remain which receive damage shall be immediately repaired by a qualified tree surgeon.
- 3.5 Where the finished grade is to be raised around trees that are to remain, provide gravel graded to a diameter of between 1 inch and 2 inches, and distribute this gravel over the full area of the tree spread affected by the grade change. Slope the gravel up against the tree trunk, and project it 3 inches above the finished grade for a horizontal distance of 12 inches all around the tree trunk. Place the finish material specified elsewhere over the rock.
- 3.6 Where the finished grade is to be lowered close to trees that are to remain, carefully excavate by hand to avoid damaging the root structure. Cut any roots that must be removed and that have a diameter of 1-1/2 inches or less, and then paint the cuts with a commercial tree paint. If roots over 1-1/2 inches in diameter require cutting or if the number of roots that need cutting is excessive, notify the A/E.
- 3.7 Branches shall be removed only by a qualified tree surgeon.
- 3.8 If any trees not designated for removal are destroyed, replace them with trees of equal species and size. If replacement has not been made or proper credit based on estimated replacement cost not issued at the time for final payment, the Owner's due credit will be subtracted from the Contractor's retainage and final payment.
- 3.9 Repair or replace existing construction, utilities, etc., either to original condition or to the satisfaction of the A/E and/or Owner.

END OF SECTION

SECTION 024119

SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. The Work of this Section Includes:

1. Demolition and removal of selected portions of exterior or interior of building or structure and site elements.
2. Removal and salvage of existing items for delivery to Owner and removal of existing items for reinstallation.

1.2 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.

1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.3 INFORMATIONAL SUBMITTALS

A. Schedule of selective demolition activities with starting and ending dates for each activity.

B. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician.

1.4 CLOSEOUT SUBMITTALS

A. Inventory: Submit a list of items that have been removed and salvaged.

1.5 QUALITY ASSURANCE

A. Refrigerant Recovery Technician Qualifications: Type I certified by an EPA-approved certification program.

1.6 FIELD CONDITIONS

A. Owner will not occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials:
 - 1. It is not expected that hazardous materials will be encountered in the Work.
 - a. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
- E. On-site sale of removed items or materials is not permitted.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs or video. Comply with Section 013233 "Photographic Documentation."
 - 1. Inventory and record the condition of items to be removed for salvage or reinstallation. Photograph or video conditions that might be misconstrued as damage caused by removal.
 - 2. Photograph or video existing conditions of adjoining construction including finish surfaces, that might be misconstrued as damage caused by selective demolition operations or removal of items for salvage or reinstallation.

3.2 PREPARATION

- A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
- B. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location and reinstalled in their original locations after selective demolition operations are complete.

- C. Refrigerant: Before starting demolition, remove refrigerant from mechanical equipment in accordance with 40 CFR 82 and regulations of authorities having jurisdiction.

3.3 UTILITY SERVICES AND BUILDING SYSTEMS

- A. Existing Services/Systems to Remain: Maintain utilities and building systems and equipment to remain and protect against damage during selective demolition operations.
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utilities and building systems serving areas to be selectively demolished.
 - 1. Arrange to shut off utilities with utility companies.
 - 2. If disconnection of utilities and building systems will affect adjacent occupied parts of the building, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to those parts of the building.
 - 3. Demolish and remove existing building systems, equipment, and components indicated on Drawings to be removed.
 - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 - b. Equipment to Be Removed: Disconnect and cap services and remove equipment and components.
 - 4. Abandon existing building systems, equipment, and components indicated on Drawings to be abandoned in place.
 - a. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
 - b. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.
 - 5. Remove and reinstall/salvage existing building systems, equipment, and components indicated on drawings to be removed and reinstalled or removed and salvaged:
 - a. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment and components; when appropriate, reinstall, reconnect, and make equipment operational.
 - b. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and components and deliver to Owner.

3.4 SALVAGE/REINSTALL

- A. Removed and Salvaged Items:
 - 1. Clean salvaged items.
 - 2. Store items in a secure area until delivery to Owner.
 - 3. Transport items to Owner's storage area on-site designated by Owner.
 - 4. Protect items from damage during transport and storage.

3.5 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
 2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

3.6 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site.
1. Do not allow demolished materials to accumulate on-site.
 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn demolished materials.

3.7 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF DOCUMENT

SECTION 024201

GENERAL EXCAVATION

PART 1 GENERAL

- 1.1 General excavation shall consist of removing and satisfactorily disposing of all materials taken from within the limits of the work contracted: i.e., the material lying between the original ground line and the established excavation limits.
- 1.2 Conduct all excavation operations in accordance with the applicable requirements of erosion control as shown on the Drawings and Specifications and as required by local authorities.
- 1.3 Complete all clearing and grubbing operations for excavation areas before starting excavation operations. The Contractor shall be responsible for and shall take all necessary precautions to protect and preserve any and all existing structures, culverts, pipelines, conduits, wires, subdrains, or parts thereof that may be affected by his operations. He shall, at his own expense, satisfactorily repair or replace any damaged part of any such structure, culvert, pipeline, conduit, wire, or subdrain that may result from his operations or negligence during the life of the contract.
- 1.4 Strip and stockpile all topsoil in cut and fill areas.
- 1.5 At all times during construction, maintain the area so that it will be well drained.
- 1.6 Erosion control devices shall be used in areas of stockpiled soil to prevent silt migration. Top Soil stockpiled for periods longer than 14 calendar days shall be temporarily seeded and mulched at on half the rate specified in SECTION 02485 – SEEDING.
- 1.7 CLASSIFICATION
 - A. Without regard to the materials encountered, all general excavation shall be unclassified. It shall be distinctly understood that any reference to rock, earth, or any other material on the Drawings is not to be taken as an indication of classified excavation or the quantity of either rock, earth, or any other material involved.
 - B. Any material that is encountered within the limits of the required excavation that cannot be removed except by drilling and/or blasting, including rock, boulders, masonry, hard pan, chert, shale, street and sidewalk pavements and/or similar materials, shall be considered as unclassified excavation, and no separate payment will be made therefore.
 - C. The bidder must draw his own conclusions as to the conditions to be encountered.
- 1.8 SUBGRADES
 - A. Where rock is encountered in the excavation, remove it to the depth below grade required by the Drawings, with no points of rock projecting above this depth. Leave the final surface of the rock so that complete drainage will be provided and so that no water will be pocketed at any point.

- B. In cut sections, compact subgrades for all areas to be paved, including structure grade slabs, in accordance with the requirements of Section 02203, Embankment, to a minimum depth of 6 inches. When the material in place does not contain enough moisture for proper compaction to be obtained, thoroughly scarify and break the subgrade to a minimum depth of 6 inches, increase the moisture content, and then compact the subgrade. For material that is unstable because of moisture but is otherwise suitable for the subgrade, either scarify, allow to dry, and compact or else remove and use for refill or embankment. Manipulation to speed drying will be permitted.

1.9 PRESPLITTING

- A. Presplit, at the designated slope lines, all rock and shale formations within excavation limits that are conducive to excavation by drilling and blasting. Perform presplitting before blasting and excavating the interior of the specified cross section at any particular location.
- B. Presplitting to obtain smooth faces in the rock and shale formations shall be performed by: (1) drilling holes at uniform intervals of between 2 feet and 4 feet along the slope lines designated on the Drawings or by the A/E, (2) loading and stemming the holes with appropriate explosives and stemming material, and (3) detonating the holes simultaneously. Adjust the intervals of the drill holes, as deemed necessary by the A/E, within the specified range in order to obtain the smoothest faces possible.
- C. When accurate drilling can be maintained, the holes for presplitting may be drilled to the specified full depth of the excavation or to the specified bench elevations. For depths that are to be drilled with more than one lift of holes, each additional lift of holes may be offset a distance of 1 foot per lift outside the designated slope lines to allow for the proper positioning of the drilling equipment in subsequent lifts. No payment will be allowed for any extra material excavated because of the drill holes being offset outside the designated slope lines.
- D. Charge the holes with explosives of a size, kind, and strength and at a spacing suitable for the formations being presplit, and do so with stemming material that passes a 3/8 inch standard sieve and that has the qualities necessary for proper confinement of the explosives.
- E. The presplit faces shall be free of all loose or crushed pieces and shall not deviate more than 6 inches inwardly from the designated slope lines or offset drill holes, nor more than 1 foot outwardly, except where seams, broken formations, or earth pockets may cause unavoidable irregularities. Discontinue presplitting if the A/E determines that the materials encountered have become unsuitable for being presplit.
- F. Locate holes drilled for blasting the interior of the cross sections 3 feet or more from the presplit faces, charge with the proper quantity of explosives so as not to damage the presplit faces, and detonate separately from the presplitting charges.

1.10 USE OF EXCAVATED MATERIALS

- A. Insofar as practicable, use all suitable material removed from excavation in the formation of embankments, subgrade, or shoulders; as backfill for structures; or for other purposes either as shown on the Drawings or directed by the A/E.
- B. Salvage topsoil from within the limits of excavation and embankment, and store it in stockpiles. Before removing topsoil, clear the area of all weeds, brush, stumps, stones, and other debris. Remove topsoil only from areas to be excavated and filled. Take care to avoid mixing subsoil or other unsuitable material with the topsoil. Locate stockpiles at locations approved by the A/E. The Contractor may elect to spread the topsoil directly on the areas designated to receive the topsoil without stockpiling.
- C. Rocks and boulders may be placed in embankments provided the embankments are deep enough to provide 12 inches or more soil cover over such rocks or boulders in grassed areas. Do not place boulders larger than 1/2 cubic yard beneath structure areas.
- D. Do not waste excavated material in excess of that required for normal embankment construction within construction limits except when and as specifically directed or approved by the A/E.
- E. Material wasted beyond the construction limits may be placed on approved sites obtained by the Contractor at no cost to the Owner. Waste material is to be moved off site only with the Owner's approval.
- F. Furnish the A/E with copies of a written agreement with the owner of the property where the waste sites are located, approval of the owner(s) of any utilities within the proposed waste area, and approvals from regulatory agencies.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 024205

SUBGRADE

PART 1 GENERAL

- 1.1 Preparation of the subgrade shall include compacting to the required density and shaping to conform to the required lines, grades, and cross sections, all in accordance with the applicable provisions of these specifications.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

- 3.1 Before starting the construction of the base course, pavement, or surface, prepare the subgrade to the full width of the widest course plus 1 foot of additional width beyond each edge, unless otherwise shown on the Drawings.
- 3.2 Shape the subgrade to conform to the lines, grades, and cross sections indicated on the Drawings or established by the A/E. Remove all high areas of the roadbed, by scarifying when necessary, and fill all low areas with material approved by the A/E and compact. Do not disturb the roadbed below the subgrade elevation except when necessary to comply with requirements specified herein.
- 3.3 Compact the subgrade to a density that is, as nearly as practicable, uniform throughout. Except when otherwise provided, the compaction requirements shall be in accordance with the requirements of Section 02203, Embankment. Should the subgrade, after being compacted to the required density during the construction of the grade, subsequently lose its density due to exposure to severe weather conditions, recompact it to the required density.
- 3.4 Excavate areas of yielding or unstable material, and backfill with approved material as directed by the A/E.
- 3.5 When the material in place is either too dry or too wet for proper compaction to be obtained, increase or reduce the moisture content and then compact the material. Scarifying of subgrades may be required.
- 3.6 When using a sheepsfoot roller, finish the compaction with either a 3 wheel roller or a multiple wheel, pneumatic tired roller heavy enough to smooth out and compact the indentations made by the sheepsfoot roller.
- 3.7 When excess dust is present on the subgrade, either wet it or completely remove and replace with suitable material before placing any aggregate on the subgrade, and do so at no additional cost to the Owner.
- 3.8 Operate a grading machine over all subgrades as necessary to maintain a uniform cross section that is free from irregularities. Prepare all subgrades far enough ahead of the base course or pavement construction to permit the necessary testing and checking of the subgrade before any aggregate is placed. Furnish the templates and labor required for checking the subgrade.
- 3.9 All subgrades being prepared for base or surface courses shall show no deviations greater than 1/2 inch from the specified crown section and shall be constructed uniformly so that subsequent base and/or surface courses can be constructed within their specified tolerances.

- 3.10 Complete all ditches and drains in order to drain the roadbed effectively before any construction materials are placed thereon. Take every precaution to protect the subgrade and repair and restore to proper condition all damage that may be caused by the hauling of material or by other causes; place no material on any subgrade until it has been restored and is accepted by the A/E.
- 3.11 Equipment used for hauling materials over the completed subgrade shall be equipped with pneumatic tires. Equipment operated over the subgrade causing rutting shall be at a minimum with damages to the subgrade repaired by the Contractor.
- 3.12 No storage or stockpiling of material will be permitted on a completed subgrade.
- 3.13 Place no surfacing materials on a frozen, muddy, soft, or yielding subgrade.
- 3.14 Prior to placement of aggregate and asphalt or concrete, the Contractor shall proof-roll the subgrade with a fully loaded single axle dump truck under the supervision of the A/E. Areas determined by the A/E to "pump" or fail shall be excavated to acceptable material and reconstructed with a suitable soil or aggregate.

END OF SECTION

SECTION 024260

FINISH GRADING

PART 1 GENERAL

- 1.1 The work called for by this section shall include, but not necessarily be limited to, finish grading and the spreading and shaping of topsoil as generally described in the Drawings.
- 1.2 Refer to other sections for work related to that specified under this heading. Coordinate this work with that specified by other sections for timely execution.

PART 2 PRODUCTS

- 2.1 **TOPSOIL:** Use stripped topsoil that has been stockpiled as specified elsewhere. If the quantity of topsoil on the job is inadequate, furnish enough additional topsoil. Topsoil furnished shall be natural, fertile, friable soil possessing characteristics of representative productive soils in the vicinity. It shall be obtained from naturally well-drained areas. It shall not be excessively acid or alkaline nor contain toxic substances that may be harmful to plant growth. Topsoil shall be without admixture of subsoil and shall be cleaned and reasonably free from clay lumps, stones, stumps, roots, or similar substances 2 inches or more in diameter, debris, or other objects that are a hindrance to planting operations. Such material shall be subject to testing.

PART 3 EXECUTION

- 3.1 Do not begin work until the earth is dry enough to be tillable.
- 3.2 Inspect subgrades to see that they generally conform to the standards called for elsewhere in these specifications, particularly with regard to the approximate depths required for the work. After work is completed, inspect it to ensure that all finish grading complies with design requirements.
- 3.3 Finish grade all areas outside the building line to the depths required for the work as follows:
 - A. Grade uniformly with rounded surfaces at the tops and bottom of abrupt changes of planes.
 - B. Hand grade steep slopes and areas that are inaccessible for machine work.
 - C. Protect graded areas from undue erosion, and repair and regrade areas where erosion does occur.
 - D. Refill areas where noticeable settlement has occurred.
 - E. Finish grade areas that are to receive topsoil up to 4 inches below the finished contour elevations or, over rock, to 12 inches below these elevations.

- 3.4 Place topsoil uniformly over disturbed areas that do not receive other work as follows:
- A. Obtain approval of the finish grading from the A/E before starting to place topsoil.
 - B. Scarify subgrade to a depth of 3 inches.
 - C. Place the topsoil to a depth of 4 inches when lightly rolled or, on rock, to a depth of 12 inches.
 - D. Level the topsoil so that it slopes uniformly and has no water pockets.
 - E. Carefully rake the topsoil by hand to remove all clods, roots, sticks, stones over 1 inch in diameter, and other foreign materials from the surface.
- 3.5 Dispose of excess excavated materials and debris away from the site.

END OF SECTION

SECTION 024282

TERMITE CONTROL

PART 1 GENERAL

- 1.1 Furnish all necessary labor, material, and equipment to ensure the eradication and control of termite infestation on all levels of the building and to render a termite protection guarantee in force as specified herein.
- 1.2 The Contractor should visit the site of the work and acknowledge that he has satisfied himself as to the nature and location of the work; the general and local conditions, particularly accessibility to locations where work must be accomplished, location of pest harborage areas, and other items affecting execution of the work; structural details of the buildings; limitations on time of work; availability of labor, character of equipment, supplies, and facilities needed preparatory to and during execution of the work; and all other matters on which information is reasonably obtainable and which can in any way affect the work or its cost. Any failure by the Contractor to acquaint himself with all available information will not relieve him from the responsibility of estimating the difficulty and cost of properly performing the work.
- 1.3 Present certification indicating satisfactory performance in insect and pest control for a minimum period of 5 years. The Contractor shall be bonded and insured, be certified by the state, and be a member of the National Pest Control Association.
- 1.4 Provide written assurance that areas, buildings, and/or structures treated will be free from reinfestation for the period of 1 year and that, if reinfestation occurs during the guarantee period, the Contractor will retreat any and all portions of the area, buildings, and/or structures which may be reinfested within 24 hours after notification of infestation, at no additional cost.
- 1.5 The guarantee and contract price shall include the cost of reinspection and the furnishing of a written report to the Owner by the Contractor's representative on the first anniversary of the effective date of the guarantee specified herein.
- 1.6 Protect at all times all personnel, materials, chemicals, supplies, property, and equipment of every description.
- 1.7 The Contractor and his representative at the site shall be thoroughly trained in pesticide first aid.

PART 2 PRODUCTS

- 2.1 Application of all insecticides and pesticides shall be performed by licensed applicators or under direct supervision of a licensed applicator. Insecticides, including equipment, shall be of types approved by the governing authorities, shall be of approved strength, and shall be applied so that excessive fumes or fogs do not adversely affect personnel in adjoining structures or buildings. All materials, equipment, and methods shall comply with the requirements of the government bodies having jurisdiction.

- 2.2 Materials and methods to accomplish the specified results are the responsibility of the Contractor within the limits set forth in this section.
- 2.3 All items of equipment proposed for use shall be free from defects and shall be kept in good working condition. Use respirators, masks, gloves, and associated items of equipment where required for safety.
- 2.4 All pesticides to be used shall be registered with EPA. Pesticide containers shall display the manufacturer's product label showing the EPA registration number and directions for its use. Apply pesticides only as directed and only against the pests listed on the label.

PART 3 EXECUTION

- 3.1 Make no applications in occupied spaces until all occupants have vacated the premises. Apply pesticides so as to prevent toxic exposure to personnel, pets, wildlife, ornamental plants, and any other nontarget components of the environment. Exercise caution to ensure that toxicants do not run off as surface flow or contaminate any ditch, culvert, drainage system, or standing body of water. Do not store or keep any pesticide or pesticidal material at the site when not working. All pesticides provided by the Contractor shall be kept either in a locked vehicle or under the immediate and direct control of the Contractor. Pesticide dispersal and formulating equipment will not normally be cleaned at the installation. Remove empty pesticide containers from the installation for disposal by the Contractor.
- 3.2 Furnish the specified guarantee on the Contractor's standard form.
- 3.3 Fill all drilled holes with a suitable sealant. Plugs must be non-cellulose material or covered by an impervious, non-cellulose material.

END OF SECTION

SECTION 024485

SEEDING

PART 1 GENERAL

- 1.1 This work shall be performed in all disturbed areas not receiving such site improvements as buildings, roads, walks, sod, planting, etc., and shall include, but not necessarily be limited to, all seed bed preparation; the supplying and placing of soil additives, seed, and mulch wherever required by the Drawings or directed by the A/E; and maintenance.
- 1.2 Unless otherwise approved in writing by the A/E, seeding operations shall be limited to the following planting periods:
 - A. Spring - March 1 through May 30
 - B. Fall - August 15 through October 31
- 1.3 Refer to other sections for items affecting seeding. Coordinate this work with that specified by other sections for timely execution.

PART 2 PRODUCTS

- 2.1 **GRASS SEED:** Kentucky 31 Fescue (*Festuca Elatior*) and/or annual rye meeting the requirements of the State Department of Agriculture and furnished in new bags or bags that are sound and not mended; no "below standard" seed accepted
- 2.2 **FERTILIZER:** Commercially manufactured; Grade 10-10-10; furnished in standard containers that are clearly marked with the name, weight, and guaranteed analysis of the contents and that ensure proper protection in transportation and handling; and in compliance with all local, state, and federal fertilizer laws
- 2.3 **AGRICULTURAL LIMESTONE:** Containing a minimum of 85 percent calcium carbonate and magnesium carbonate combined, 85 percent of which passes a No. 10 mesh sieve
- 2.4 **MULCH:** Stalks of rye, oats, wheat, or other approved grain crops properly cured prior to baling, air dried, and reasonably free of noxious weeds and weed seeds or other material detrimental to plant growth

PART 3 EXECUTION

- 3.1 Perform all seeding and related work as a continuous operation. Sow seed as soon as the seed bed has been prepared, and perform subsequent work in a continuous manner.
- 3.2 Before beginning seeding operations in any area, complete the placing of topsoil and final grading, and have the work approved by the A/E.
- 3.3 Scarify, disk, harrow, rake, or otherwise work each area to be seeded until the soil has been loosened and pulverized to a depth of not less than 2 inches. Perform this work only when the soil is in a tillable and workable condition.

- 3.4 Apply fertilizer and agricultural limestone uniformly over the seed bed, and lightly harrow, rake, or otherwise incorporate them into the soil for a depth of approximately 1 inch at the following rates:
 - A. Fertilizer: 15 pounds per 1,000 square feet
 - B. Agricultural Limestone: 40 pounds per 1,000 square feet
- 3.5 Sow seed uniformly with a rotary seeder, wheelbarrow seeder, or hydraulic equipment or by other satisfactory means.
- 3.6 The seeding rate shall be 5 pounds per 1,000 square feet for Kentucky 31 Fescue (*Festuca Elatior*).
- 3.7 When seeding during March 1 through April 1 and October 1 through November 20, add an additional 3 pounds per 1,000 square feet of annual rye grass.
- 3.8 Perform no seeding during windy weather or when the ground surface is frozen, wet, or otherwise untiltable.
- 3.9 When seeding with mulch is specified, spread the mulch material evenly over the seeded areas immediately following the seeding operation.
 - A. Mulch Rate: 2 bales (100 pound minimum) per 1,000 square feet
- 3.10 The mulch rate may be varied by the A/E, depending on the texture and condition of the mulch material and the characteristics of the area seeded. Cover all portions of the seeded areas with a uniform layer of mulch so that approximately 25 percent of the ground is visible.
- 3.11 No equipment, material storage, construction traffic, etc., will be permitted on newly seeded ground.
- 3.12 Dispose of all surplus materials as directed by the Owner.

Part 4 INSPECTIONS

- 4.1 The A/E shall inspect the seeding within 60 days after planting and determine if it is acceptable.

Part 5 GUARANTEE

- 5.1 Secure an acceptable growth of grass in all areas designated for seeding.
- 5.2 An area is considered acceptable if it is represented by a minimum of 100 seedlings per square foot of the permanent species of grass representative of the seed mixture. If an acceptable growth is not obtained on the first planting, reseeding and remulching will be required.
- 5.3 If the planting is less than 50 percent successful, rework the ground, refertilize, reseed, and remulch.

END OF SECTION

SECTION 024491

LANDSCAPE PLANTING - TREES, SHRUBS, AND GROUND COVER

PART 1 GENERAL

- 1.1 This work shall include, but not necessarily be limited to, the excavation of tree pits, planting pits, and beds; placement of topsoil and soil additives; the furnishing of all materials; and the planting of all trees, shrubs, and ground cover shown on the Drawings.
- 1.2 Plant names referred to on the Drawings conform to The Standardized Plant Names, Second Edition, adopted by the American Joint Committee on Horticultural Nomenclature, 1942, as amended. In cases not covered therein, follow the custom of the nursery trade.
- 1.3 Plant specifications such as height, spread, shape, caliper, or size of ball for plants specified shall conform to the "American Standard for Nursery Stock," ANSI Z60.1, adopted by the American Association of Nurserymen.
- 1.4 All work shall be performed by fully qualified plantsmen. Use good horticultural practices to keep all plants and plant material installed in a living, healthy condition up to the date for termination of the Contractor's responsibility for care.
- 1.5 The plants delivered to the project site shall be planted as soon as site conditions permit. Take care in scheduling plant deliveries and the size of deliveries so that long periods of storage are avoided. Adequately protect plants placed in temporary storage from the sun and wind; water the plants so as to maintain their appearance and health. Plants that have not been properly maintained during temporary storage may be rejected by the A/E.
- 1.6 The Contractor shall be responsible for all inspections of plant material that may be required by the state and federal authorities and shall secure and have executed any permits and certificates that may be necessary. All plants shall be subject to the approval of the A/E and may be inspected by him at any place or at any time and before any plant is dug. Plants shall be inspected for size and quality only; variety, species, sex, and flower color shall be the responsibility of the Contractor.
- 1.7 The optimum time for planting is from October 1 to April 1. Scheduling for planting at other times must be approved in writing by the A/E.
- 1.8 Set all plant material to the required grade so that it bears the same relationship to the surrounding grade as it had before transplanting. Plant each tree and shrub in topsoil in the center of the pit unless otherwise specified or shown on the Drawings.
- 1.9 Refer to other sections for work affecting the landscape planting of trees, shrubs, and ground cover. Coordinate this work with other specific sections for timely execution. The Contractor shall be wholly responsible for the coordinating, scheduling, ordering, receiving, storing, and installing of plant material as specified herein.

PART 2 PRODUCTS

- 2.1 FERTILIZER: commercially manufactured; furnished in unopened standard containers that are clearly marked with the name, weight, and guaranteed analysis of the contents and that

ensure proper protection in transportation and handling; and in compliance with all local, state, and federal fertilizer laws; Milorganite by the Milorganite Division of the City of Milwaukee, Peters Slow Release Fertilizer by W. R. Grace and Company, or Agreform Planting Tablets by Agreform International

- 2.2 SAND: from an approved source
- 2.3 AGRICULTURAL LIMESTONE: containing a minimum of 85 percent calcium carbonate and magnesium carbonate combined, 85 percent of which passes a No. 10 mesh sieve
- 2.4 MULCH: natural, shredded or chipped hardwood bark mulch.
- 2.5 PEAT MOSS: packaged in substantial commercial containers of the type, size, and kind commonly used for the purpose and marked with the name of the manufacturer; sampled and tested in accordance with the Federal Specification for Peat Moss, Reed and Sledge, Q-P-166, Section F, dated November 28, 1947:
 - A. Sphagnum Peat: partially decomposed fibrous or cellular stems and leaves of several species of sphagnum mosses conforming to the following requirements:
 - 1. Texture and Composition: may vary from porous-fibrous to spongy-fibrous; either crumbly or compact; fairly elastic and substantially homogenous; free from decomposed colloidal residue, wood sulfur, and iron; brown in color; finely shredded material suitable for horticultural purposes, shredded particles not to exceed 1/4 inch in size
 - 2. pH Value: not less than 3.5 or more than 5.5
 - 3. Moisture Content: furnished in air dry condition, containing not more than 35 percent moisture by weight
 - 4. Water Holding Capacity: than 100 percent by weight on an oven dry basis
 - 5. Ash: not more than 3 percent
 - B. Sledge Peat: pure black domestic peat native to the area, consisting of partially decomposed vegetable matter of natural occurrence, free of weeds, clean, low in content of mineral and woody material, pH range of 6.0 to 6.2, either granulated or shredded
- 2.6 TREE WRAPPING MATERIAL: waterproof, 6 inches in width, and of the type manufactured by Chase Bag Company, Sisal Kraft
- 2.7 PLANT MATERIALS: conforming to the following requirements for the types shown on the Drawings and specified herein:
 - A. Condition: sound; healthy; vigorous; free from plant diseases, abrasions, insect pests, and insect eggs; and with healthy, normal root systems. Stock that is freshly dug and not heeled in or that is from cold storage will not be accepted.
 - B. Origin: grown under climatic conditions similar to those in the locality of the project site, acclimated to the conditions of the locality of the site for at least 2 years, or as approved by the A/E
 - C. Pruning: not to be pruned prior to delivery except as authorized by the A/E; dressing for pruned plants to be Treekote tree wound dressing

- D. Symmetry: symmetrical, typical of the variety and species, conforming to all minimum measurements shown on the Drawings. Match plants in groups or where symmetry is required as nearly as possible or as approved by the A/E.
 - E. Height and Spread: Measure height and to foliage line with the branches in their normal position.
 - F. Multi-Stemmed or Clumps: to be a minimum of 3 leaders or trunks and a maximum of 6
 - G. Specimen Stock: to be nursery grown but not the ordinary nursery-run grade, fully developed, bushy, and better branched than is typical of the species
 - H. Stakes for Bracing and Anchoring: sound, sturdy, new lumber suitable for the intended use
 - I. Wire: malleable, galvanized 12 gauge wire; or, for trees over 4 inches in caliper, 9 gauge
- 2.8 Remove any plant material delivered to the site that does not satisfy all the requirements of these specifications, and replace with materials that do meet the requirements. No inspections or sealing of plant materials as herein specified shall be taken to change or modify these requirements in any way.

PART 3 EXECUTION

- 3.1 Select and prepare all plant materials to conform to at least the minimum specifications established by the American Association of Nurserymen Standards, ANSI Z60.1. Plants marked as B&B on the itemized plant list shall be adequately balled and burlapped. Do not accept any plant if the ball of earth surrounding its roots has been cracked or broken preparatory to or during the process of planting or if the burlap, staves, ropes, or platforms required in connection with its use have been removed.
- 3.2 Set all balled and burlapped plants that cannot be planted immediately on the ground, and cover the balls well with soil, straw, or other acceptable material. Moisten such material periodically to prevent drying.
- 3.3 Take care when removing container grown plants from their containers so that the earth ball is not broken. Plants on which the ball has been loosened or broken will be rejected. No portion of a container shall be buried with the root system unless the container is made of material that will readily decompose (e.g., peat or paper).
- 3.4 Do not excavate or prepare planting areas until they have been staked on the ground and, if necessary, until the location and outline have been approved by the A/E. Excavate all planting areas to the depths necessary to install plantings and/or mulch of required depths. Planting areas shall be cleared of grass and weeds prior to installation of plants. If rock or any other objectionable materials are encountered, notify the A/E before proceeding.
- 3.5 Plant trees in individual pits 2 feet greater in diameter than the plant ball. The depths of such pits shall be not less than 1 foot more than the depths of the ball of the plant materials. The pits shall have vertical sides and flat bottoms. Set trees so that the top of the ball at the trunk is at finished grade, unless trees are planted beneath grates, in which case set the ball in

accordance with the Tree Planting Details on the Drawings.

- 3.6 Plant shrubs in individual pits 18 inches greater in diameter than the plant ball. The depths of such pits shall be not less than 6 inches more than the depths of the ball of the plant materials. The pits shall have vertical sides and flat bottoms. For shrubs planted in shrub beds, excavate the entire bed to a depth of 24 inches. Set shrubs so that the top of the ball at the trunk is at finished grade.
- 3.7 Plant ground cover in individual pits 12 inches larger than the plant ball. The depths of such pits shall not be less than 4 inches more than the depths of the plant balls. Set plants so that the top of the ball at the trench is at finished grade.
- 3.8 Plant with a soil mixture of 25 percent peat moss and 75 percent topsoil, by volume.
- 3.9 All planted areas shall be treated with a water soluble herbicide for the non-selective control of annual and perennial weed prior to planting.
- 3.10 After the plant is set in the center of the pit, backfill the pit to approximately 2/3 of the required topsoil depth. At this time, thoroughly saturate the tree pits with water. Soil saturation shall be considered complete when water begins to collect in the planting pit. Allow time for any water standing in the pits to be absorbed before completing the backfilling.
- 3.11 Apply two pounds actual nitrogen (in slow release form) per 1,000 square feet to all shrub and tree planting areas before laying mulch.
- 3.12 For shrubs planted in beds or individually, place a layer of hardwood bark mulch on the finished grade. The outline of the mulch for individual shrubs shall be circular and cover the limits of the planting pit with no less than a 2 feet diameter circle for each plant. When shrubs are planted in beds or mass planting, the entire bed shall be mulched. Mulch shall be 4 inches in depth.
- 3.13 For trees planted in beds or individually, place a layer of hardwood bark mulch on the finished grade. The outline of the mulch shall be circular and cover the limits of the planting pit with no less than a 2 feet diameter circle for each plant. The depth shall be a minimum of 4 inches.
- 3.14 Landscape edging shall be provided at the perimeters of all planting beds as follows:
14 gauge Ryerson steel edging by Joseph T. Ryerson & Son, Inc., P.O. Box 8000-A, Chicago, IL 60680, or approved equal.
- 3.15 Place a layer of hardwood bark mulch on the entire ground cover bed. The depth of the bed shall be 4 inches.
- 3.16 After planting, wrap all deciduous trees with wrapping paper 6 inches wide. Begin the wrapping at the ground and proceed spirally to the lower part of the bottom branches. Each successive wrap shall overlap the preceding one by 1/2 the width of the paper.
- 3.17 Tightly secure the last wrap with twine, winding in the direction opposite to the paper wrap and in 12 inches vertical spirals down the trunk. Tightly secure the end at the bottom wrap.
- 3.18 The Contractor shall be responsible for the condition of this wrapping throughout the life of the contract. Any damage resulting from the improper installation or maintenance of this

wrapping shall be the responsibility of the Contractor, who shall replace trees with such damage at his own expense. Remove the wrapping immediately prior to final inspection unless the A/E directs otherwise.

- 3.19 Schedule the placement of topsoil to follow plant excavation so that no excavated areas are left unfilled for more than 24 hours.
- 3.20 Loosen and remove ropes and burlap from the top 1/3 of the ball, but do not pull burlap or ropes out from under the ball.
- 3.21 The Contractor shall be required to repair at his own expense any areas where settling may occur due to improper backfilling.
- 3.22 The Contractor shall grade and seed all disturbed areas beyond the planting areas unless otherwise noted.
- 3.23 Methods of staking or guying shall be in accordance with the detailed Drawings. Any deviation from these details shall be approved by the A/E before work proceeds. Stakes, braces, and anchors must be in a horizontal or vertical position. Irregular or unsymmetrical staking will not be accepted.
- 3.24 At the direction of the A/E, the Contractor shall replace or correct at his own expense any trees that sway excessively, move out of plumb, are blown down, or are otherwise injured due to settling or failure of bracing during the life of this contract and the guarantee period.
- 3.25 The Contractor shall remove from the site any material which turns brown or defoliates within five days after planting. Replace immediately with approved specified materials.
- 3.26 Trees and shrubs shall not be pruned prior to delivery except as authorized by the A/E. All pruning on the planting site shall be as follows:
 - A. Prune the ends of all broken and damaged branches and roots with diameters of 1/4 inch or larger with a clean cut, removing only the injured portion; remove all broken branches and stubs; and
 - B. Treat all wounded or pruned surfaces of 1/2 inch or more in diameter with a dressing approved by the A/E.
- 3.27 The Contractor shall, at his own expense, remove from the site and dispose of any surplus and waste materials resulting from planting.
- 3.28 INSPECTIONS
 - A. The A/E shall make a primary and final inspection of all trees, shrubs, and ground cover.
 - B. He shall conduct the primary inspection when the Contractor requests, provided this inspection is made within ten (10) days after planting is completed.
 - C. He shall conduct the final inspection at the end of the first growing season.

- D. Plants not conforming to the plant specifications outlined in the "American Standard for Nursery Stock," ANSI Z60.1, as adopted by the American Association of Nurserymen, will be rejected.

3.29 GUARANTEES

- A. Establish the specified types of trees, shrubs, and ground cover in the locations approved by the A/E. These shall be in a live, healthy, and growing condition when inspected for acceptance by the Owner. At each inspection, the A/E shall determine whether dead, degenerated, defective, or missing plants or any other plants not in compliance with the Drawings and specifications must be replaced.
- B. The Contractor shall maintain all plant material and lawns until the project is accepted by the Architect.
- C. The Contractor shall guarantee all workmanship and material for a period of one growing season, from the date the project is accepted (Substantial Completion).

END OF SECTION

SECTION 025500

WALKS AND PADS

PART 1 GENERAL

- 1.1 Refer to the Drawings to determine the extent of the work specified under this heading.
- 1.2 Coordinate this work with equipment installation schedules for pad completion.

PART 2 PRODUCTS

- 2.1 CONCRETE: As specified elsewhere
- 2.2 GRANULAR FILL: As specified elsewhere
- 2.3 JOINT FILLERS: Fiberboard of the lengths necessary to accomplish the work
- 2.4 FINISH: Broom

PART 3 EXECUTION

- 3.1 Place granular fill, compact and level, under walks and equipment pads.
- 3.2 Where walks run along parking areas, turn concrete down to form curb.
- 3.3 Place expansion joint every 20 feet in straight runs of walks, at right angle turns, and wherever the concrete butts vertical surfaces.
- 3.4 Tool transverse joints at 5 feet intervals unless otherwise detailed on the Drawings. Joints shall be 1/4 the depth of the slab and 1/8 inch to 1/4 inch wide. Tool a 3/4 inch radius on edges of joints and on the sides of all walks.
- 3.5 When the concrete has hardened enough to bear a man's weight without imprint, float the concrete until its surface is porous and open. Broom lightly from side to side, keeping scoring lines straight and approximately 1/16 inch deep.
- 3.6 Caution truck drivers and equipment operators to prevent damage. Replace any damaged walks or pads.

END OF SECTION

SECTION 025528

CONCRETE PAVEMENT, CURB, AND GUTTERS

PART 1 GENERAL

- 1.1 The work covered by this section consists of furnishing all plant, labor, equipment, appliances, and materials and of performing all operations in connection with the construction of concrete pavements, curbs and gutters, sidewalks, concrete steps, and driveway ramps on previously prepared subgrades in accordance with the Drawings and these specifications.

1.2 CONCRETE

- A. Unless otherwise noted on the Drawings, all concrete shall be $f' = 3,500$ psi, as defined by ACI standards, air entrained. The applicable provisions of ACI 301, Specifications for Structural Concrete for Buildings, form a part of this specification.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 SUBGRADE AND FORMS

- A. Provide and operate a template for checking the contour of the subgrade. The template shall rest on the side forms and shall be provided with adjustable rods that project downward to the subgrade at 1 foot intervals. Adjust these rods to the required cross sections of the bottom of the slab when the template is supported at its sides.
- B. Forms shall be of metal or wood and subject to approval by the A/E.
- C. The Contractor may elect to use extruded machine curb or curb and gutter. The Owner reserves the right to approve the machine used, the contour and finish of the curb and gutter, and the design mix and the right to designate the spacing for expansion and contraction joints.
- D. Test the subgrade with respect to elevation and density prior to setting forms. Complete the subgrade to the plane of the typical sections shown on the Drawings and/or to the lines, grades, and/or notes established in the Drawings. Compact subgrades for all slabs of earth to at least 95 percent of maximum dry density as determined by ASTM D698 (Standard Proctor).
- E. After preparing the subgrade as described above, set the forms. The subgrade under the forms shall be firm and cut true to grade so that each form section will, when placed, be firmly in contact for its entire length and base width. Stake the form into position so that the top, when tested by a 10 feet straightedge, conforms to the requirements specified for the surface of the concrete and so that the longitudinal

axis of the upstanding leg does not vary more than 1/4 inch. Tightly lock form sections together.

- F. Finish and wet the subgrade down far enough in advance of the placing of the concrete to ensure that it is firm and moist. In cold weather, the subgrade shall be entirely free from frost when the concrete is deposited.
- G. Leave forms in place at least 24 hours after the concrete has been placed against them. Do not use crowbars or heavy tools against green concrete when removing the forms. Clean the forms well before reoiling and reuse.

3.2 PLACING

- A. Concrete shall be in place within 45 minutes from the time all ingredients are charged in the mixing drum and before the concrete has obtained its initial set. Deposit concrete so that minimum handling will be necessary, and distribute it so that, when consolidated and finished, the slab thickness and surface grade required by the Drawings will be obtained at all points. Place concrete rapidly and continuously between expansion joints. Use shovels for any necessary hand spreading. Consolidate the concrete adjacent to forms and joints with forks and spades.
- B. Do not place concrete when the ambient temperature is below 35 degrees F, nor when the concrete is, without special protections, likely to be subject to freezing temperatures before final setting has occurred. The temperature of the concrete when placed shall be not less than 50 degrees F, nor more than 90 degrees F. Heating of the mixing water and/or aggregates will not be permitted until the temperature of the concrete has decreased to 55 degrees F. Heated materials shall be free from ice, snow, and frozen lumps before entering the mixer. Methods and equipment for heating shall be subject to the A/E's approval. Provide suitable means for maintaining the concrete at a temperature of at least 40 degrees F for not less than 72 hours after placement. Any concrete damaged by freezing shall be removed and replaced at the expense of the Contractor.

3.3 FINISHING

- A. Immediately after placement, properly finish the concrete. The sequence of operations shall be as follows: hand finishing, longitudinal floating, straightedge finishing, and edging the joints.
- B. Provide an approved hand strike template, approved tamping template, and a longitudinal float for the hand finishing of pavement. The templates shall be at least 1.0 foot longer than the pavement width and at least 4 inches wide. The longitudinal float shall be 6 feet to 8 feet long. The float shall be rigid and substantially braced and provided with suitable handles to ensure smooth and effective manipulation. The bottom edges of the base of the float shall be rounded. Floats made of metal or a combination of wood and metal may be used.
- C. As soon as concrete is placed, strike off and screed to the appropriate cross section and to an elevation above grade which, when the concrete is consolidated and finished, will ensure that the surface of the pavement is at the exact elevation indicated on the Drawings. Tamp the entire surface, and continue tamping until the required compaction and reduction of internal and surface voids are secured.

Immediately after the final tamping of the surfaces, float the pavement longitudinally by hand. If contact with the pavement is not made at all points by the float, additional concrete shall be required and screeded, and the float operated until a satisfactory surface is obtained.

- D. After the longitudinal floating is complete, eliminate minor irregularities and score marks remaining in the pavement surface by removing surplus material or, if necessary, by adding and working in freshly mixed concrete with long handled floats and filling in open textured areas in the pavement surfaces. Make the final finish with straightedges 8 feet in length. A straightedge operated from the side of the pavement shall be equipped with a handle 3 feet longer than 1/2 of the pavement width. Place the straightedge at the centerline and pull uniformly to the edge. Do not advance the straightedge along the pavement in successive stages more than 1/2 its length. Immediately fill depressions with freshly mixed concrete, strike off, consolidate, and refinish. Remove projections above the required elevation while the concrete is still plastic and workable, doing so in a time sequence that will ensure the removal of all water and laitance from the surface. Continue the straightedge testing and refloating until the entire surface is free from observable departures from the straightedge, conforms to the required grade and contour, and will, when the concrete has hardened, conform with the surface requirements specified herein.
- E. After hand finishing has been completed but before the concrete has attained initial set, carefully finish the edges of slabs along forms and at joints with an edging tool of 1/2 inch radius to form a smooth, rounded surface. Clean corners or edges of slabs that have crumbled and any areas that lack enough mortar for proper finishing by removing loose fragments and soupy mortar, and then fill solidly and finish with a mixture of the correct proportions and appropriate consistency. Eliminate unnecessary tool marks, and leave edges smooth and true to line. After removing the forms, fill any damaged or honeycombed areas with mortar composed of 1 part cement and 2 parts sand.
- F. Form transverse and contraction joints in the finished pavement prior to initial set, spacing them as shown on the Drawings. Contraction joints shall be 1/4 inch wide and 3/4 inch deep and shall be finished with an edging tool of 1/4 inch radius.
- G. Place transverse and premolded expansion joints 1/2 inch thick in such a way that the joint will be filled to within 1/2 inch of the surface of the walk. Place them to full depth and normal to the grade. Wherever concrete walks abut against transverse steps, other walks, or adjacent structures, provide expansion joints. Clean all concrete from the top of the premolded joints and edge the concrete as specified above.

3.4 PROTECTION AND CURING

- A. Protect and cure concrete with an approved curing compound applied according to the manufacturer's directions.

3.5 SURFACE TEST

- A. Remove any portion of the pavement that shows a variation or departure greater than 1/4 inch from the testing edge of a 10 feet straightedge, and replace or correct as directed by the A/E.

END OF SECTION

SECTION 025575

PAVEMENT REPAIR

PART 1 GENERAL

- 1.1 The work specified by this section shall consist of repairing or replacing all damaged pavement, whether public or private. Dirt shoulders, roads, streets, drives, and walks are to be restored to their original condition as an incidental part of the installation of utilities. Repair damaged base on either side of a trench wherever necessary. Trim the oxidation surface to neat lines outside of the trench wall, and repave the entire area as specified below and as shown on the Drawings or on the standard drawings.
 - A. Refer to other sections for work related to that covered by this section.

PART 2 PRODUCTS

- 2.1 MINERAL AGGREGATE BASE: Class A, Grading D crushed stone (TDOT specifications, Section 303, subsection 903.05)
- 2.2 BITUMINOUS PRIME COATS: cutback asphalt, Grade RC-250, or emulsified asphalt, Grade AE-P (Section 402, Subsections 904.02 and 904.03)
- 2.3 CRUSHED STONE CHIPS: Size 6 or Size 7 (Subsection 903.14)
- 2.4 DOUBLE BITUMINOUS SURFACE: for both courses, either cutback asphalt, Grade RC-800 or RC-3000, or emulsified asphalt, Grade RS-2 (Subsections 904.02 and 904.03)
- 2.5 ASPHALTIC CONCRETE BINDER: Grading B or C, as directed by the A/E (Section 307)
- 2.6 BITUMINOUS TACK COAT: Grade AE-3 (Section 403, Subsection 904.03)
- 2.7 ASPHALTIC CONCRETE SURFACE: Grading E (Section 411)
- 2.8 QUICK DRY TRAFFIC MARKING PAINT (WHITE AND YELLOW): Subsection 910.05.

PART 3 EXECUTION

3.1 SUBGRADE

- A. Before any base material is installed, compact the subgrade of the area to be paved to 95 percent of optimum density as determined by ASTM D698 (Standard Proctor).
- B. The backfill material shall contain no topsoil or organic matter. For all areas where subgrade has been prepared, test for uniformity of support by driving a loaded dump truck at a speed of 2 to 3 mph over the entire surface. Make further improvements on all areas that show a deflection of 1 inch or more. When completed, the finished subgrade shall be hard, smooth, stable, and constructed in reasonably close conformance with the lines and grades that existed prior to beginning construction.

- C. When a base course is compacted, cut back the surface course of the existing pavement a minimum of 1 foot beyond the limit of the joint between the old and new base course or as shown on the standard drawings. Take special care to ensure good compaction of the new base course at the joint. Apply and compact the surface to conform to the existing pavement so that it will have no surface irregularity.

3.2 BASE

- A. Install a mineral aggregate base of the type specified above. The maximum compacted thickness of any 1 layer shall be 6 inches and the total thickness of the base shall be that indicated by the standard drawings or as shown on the plans.

3.3 SEAL COAT SURFACE

- A. Uniformly apply a bituminous prime coat of either emulsified asphalt, Grade AE-P, or cutback asphalt, Grade RC-250, over the entire width of the area to be surfaced at a rate of 0.3 gallon per square yard. Immediately after application, uniformly cover the entire area with Size 7 crushed stone chips at a rate of 12 pounds per square yard.

3.4 DOUBLE BITUMINOUS SURFACE

- A. Apply the first course at a rate of 0.38 to 0.42 gallon per square yard with either emulsified asphalt, Grade RS-2, or cutback asphalt, Grade RC-800 or RC-3000, and then immediately cover with Size 6 crushed stone chips at a rate of 33 to 37 pounds per square yard. After this is rolled, apply the second course at a rate of 0.30 to 0.35 gallon per square yard, and at once uniformly cover with Size 7 chips at a rate of 20 to 25 pounds per square yard. Then roll the entire area.
- B. After the application of the cover aggregate, lightly broom or otherwise maintain the surface for a period of 4 days, or as directed by the A/E. Maintenance of the surface shall include the distribution of cover aggregate over the surface to absorb any free bitumen and cover any areas deficient in aggregate. Sweep excess material from the entire surface with rotary brooms. Sweep the surface at the time determined by the A/E.

3.5 ASPHALTIC CONCRETE BINDER

- A. Apply a bituminous prime coat of emulsified asphalt, Grade AE-P, or cutback asphalt, Grade RC-250, at a rate of 0.38 to 0.42 gallon per square yard. Take care to prevent the bituminous material's splashing on exposed faces of curbs and gutters, walls, walks, trees, etc.; if such splashing does occur, remove it immediately. After the prime coat has been properly cured, apply an asphaltic concrete binder to the thickness shown on the standard drawings or the plans.
- B. Carefully place the material to avoid segregation of the mix. Broadcasting of the material will not be permitted. Remove any lumps that do not readily break down.

3.6 ASPHALTIC CONCRETE SURFACE

- A. If the asphaltic concrete surface course is to be placed directly on the mineral aggregate base, place a bituminous prime coat as described above. If, however, the

surface course is to be placed on a binder course, then apply a bituminous tack coat of the sort specified above under PRODUCTS at a rate of 0.05 to 0.10 gallon per square yard. Take care to prevent the bituminous material's splashing on exposed faces of curbs, gutters, walls, walks, trees, etc.; if such splashing does occur, remove it immediately. After the prime or tack coat has been properly cured, apply the asphaltic concrete to the thickness shown on the Drawings or standard drawings. Apply the surface course as described above for the binder course.

3.7 SMOOTHNESS

- A. The finished surfaces shall conform to the lines and grades that existed prior to construction. No deviations, variations, or irregularities exceeding 1/4 inch in any direction when tested with a 12 foot straightedge will be permitted in the finished work, nor will any depressions that will not drain. Correct all such defects.

3.8 SAMPLING AND TESTING

- A. Submit to the A/E test reports made by an independent testing laboratory on the crushed stone aggregate, bituminous materials, and asphaltic concrete design mixes, and obtain his approval of these reports before starting paving operations.
- B. Tests shall be made on the completed elements of the pavement to ascertain the compacted thickness of the base and surface courses. If sections with deficient thicknesses are found, the full section for a reasonable distance on each side of the deficiency shall be refused. Remove and reinstall all such sections. Patch all test holes in connection with thickness tests.
- C. When making surface tests, furnish 1 man to mark all surface defects for corrections.

END OF SECTION

DIVISION 3

CONCRETE

SECTION 03001

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 WORK INCLUDED

- A. The concrete walks, landings, steps, walls, curbs, wheelstops, footings, and other miscellaneous concrete items where called for on the Drawings.

1.2 QUALITY ASSURANCE

- A. Comply with the provision of the following codes, specifications, and standards except where more stringent requirements are shown or specified.

1. ACI 302, Guide for Concrete Floor and Slab Placement
2. ACI 304, Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete
3. ACI 305, Hot Weather Concreting
4. ACI 306, Cold Weather Concreting
5. ACI 347, Recommended Practice for Concrete Formwork

- B. Concrete Testing

1. Concrete testing services shall be paid by the General Contractor and shall be furnished by a laboratory approved by the A/E. The General Contractor shall be responsible for obtaining and delivering all test cylinders to the approved laboratory facility.
2. Materials and installed work may require testing and retesting, as directed by the A/E, at any time during the progress of the work. Tests not specifically indicated to be done at the Owner's expense, including retesting of rejected materials, shall be done at the expense of the General Contractor.

- C. The Contractor is responsible for correcting concrete work that does not conform to the specified requirements, including requirements for strength, tolerances, and finishes. Correct deficient concrete as directed by the A/E.

- D. Test aggregates by the methods of sampling and testing outlined in ASTM C33.

- E. For portland cement, sample the cement and determine the properties by the methods of testing outlined in ASTM C150.

1.3 SUBMITTALS

- A. Product Data

1. Submit data for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, dry-shake finish materials and others as requested by the A/E.

2. Provide material certificates when permitted by the A/E. The certificates shall be signed by the manufacturer and the Contractor certifying each material item complies with or exceeds specified requirements.

B. Design Mix and Testing

1. Design mix shall be submitted in 2 copies for each class of concrete to be used. Do not proceed with concrete production until mix designs have been reviewed and approved by the A/E.
2. Provide 3 copies of each cylinder test.

1.4 PROJECT CONDITIONS

- A. Cover completed work at footing level with sufficient temporary or permanent cover as required to protect footings and adjacent subgrade from the possibility of freezing. Maintain the covering throughout the period when freezing conditions can be anticipated.

PART 2 PRODUCTS

2.1 FORMS

- A. Exposed Surfaces: Plywood, metal framed plywood faced or other acceptable panel type materials, to provide continuous, straight, smooth exposed surfaces. Finish in largest practical sizes to minimize the number of joints and to conform to joint system shown on the Drawings. Provide form material with sufficient thickness to withstand pressure of newly poured concrete without bending.
- B. Other Surfaces: Plywood, lumber, metal or other acceptable material. Provide lumber dressed on at least 2 edges and 1 side for a tight fit.

2.2 FORM COATINGS

- A. Coatings shall be commercially formulated compounds that will not impair subsequent treatments of the concrete surface and will not bond, stain, or adversely affect the concrete surface.

2.3 MATERIALS

A. Concrete

1. Portland Cement: ASTM C150, Type I. Use 1 brand throughout.
2. Aggregates: ASTM C33, normal weight, absent of any spalling-causing substances.
3. Water: Drinkable.
4. Air-Entrainment: ASTM C260, compatible with other admixtures.
5. Water Reducer: ASTM C494, Type A.
6. Calcium Chloride: Not permitted.

B. Related Items

1. Wire Fabric: ASTM A82, cold-drawn, smooth.

2. Steel Wire: ANSI/ASTM A82, cold-drawn steel.
3. Reinforcing Bars: ASTM A615, Grade 60, deformed.
4. Vapor Barrier: ASTM E154, polyethylene sheet, 6 mils thick.
5. Moisture Retention: ASTM C171, polyethylene, polyethylene coated burlap or waterproof paper.
6. Anti-Spalling Agent: AASHTO M-233.
7. Sub-Base Material: AASHTO M-147, natural or crushed gravel, crushed stone, or sand.
8. Hardener: Clear, water-soluble, sprayable silicate-based liquid for curing, hardening, and dustproofing.
9. Bonding Agent: Polyvinyl acetate or acrylic base, rewettable type.
10. Epoxy Adhesive: ASTM C881, 2 component material suitable for use on dry or damp surfaces.
11. Expansion Joints: Pre-formed asphaltic saturated composition board.
12. Joint Sealants: Refer to other sections of these Specifications.

2.4 DESIGN MIXES

- A. The Contractor shall have prepared design mixes for each type and strength of concrete specified, using methods prescribed in ACI 301.
- B. Design mixes shall provide normal weight concrete with the following properties:
 1. General: 3,500 psi 28 day compressive strength; 560 pounds cement per cubic yard, minimum; W/C ratio, 0.44 maximum.
 2. Air-Entrainment: 2 to 4 percent, added at the manufacturer's prescribed rate for exterior exposed concrete subject to freezing, thawing, hydraulic pressure or deicing chemicals.
 3. Slump: Not less than 1 inch and not more than 4 inches.

2.5 CONCRETE MIXING

- A. Job Site Mixing: Mix materials in appropriate drum-type batch machine mixer. For mixes of 1 cubic yard or smaller, continue mixing at least 1-1/2 minutes, but no more than 5 minutes after ingredients are in mixer, before any part of the batch is released. For larger capacities increase mix time by 15 seconds for each additional cubic yard or fraction thereof.
- B. Ready Mix: ASTM C94. Delete references allowing additional water to be added to the batch with insufficient slump. Addition of water shall not be permitted.
- C. Weather: When air temperatures are between 85 degrees F and 90 degrees F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes. When air temperature is expected to exceed 90 degrees F, reduce mixing and delivery time to 60 minutes.

PART 3 EXECUTION

3.1 PREPARATION

- A. Following excavation and removal or relocation of existing construction, install sub-base materials for slabs as needed to insure that slabs will be a minimum thickness

of 4 inches when placed. Compact additional sub-base materials, wetting if necessary, to obtain a minimum of 84 percent solid volume throughout the layer. New materials shall be placed in layers not to exceed 6 inches when measured loose.

- B. Extend excavations, so that structural components, such as walls, footings or underpinning, are at an elevation not less than 24 inches below the final or finish grade.
- C. Moisten sub-base to provide a uniform, dampened condition at the time the concrete is placed.

3.2 FORMS

- A. Design, erect, support, brace and maintain formwork to support vertical and lateral loads that might be applied until such loads can be supported by the concrete structure. Construct forms to correct size, shape, alignment, elevation and position.
- B. Construct forms to sizes, shapes, lines and dimensions shown and obtain accurate alignment, location, grades, level and plumb work in finished structure. Provide for openings, offsets, sinkages, keyways, recesses, molding, reglets, rustications, chamfers, blocking, screeds, bulkheads, anchorages and inserts of other features required in the work. Solidly butt joints and provide backup to prevent leakages of cement paste. Set forms to provide slope for all horizontal exposed surfaces, such as walks, landings, stair treads, etc.
- C. Provide openings in formwork to accommodate the work of other trades. Accurately place and securely support items built into forms.
- D. Thoroughly clean forms and adjacent surfaces to receive concrete. Retighten forms and bracing after concrete is placed as required to eliminate mortar leaks and maintain proper alignment.

3.3 PLACING REINFORCEMENTS

- A. Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcement Bars," for details and methods of placing reinforcement and supports. Reinforcements shall be provided for each type of concrete placement in the size or type indicated on Drawings or as directed by the A/E.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials which reduce or destroy bond with concrete.
- C. Install welded wire fabric in as long lengths as practical. Lap adjoining pieces at least 1 full mesh and lace splices with wire. Offset end laps in adjacent widths to prevent continuous laps in either direction.

3.4 CONSTRUCTION JOINTS

- A. Locate and install construction joints as are shown on the Drawings or a maximum of 5 foot spacing for walks, 20 foot spacing for slabs or match existing patterns, if not shown, so as not to impair the strength and appearance of the placement.

- B. Provide keyways at least 1-1/2 inches deep in construction joints in flatwork, where placement operations are stopped for a period of more than 1/2 hour, except at designated expansion joints. The use of accepted bulkheads designed for this purpose may be used. Saw joints will not be acceptable.
- C. Place joints perpendicular to the main reinforcing and continue reinforcement across construction joints. Joints shall be true to line and perpendicular to the surface of the concrete to a minimum depth equal to 1/4 of the concrete thickness. Form joints with hand tools specifically made for the joint configuration.

3.5 EXPANSION JOINTS

- A. Locate and install expansion joints where new construction adjoins existing construction, such as walks, walls, or stairs. In addition, place expansion joints at a maximum spacing of 20 feet in any direction for new placements, unless otherwise directed.
- B. Joint filler shall extend full width of surfaces and shall be set to be a maximum of 3/8 inch below the finished concrete surface. Fill the remaining depth with joint backer according to the sealant manufacturer's directions. Use only materials recommended by the sealant manufacturer for reducing the filler depth when the joint depth exceeds the 3/8 inch maximum. Strictly follow the sealant manufacturer's directions for preparation of surfaces prior to installing the sealant.

3.6 CONCRETE PLACEMENT

- A. Before placing concrete, inspect and complete formwork, reinforcing steel and items to be embedded. Notify other trades to complete installation of their work. Moisten forms immediately before placing concrete where form coatings are not used. Coordinate the installation of joint materials and moisture barriers with placement of forms and reinforcing steel.
- B. Comply with ACI 304 and as herein specified. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness in construction joints. Deposit concrete as early as practical to its final location to avoid segregation. Continue until placing of panel or section is complete. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.
- C. Bring slab surfaces to correct levels with straight edge and strike off. Use bull floats or darbies to smooth surface free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.
- D. Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions or low temperatures in compliance with ACI 306.
- E. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade that contains frozen materials.
- F. Do not use calcium chloride, salt and other materials containing antifreeze agents or chemical accelerators, unless otherwise accepted in mix designs.

- G. When hot weather conditions exist that would seriously impair the quality and strength of concrete, place concrete in compliance with ACI 305. Cover reinforcing steel with watersoaked burlap if it becomes too hot, so that the steel temperature will not exceed the ambient air temperature immediately before embedment in concrete. Wet forms thoroughly before placing concrete.

3.7 FINISHING

- A. Following completion of floating and troweling, when excess moisture or surface sheen has disappeared, apply a broom finish across the surface perpendicular to the direction of traffic.

3.8 CURING AND PROTECTION

- A. Protect freshly poured concrete from premature drying and excessive cold or hot temperatures. Start initial curing as soon as free water has disappeared from the surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days. Begin final curing procedures immediately after initial curing and before concrete has dried. Continue final curing for at least 7 days at end of curing period.
- B. Perform curing of concrete by moist curing, by moisture retaining cover curing, by curing compound or by combinations thereof as herein specified. Moisture curing shall be conducted by the following methods:
1. Keep concrete surface continuously wet by covering with water.
 2. Continuous water-fog spray.
 3. Covering concrete surface with specified absorptive cover, thoroughly saturating cover with water and keeping continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4 inch lap over adjacent covers.
- C. Apply sealers, following brooming, at the sealer manufacturer's recommended rate of application. Protect surfaces of joints to be caulked and remove sealer to permit proper bonding of joint sealant materials.

3.9 QUALITY CONTROL TESTING DURING CONSTRUCTION

- A. The Contractor shall employ a testing laboratory to perform any or all of the tests specified below and to submit reports on these tests. Sampling and testing for quality control during the placement of concrete may include the following, as directed by the Owner:
1. Sampling Fresh Concrete: ASTM C172, but modified for slump to comply with ASTM C94
 2. Slump: ASTM C143; 1 test for each concrete load at point of discharge and 1 test of each set of compressive strength test specimens
 3. Air Content: ASTM C173 volumetric method for lightweight concrete; ASTM C231 pressure method for normal weight concrete; 1 test for each set of compressive strength test specimens
 4. Concrete Temperature: Test hourly when air temperature is 40 degrees F and below or when 80 degrees F and above and each time a set of compression test specimens is made.

5. Compression Test Specimen: ASTM C31; 1 set of 3 standard cylinders for each compressive strength test, unless otherwise directed by the Owner. Mold and store cylinders of laboratory cured test specimens except when the Owner requires field cured test specimens.
 6. Compressive Strength Tests: ASTM C39; 1 set for each 100 cubic yards or fraction thereof of each concrete class placed in any 1 day or 1 set for each 5,000 square feet of surface area placed; 1 specimen tested at 7 days, 1 specimen tested at 28 days, and 1 specimen retained in reserve for later testing, if needed
- B. When the frequency of testing provides less than 5 strength tests for a given class of concrete, conduct testing from at least 5 randomly selected batches or, if fewer than 5 are used, from each batch.
 - C. When the total quantity of a given class of concrete is less than 50 cubic yards, the strength test may be waived by the Owner if, in his judgment, adequate evidence of satisfactory strength is provided.
 - D. The strength level shall be considered satisfactory as long as the averages of all sets of 3 consecutive strength test results equal or exceed the specified strength f'_c , and no individual test result falls below the specified strength f'_c by more than 500 psi.
 - E. When the strength of field cured cylinders is less than 85 percent of companion laboratory cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
 - F. Test results will be reported to the Owner and Contractor in writing on the same day that the test is made. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in the structure, design compressive strength at 28 days, concrete mix proportions and materials, and compressive breaking strength and type of break for both 7 day tests and 28 day tests.
 - G. The testing service will make additional tests of in-place concrete when the test results indicate that the required strength level has not been achieved and other characteristics have not been attained in the structure, as directed by the Owner. The testing service may conduct tests to determine the adequacy of concrete by cored cylinders that comply with ASTM C42 or by such other methods as are directed by the Owner. The Contractor shall pay for such tests and any additional testing that may be required when concrete is verified to be unacceptable.

END OF SECTION

DIVISION 6

WOOD AND PLASTIC

SECTION 060110

ROUGH CARPENTRY AND WOOD FRAMING

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

- A. Definition: Rough carpentry includes carpentry work not specified as part of other sections and which is generally not exposed, except as otherwise indicated.
- B. Types of work in this section include rough carpentry for:
 - 1. Wood framing
 - 2. Wood grounds, nailers, and blocking
 - 3. Wood furring
 - 4. Sheathing

1.2 SUBMITTALS

- A. Wood Treatment Data: Submit chemical treatment manufacturer's instructions for handling, storing, installation, and finishing of treated material.
 - 1. Preservative Treatment: For each type specified, include certification by treating plant stating type of preservative solution and pressure process used, net amount of preservative retained and conformance with applicable standards.
 - 2. For Waterborne treatment: Include statement that moisture content of treated materials was reduced to levels indicated prior to shipment to project site.

1.3 PRODUCT HANDLING

- A. Delivery and Storage: Keep materials under cover and dry. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber as well as plywood and other panels; provide for air circulation within and around stacks and under temporary coverings, including polyethylene and similar material. For lumber and plywood pressure treated with waterborne chemicals, place blocks between each course to provide air circulation.

1.4 PROJECT CONDITIONS

- A. Coordination: Fit carpentry work to other work; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds and similar supports to allow attachment of other work.
- B. Coordinate this work with that of suppliers and other trades for timely execution.

PART 2 PRODUCTS

2.1 LUMBER, GENERAL

- A. **Lumber Standards:** Manufacture lumber to comply with PS 20 American Softwood Lumber Standard and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee's (ALSC) Board of Review.
- B. **Grade Stamps:** Factory mark each piece of lumber with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill.
 - 1. For exposed lumber, apply grade stamps to ends or back of each piece, or omit grade stamps entirely and issue certificate of grade compliance from inspection agency in lieu of grade stamp.
- C. **Nominal sizes are indicated, except as shown by detail dimensions. Provide actual sizes as required by PS 20, for moisture content specified for each use.**
 - 1. Provide dressed lumber, S4S, unless otherwise indicated.
 - 2. Provide seasoned lumber with 19 percent maximum moisture content as determined by ASTM D 2016 at time of dressing and shipment for sizes 2 inches or less in nominal thickness, unless otherwise indicated. Either air or kiln drying is acceptable.

2.2 DIMENSION LUMBER

- A. **Wood Species and Grade:** Any species and grade which meets or exceeds:
 - 1. **Studs:**
 - a. Load Bearing: No. 2 or Standard Grade
 - b. Non-Load Bearing: Standard Grade
 - 2. Ceiling Joists (If Required): No. 2
 - 3. Rafters (If Required): No. 2
- B. **Applications and Sizes**
 - 1. For light framing, provide wood 2 inches to 4 inches thick, 2 inches to 6 inches wide, 10 feet and shorter.
 - 2. For structural light framing, provide wood 2 inches to 4 inches thick, 2 inches to 4 inches wide.
 - 3. For structural framing, provide wood 2 inches to 4 inches thick, 5 inches and wider.
- C. **Exposed Framing Lumber:** Furnish material complying with the following requirements (when applicable or indicated):
 - 1. **Definition:** Exposed framing refers to dimension lumber which is not concealed by other work and is indicated to receive a stained or natural finish.

2. Grading: Hand select material at factory from lumber of species and grade meeting specified values for compliance with Appearance Grade Requirements of ALSC National Grading Rule; issue inspection certificate of inspection agency for selected material.

D. Furnish pressure treated wood as indicated.

2.3 MISCELLANEOUS LUMBER

A. Provide wood for support or attachment of other work, including bucks, nailers, blocking, furring, grounds, stripping, and similar members. Provide lumber of sizes indicated, worked into shapes shown, and as follows:

1. Moisture content shall be 19 percent maximum for lumber items not specified to receive wood preservative treatment.
2. Grade to be No. 2 Grade or better light framing size lumber of any species of board size lumber as required.

2.4 CONSTRUCTION PANELS (PLYWOOD)

A. Construction Panel Standards: Comply with PS 1 U.S. Product Standard for Construction and Industrial Plywood for plywood panels, and for products not manufactured under PS 1 provisions, with American Plywood Association (APA), Performance Standard and Policies for Structural Use Panels, Form No. E445.

B. Trademark: Factory mark each construction panel with APA trademark evidencing compliance with grade requirements.

C. Concealed APA Performance Rated Panels: Where construction panels will be used for the following concealed types of applications, provide APA Performance Rated Panels complying with requirements indicated for grade designation, span rating, exposure durability classification, edge detail (where applicable) and thickness.

1. Wall Sheathing: APA Rated Sheathing.
 - a. Exposure Durability Classification: Exposure 1
 - b. Thickness: 1/2 inch or greater, suitable for roof support spacing.
 - c. Span Rating: Wall, 16 inches on center.
 - d. Edge detail: Square.

2.5 MISCELLANEOUS MATERIAL

A. Fasteners and Anchorages: Provide size, type, material, and finish as indicated and as recommended by applicable standards, complying with applicable Federal Specifications for nails, staples, screws, bolts, nuts, washers, and anchoring devices. Provide metal hangers and framing anchors of the size and type recommended by the manufacturer for each use, including recommended nails.

1. Where rough carpentry work is exposed to weather, in ground contact, used with redwood or red cedar, or in area of high relative humidity, provide fasteners and anchorages with a hot dip galvanized coating (ASTM A 153).

Use of cadmium plated or noncorrodible alloy finished fasteners and anchorages shall be approved by the A/E.

- B. Building Paper: ASTM D 226, Type I; asphalt saturated felt, non perforated, 15 pound type (when required).
- C. Adhesive: Comply with PS AFG-01 developed by APA for use with glue nail installations.

2.6 WOOD TREATMENT BY PRESSURE PROCESS

- A. Preservative Treatment: Where lumber or plywood is indicated as PT or Treated, or is specified herein to be treated, comply with applicable requirements of AWPA Standards C2 (Lumber and C9 Plywood) and AWPB Standards listed below. Mark each treated item with the AWPB Quality Mark Requirements.
- B. Pressure treat above ground items with waterborne preservatives to comply with AWPB LP-2. After treatment, kiln dry lumber and plywood to a maximum moisture content, respectively, of 19 percent and 15 percent. Treat indicated items and the following:
 - 1. Wood nailers, curbs, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 - 2. Wood sills, blocking, furring, stripping and similar concealed members in contact with masonry or concrete.
 - 3. Wood framing members less than 18 inches above grade.
- C. Pressure treat the following with waterborne preservatives for ground contact use, complying with AWPB LP-22.
 - 1. Wood members in contact with ground.
 - 2. Wood members in contact with fresh water.
- D. Complete fabrication of treated items prior to treatment, where possible. If cut after treatment, coat cut surfaces with heavy brush coat of same chemical used for treatment and to comply with AWPA M4. Inspect each piece of lumber or plywood after drying and discard damaged or defective pieces.
- E. Inspect each piece of treated lumber or plywood after drying and discard damaged or defective pieces.

PART 3 EXECUTION

3.1 INSTALLATION, GENERAL

- A. Perform all work specified by this section in strict conformance with the methods, nailing schedules, etc., printed in the referenced Standards and by the appropriate trade associations.

- B. Discard units of material with defects which might impair quality of work and units which are too small to use in fabricating work with minimum joints of optimum joint arrangement.
- C. Install members as detailed on the Drawings to required levels and lines, with members plumb and true to line and cut and fitted.
- D. Securely attach carpentry work to substrate by anchoring and fastening as shown and as required by recognized standards.
- E. Countersink nail heads on exposed carpentry work and fill holes.
- F. Use common wire nails, except as otherwise indicated. Use finishing nails for finish work. Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting of wood; predrill as required.
- G. Request clarification from the A/E if the intent of the Drawings are not clear.
- H. Do not cut, notch or bore structural members without specific approval from the A/E or otherwise outlined below:
 - 1. Cutting and Notching: In exterior walls and bearing partitions, any wood stud is permitted to be cut or notched to a depth not exceeding 25 percent of its width. Cutting or notching of studs to a depth not greater than 40 percent of the width of the stud is permitted in nonbearing partitions supporting no loads other than the weight of the partition.
 - 2. Bored Holes: A hole not greater in diameter than 40 percent of the stud width is permitted to be bored in any wood stud. Bored holes not greater than 60 percent of the width of the stud are permitted in nonbearing partitions or in any wall where each bored stud is doubled, provided not more than two such successive doubled studs are so bored. In no case shall the edge of the bored hole be nearer than 5/8 inch to the edge of the stud
 - 3. Bored holes shall not be located at the same section of stud as a cut or notch.
- I. Install bolts, anchors, shields, and other necessary rough hardware.

3.2 WOOD GROUNDS, NAILERS, AND BLOCKING

- A. Provide wherever shown and where required for screening or attachment of other work. Form to shapes as shown and cut as required for true line and level of work to be attached. Coordinate location with other work involved.
- B. Attach to substrates as required to support applied loadings. Countersink bolts and nuts flush with surfaces, unless otherwise indicated. Build into masonry during installation of masonry work. Where possible, anchor to form work before concrete placement.
- C. Provide permanent grounds of dressed, preservative treated, key beveled lumber not less than 1-1/2 inches wide and of thickness required to bring face of ground to exact thickness of finish material involved. Remove temporary ground when no longer required.

3.3 WOOD FURRING (WHEN DETAILED OR INDICATED):

- A. Install plumb and level with closure strips at edges and openings. Shim with wood as required for tolerance of finished work.
 - 1. Furring to Receive Plywood Paneling: Unless otherwise indicated, provide 2 inches x 4 inches furring at 2 feet on center, horizontally and vertically.
 - 2. Furring to Receive Gypsum Drywall: Unless otherwise indicated, provide 2 inches x 4 inches furring at 16 inches on center, vertically or use metal channels or stud specified elsewhere.
 - 3. Suspended Furring: Provide size and spacing shown, including hangers and attachment devices. Level to a tolerance of 1/8 inch in 10 feet.

3.4 WOOD FRAMING, GENERAL

- A. Provide framing members of sizes and on spacings shown on drawings, and frame openings as shown, or if not shown, comply with recommendations of Manual for House Framing of National Forest Products Association (NFPA). Do not splice structural members between supports.
- B. Anchor and nail, as shown, and to comply with Recommended Nailing Schedule of Manual for House Framing and National Design Specifications for Wood Construction published by NFPA.
- C. Firestop concealed spaces of wood framed walls and partitions at each floor level and at the ceiling line of the top story. Where firestops are not automatically provided by the framing system, use closely fitted wood blocks of nominal 2 inches thick lumber of the same width as framing members.

3.5 STUD FRAMING

- A. General: Provide stud framing where shown. Unless otherwise indicated, use 2 inches x 4 inches wood studs spaced 16 inches on center with 4 inches face perpendicular to direction of wall or partition. Provide single bottom plate and double top plates 2 inches thick by width of studs, except single top plate may be used for nonbearing partitions. Nail or anchor plates to supporting construction.
- B. Construct corners and intersections with not less than 3 studs. Provide miscellaneous blocking and framing as shown and as required for support of facing materials, fixtures, specialty items and trim.
- C. Provide continuous horizontal blocking row at mid height of single story partitions over 8 feet high and at midpoint of multi-story partitions, using 2 inches thick members of same width wall or partitions.
- D. Frame openings with multiple studs and headers. Provide nailed header members of thickness equal to width of studs. Set headers on edge and support on jamb studs.
 - 1. Lintels indicated are specified in Division 5 and shown on the Drawings in Lintel Schedule (if any).

- E. For nonbearing partitions, provide 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.
- F. For load bearing partitions, provide double jamb studs for openings 6 feet and less in width, and triple jamb studs for wider openings. Provide headers of depth shown, or if not shown, provide as recommended by NFPA Manual for House Framing.

3.6 FLOOR JOIST FRAMING (WHERE INDICATED OR REQUIRED)

- A. General: Provide framing of sizes and spacing shown on drawings. Install with crown edge up and support ends of each member with not less than 1-1/2 inch of bearing on wood or metal, or 3 inches on masonry. Attach to wood bearing members by toe nailing or metal connectors; frame to wood supporting members with wood ledgers as shown, or if not shown, with metal connectors. Fire cut members built into masonry (if any). Frame openings with headers and trimmers supported by metal joist hangers, double headers and trimmers where span of header exceeds 4 feet. Do not notch in middle third of joists; limit notches to 1/6 depth of joist, 1/3 at ends. Do not bore holes larger than 1/3 depth of joist or locate closer than 2 inches from top or bottom. Provide solid blocking (2 inch thick by depth of joist) at ends of joists unless nailed to header or brand member.
- B. Lap members framing from opposite sides of partitions not less than 4 inches or securely tie opposing members together. Provide solid blocking (2 inches thick by depth of joist) over supports.
- C. Under jamb studs at openings, provide solid blocking between joist.
- D. Provide bridging between joists where nominal depth to thickness ratio exceeds 4, at intervals of 8 feet. Use bevel cut 1 inch x 4 inches or 2 inches x 3 inches wood bracing, double crossed and nailed both ends to joists, or use solid wood bridging 2 inches thick by depth of joists, end nailed to joist.

3.7 RAFTER AND CEILING JOIST FRAMING (WHERE INDICATED OR REQUIRED)

- A. Ceiling Joists: Provide member size and spacing shown, and as previously specified for floor joist framing. Face nails to ends of parallel rafters.
 - 1. Where principal ceiling joists are at right angles to rafters, frame as indicated with additional short joists from wall plate to first joist; nail to ends of rafters and to top plate and nail to long joists or anchor with framing anchors or metal straps. Provide 1 x 8 or 2 x 4 stringers spaced 4 feet on center crosswise over principal ceiling joists.
- B. Rafters: Provide member size and spacing shown. 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.

1. At valleys, provide valley rafter of size shown, or if not shown, provide rafter twice as thick as regular rafters and 2 inches deeper. Bevel ends of jack rafters for full bearing against valley rafter.
2. At hips, provide hip rafters of size shown, or if not shown, provide of same thickness as regular rafters and 2 inches deeper. Bevel ends of jack rafters for full bearing against hip rafters.
3. Provide collar beams (ties) as shown, or if not shown, provide 1 inch x 6 inches boards between every third pair of rafters. Locate below ridge member, 1/3 of distance to ceiling joists. Cut ends to fit slope and nail to rafters.
4. Provide special framing as shown for eaves, overhangs, dormers and similar conditions, if any.

3.8 INSTALLATION OF CONSTRUCTION PANELS (PLYWOOD):

- A. General: Comply with applicable recommendations contained in Form No. E 30E, APA Design/Construction Guide - Residential and Commercial, for types of construction panels and applications indicated.
- B. Fastening Methods: Fasten panels as indicated below:
 1. Sheathing: Nail to framing.

3.9 PROTECTION AND CLEANING

- A. Protect adjacent surfaces. Repair or replaced damaged products and surfaces.
- B. Clean up debris and leave areas broom clean.

END OF SECTION

SECTION 060192

PREFABRICATED WOOD TRUSSES

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

- A. Definition: Prefabricated wood trusses include planar structural units consisting of metal plate connected members which are fabricated from dimension lumber and which have been cut and assembled prior to delivery to the job site. Provide wood trusses for roof construction according to spacing, pitch, and span length(s) as shown on the Drawings.
- B. Roof sheathing is specified with rough carpentry in another Division 6 section.

1.2 QUALITY ASSURANCE

- A. TPI Standards: Comply with applicable requirements and recommendations of the following Truss Plate Institute (TPI) publications:
 - Design Specification for Metal Plate Connected Wood Trusses
 - Commentary and Recommendations for Handling and Erecting Wood Trusses
 - Commentary and Recommendations for Bracing Wood Trusses
 - Quality Control Manual
- B. Wood Structural Design Standard: Comply with applicable requirements of National Design Specification for Wood Construction published by NFPA.
- C. Lumber Standard: Comply with PS 20 and with applicable rules of the respective grading inspecting agencies for species and grade of lumber indicated.
- D. Connector Plate Manufacturer's Qualifications: Provide truss connector plates manufactured by a firm which is a member of TPI and which complies with TPI quality control procedures for manufacture of connector plates published in TPI Quality Control Manual.
 - 1. Fabricator's Qualifications: Provide trusses by a firm which has a record of successfully fabricating trusses similar to type indicated.
 - 2. Uniformity of Manufacture for Connector Plates: Provide metal connector plates from a single manufacturer.

1.3 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Submit fabricator's technical data covering lumber, metal plates, hardware, fabrication process, treatment (if any), handling, and erection.
- C. Submit certificate, signed by an officer of fabricating firm, indicating that trusses to be supplied for the project comply with indicated requirements.
- D. Shop Drawings: Submit shop drawings showing species, sizes, and stress grades of lumber to be used; pitch, span, camber, configuration, and spacing for each type of truss required; type, size, material, finish, design value, and location of metal connector plates; and bearing and anchorage details.
 - 1. To the extent engineering design considerations are indicated as fabricator's responsibility, submit design analysis and test reports indicating loading, section modulus, assumed allowable stress, stress diagrams and calculations, and similar information needed for analysis and to ensure that trusses comply with requirements. Include placement plan with shop drawing submittals.
 - 2. Provide shop drawings which have been signed and stamped by a structural engineer licensed to practice in the state where trusses are fabricated.
 - 3. Materials shall not be delivered to the job site prior to the Contractor's receipt of approved shop drawings.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle to site under provisions of Section 01600.
- B. Handle and store trusses with care and in accordance with the manufacturer's instructions and TPI HET-80 instructions to avoid damage from bending, overturning, or other cause for which the truss is not designed to resist or endure. Store trusses so that they are protected from soil and exposure to the elements. Store truss depth in vertical position resting on intermittent bearing pads.
- C. Time delivery and erection of trusses to avoid extended on-site storage and to avoid delaying work of other trades whose work must follow erection of trusses.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Mass produced wood trusses shall be constructed from uniform parts using precision shop assembly techniques that provide proper alignment and full bearing of wood members. Use a fabricator who is regularly engaged in the manufacturing of plate connected wood trusses. Subject to compliance with requirements, provide metal connector plates manufactured by a member of TPI.

2.2 MATERIALS

- A. Lumber:
 - 1. Factory mark each piece of lumber with type, grade, mill, and grading agency.
 - 2. Nominal sizes are indicated, except as shown by detail dimensions. Provide actual sizes as required by PS 20, for dressed lumber, S4S, unless otherwise indicated. Provide seasoned lumber with a maximum moisture content of 19 percent at time of dressing.
- B. Lumber Species: Any softwood, at fabricator's option, with a minimum modulus of elasticity of 1,600,000 psi.
- C. Lumber Grade: For species selected, provide the following stress rated grade.
 - 1. Grade No. 2: Minimum for top and bottom chord members
 - 2. Grade No. 3: Minimum for web members
- D. Metal Connector Plates, Fasteners and Anchorages
 - 1. Connector Plate Material: Metal complying with following requirements, unless otherwise indicated; not less than 0.036 inch thick, coated thickness (Contractor's option if more than 1 metal indicated).
 - a. Galvanized Sheet Steel: ASTM A446, Grade A, Coat G60.
 - b. Electrolytic Zinc Coated Steel Sheet: ASTM A591, Coating Class C, with minimum structural quality equivalent to ASTM A446, Grade A.
 - 2. Fasteners and Anchorages: Provide size, type, material, and finish indicated, complying with applicable Federal Specifications for nails, screws, bolts, nuts and washers, and anchoring devices.
 - 3. Wind Anchorage: Simpson Strong-Tie Co., No. H2.5.

2.3 WOOD TREATMENT

- A. Fire Retardant Treatment: Where fire retardant treated lumber is required for trusses, provide treatment by pressure process complying with AWPA C20, and identify treated lumber with appropriate classification marking of UL or other testing and inspecting agency acceptable to authorities having jurisdiction. Use a low hygroscopic fire retardant treatment suitable for interior applications with relative humidities of 92 percent or less which is approved by truss plate manufacturer for indicated applications as being noncorrosive to metal plates of material and finish specified.
- B. Kiln dry lumber after treatment to a moisture content of 19 percent or less.
- C. Inspect each piece of treated lumber after drying and discard damaged or defective pieces.

2.4 FABRICATION

- A. Cut truss members to accurate lengths, angles, and sizes to produce close fitting joints with wood-to-wood bearing in assembled units.

- B. Fabricate metal connector plates to size, configuration, thickness, and anchorage details required for types of joint designs indicated.
 - C. Assembled truss members in design configuration indicated using jigs or other means to ensure uniformity and accuracy of assembly with close fitting joints. Position members to produce design camber indicated.
 - D. Connect truss members by means of metal connector plates accurately located and securely fastened to wood members by means indicated or approved.
- 2.5 **LOADING:** Live load at top chord of 20 psf; dead load at top chord of 10 psf; dead load at bottom chord of 10 psf; and total load of 40 psf. Refer to Drawings for trusses requiring special loading and sizes.

PART 3 EXECUTION

- 3.1 **GENERAL:** Erect and brace trusses to comply with recommendations of manufacturer and the Truss Plate Institute.
- 3.2 Erect trusses with plane of truss webs vertical (plumb) and parallel to each other, located accurately at design spacings indicated.
- 3.3 Hoist units in place by means of lifting equipment suited to sizes and types of trusses required, applied at designated lift points in accordance with the manufacturer's recommendations, exercising care not to damage truss members or joints by out-of- plane bending or other causes.
- 3.4 Provide temporary bracing as required to maintain trusses plumb, parallel, and in location indicated, until permanent bracing is installed.
- 3.5 Anchor trusses securely at all bearing points to comply with methods and details indicated.
- 3.6 Install permanent bracing and related components to enable trusses to maintain design spacing, withstand live and dead loads, including lateral loads, and to comply with other indicated requirements.
- 3.7 Do not cut or remove truss members.

END OF SECTION

SECTION 062205

FINISH CARPENTRY (INTERIOR)

PART 1 GENERAL

1.1 SECTION INCLUDES

Work includes the following items. Refer to the Drawings to determine the specific extent of items included in the scope of work for this project. Items could include:

- A. Finish carpentry items, of standing and running trim.
- B. Finish carpentry items, other than shop fabricated items.
- C. Attachment accessories.

1.2 QUALITY ASSURANCE

- A. Perform work in accordance with AWI Premium quality.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Store materials in ventilated, interior locations under constant minimum temperatures of 60 degrees F and maximum relative humidity of 55 percent.

1.4 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated on shop drawings.

1.5 COORDINATION

- A. Coordinate the work with plumbing and electrical rough-in, installation of associated and adjacent components, custom casework, and wood paneling.

PART 2 PRODUCTS

2.1 LUMBER MATERIALS

- A. Custom grade in accordance with AWI; maximum moisture content of 6 percent; white pine wood species and cuts of quality capable of paint finish, unless noted otherwise.

2.2 STANDING AND RUNNING TRIM (WHERE APPLICABLE-REFER TO DRAWINGS)

- A. Interior Wood Trim: AWI Custom Grade
- B. Wood Base:
 - a. WM618 (9/16" x 5-1/4") Traditional Style

- C. Wood Base Shoe:
 - a. WM129 (7/16" x 11/16") Finger Jointed Pine (where to be painted)
 - b. WM126 (7/16" x 11/16") Clear Oak (where to be stained)
- D. Chair Rail:
 - a. WM224 (9/16" x 2-1/4") Traditional Style (Flat Profile to match base)
- E. Windowsill:
 - a. WM1021 (11/16" x 5-1/4") Trimmed as necessary or as detailed
- F. Profile/Shapes: Fabricated to specified profile or to details on the Drawings.

2.3 SHEET MATERIALS

- A. Hardwood Plywood (Furr-Down): Graded in accordance with AWI Premium; veneer core, type of glue recommended for application; birch face species, plain sliced cut; 1/4 inch thick.
- B. Softwood Plywood (Walls, Ceilings, Washer Box): Graded in accordance with AWI Economy; veneer core, exterior glue, Douglas fir of white pine face species, rotary cut; 1/2 inch thick or unless noted otherwise.

2.4 ADHESIVE

- A. Contact Adhesives: Solvent release type.
- B. Wall Adhesive: Solvent release, cartridge type, compatible with wall substrate, capable of achieving durable bond.

2.5 ACCESSORIES

- A. Screws and Nails: Size and type to suit application.
- B. Lumber for Shimming, Blocking, and Framing.

2.6 FABRICATION

- A. Fabricate to AWI Custom standards.
- B. Shop prepare and identify components for grain matching during site erection.
- C. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are ready to receive work and field measurements are as shown on shop drawings.

- B. Verify mechanical, electrical, and building items affecting work of this Section are placed and ready to receive this work.

3.2 PREPARATION

- A. Before installation, back prime paint surfaces of items or assemblies.

3.3 INSTALLATION - WOOD WORK

- A. Install work in accordance with AWI Premium quality standard.
- B. Set and secure materials and components in place, plumb and level.
- C. Install components and trim with nails 6 to 8 inches on center.
- D. Install hardware in accordance with manufacturer's instructions and detailed locations.

3.4 TOLERANCES

- A. Maximum Variation from True Position: 1/16 inch.
- B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

3.5 PREPARATION FOR SITE FINISHING

- A. Set exposed fasteners. Sand work smooth.
- B. Site Finishing: Refer to Section 09903.

3.6 PROTECTION

- A. Protect finished installation from damage.

END OF SECTION

SECTION 062206

FINISH CARPENTRY (EXTERIOR)

PART 1 GENERAL

1.1 SECTION INCLUDES

Work includes the following items. Refer to the Drawings to determine the specific extent of items included in the scope of work for this project. Items could include:

- A. Finish carpentry items, exterior fascia trim.
- B. Attachment accessories.

1.2 QUALITY ASSURANCE

- A. Perform work in accordance with AWI Premium quality.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Store materials in ventilated, interior locations under constant minimum temperatures of 60 degrees F and maximum relative humidity of 55 percent.

1.4 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated on shop drawings.

1.5 COORDINATION

- A. Coordinate the work with plumbing and electrical rough-in, installation of associated and adjacent components, custom casework, and wood paneling.

PART 2 PRODUCTS

2.1 LUMBER MATERIALS

- A. Custom grade in accordance with AWI; maximum moisture content of 6 percent; white pine wood species and cuts of quality capable of paint finish, unless noted otherwise.

2.2 STANDING AND RUNNING TRIM (WHERE APPLICABLE-REFER TO DRAWINGS)

- A. Exterior Fascia:
 - 1. Grade: AWI Custom
 - 2. Wood Species: Douglas Fir or Southern Pine
 - 3. Size: Refer to Drawings

4. Wood Preservative by Pressure Treatment (PT Type): AWPA treatment C2 using water borne preservative with 0.25 percent retainage.

2.3 ADHESIVE

- A. Contact Adhesives: Solvent release type.

2.4 ACCESSORIES

- A. Screws and Nails: Size and type to suit application, plain finish.

2.5 FABRICATION

- A. Fabricate to AWI Custom standards.
- B. Shop prepare and identify components for grain matching during site erection.
- C. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are ready to receive work and field measurements are as shown on shop drawings.
- B. Verify mechanical, electrical, and building items affecting work of this Section are placed and ready to receive this work.

3.2 PREPARATION

- A. Before installation, back prime paint surfaces of items or assemblies.

3.3 INSTALLATION - WOOD WORK

- A. Install work in accordance with AWI Premium quality standard.
- B. Set and secure materials and components in place, plumb and level.
- C. Install components and trim with nails 6 to 8 inches on center.
- D. Install hardware in accordance with manufacturer's instructions and detailed locations.

3.4 TOLERANCES

- A. Maximum Variation from True Position: 1/16 inch.
- B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

3.5 PREPARATION FOR SITE FINISHING

A. Set exposed fasteners. Sand work smooth.

B Site Finishing: Refer to Section 09903

3.6 PROTECTION

A. Protect finished installation from damage.

END OF SECTION

DIVISION 7

THERMAL AND MOISTURE PROTECTION

SECTION 070200

INSULATION

PART 1 GENERAL

- 1.1 Extent of insulation work is shown on the Drawings and indicated by provisions of this section. Refer to the Drawings for the locations, thicknesses, and thermal rating of the insulation specified.
- 1.2 QUALITY ASSURANCE
- A. Fire Performance Characteristics: Provide insulation materials which are identical to those whose fire performance characteristics, as listed for each material or assembly of which insulation is a part, have been determined by testing, in accordance with methods indicated below, by UL or other testing and inspecting agency acceptable to authorities having jurisdiction.
1. Surface Burning Characteristics: ASTM E84
 2. Fire Resistance Ratings: ASTM E119
- 1.3 SUBMITTALS
- A. Product Data: Submit manufacturer's product literature and installation instructions for each type of insulation and vapor retarder material required.
- B. Equals will be acceptable provided specification materials are submitted to the A/E, and he finds that the substitute products meet or exceed minimum federal specifications and ASTM requirements and have a quality and performance equal to those of the specified products.
- C. Certification: The Contractor shall certify the actual installed performance of blow-in ceiling insulation.
- 1.4 DELIVERY, STORAGE AND HANDLING
- A. Protect insulation from physical damage and from becoming wet, soiled, or covered with ice or snow. Comply with manufacturer's recommendations for handling, storage, and protection during installation for each type of insulation specified.
- 1.5 Coordinate the work with that of other trades for timely execution.

PART 2 PRODUCTS

- 2.1 ACCEPTABLE MANUFACTURER: Subject to compliance with requirements, manufacturer offering products which may be incorporated in the work include, but are not limited to, the following:
- A. Owens-Corning Fiberglas Corporation

- B. United States Gypsum Company
 - C. CertainTeed Corporation
 - D. W. R. Grace and Company
- 2.2 **BLANKET INSULATION:** Blankets meeting the requirements of ASTM C-665, and wide enough to accommodate the framing spacing indicated on the Drawings
- A. Insulation installed in wood framing shall be Type III, kraft-faced blankets with nailing flanges.
 - B. Insulation installed in metal stud framing shall be Type I, open faced blankets of either 16 inches or 24 inches actual width to suit frame spacing indicated.
- 2.3 **CEILING INSULATION:** Kraft-faced fast-fit blankets, 24 inches x 48 inches, meeting the requirements of ASTM C-665, Type II
- 2.4 **BLOW-IN CEILING INSULATION:** Mineral fiber pellet blowing wool in accordance with ASTM C764, Type I
- 2.5 **SOUND ATTENUATION:** USG unfaced thermafiber sound attenuation blankets meeting the requirements of ASTM C-665, Type I and ASTM E136.
- 2.6 **LOOSE FILL INSULATION:** Zonolite masonry insulation conforming to ASTM C516 and treated for water repellency
- 2.7 **CAVITY INSULATION:** Rigid cellular polystyrene thermal insulation with closed cells and integral high density skin, formed by expansion of polystyrene base resin in an extrusion process to comply with ASTM C578, Type IV, 5 year aged R-value of 5.0 at 75 degrees F, in manufacturer's standard lengths and widths; thicknesses as indicated.
- 2.8 **PERIMETER INSULATION:** Expanded polystyrene foam, 1-1/2 inch thick.
- 2.9 **ADHESIVE FOR BONDING INSULATION:** Type recommended by insulation manufacturer, and complying with requirements for fire performance characteristics.
- 2.10 **MECHANICAL ANCHORS:** Type and size indicated or, if not indicated, as recommended by the insulation manufacturer for type of application and condition of substrate.
- 2.11 **PROTECTION BOARD:** Premolded, semirigid asphalt/fiber composition board, 1/4 inch thick, formed under heat and pressure, standard sizes
- 2.12 **MASTIC SEALER:** Type recommended by insulation manufacturer for bonding edge joints between units and filling voids in work.
- 2.13 **CRACK SEALER FOR BOARD INSULATION:** Provide polymeric insulating foam in aerosol dispenser designated for filling voids in board insulation, Polycel 100 by W. R. Grace and Company, or approved equal.

PART 3 EXECUTION

3.1 INSPECTION AND PREPARATION

- A. Examine substrates and conditions under which insulation work is to be performed. A satisfactory substrate is one that complies with requirements of the section in which substrate and related work are specified. Obtain installer's written report listing conditions detrimental to performance of work in this section. Do not proceed with installation of insulation until unsatisfactory conditions have been corrected.
- B. Clean substrates of substances harmful to insulations or vapor retarders, including removal of projections which might puncture vapor retarders.
- C. Close off openings in cavities to receive poured-in-place insulation sufficiently to prevent escape of insulation. Provide bronze or stainless steel screen (inside) where openings must be maintained for drainage or ventilation.

3.2 INSTALLATION, GENERAL

- A. Install the specified insulation as detailed on the Drawings and comply with the manufacturer's instructions for particular conditions of installation in each case. If printed instructions are not available or do not apply to project conditions, consult manufacturer's technical representative for specific recommendations before proceeding with work.
- B. Extend insulation full thickness as shown over entire area to be insulated. Cut and fit tightly around obstructions, and fill voids with insulation. Remove projections which interfere with placement. Ensure that vapor barrier or facing material is continuous tape joints if overlapping is not possible at obstructions.
- C. Apply a single layer of insulation of required thickness, unless otherwise shown or required to make up total thickness.
- D. Do not install ceiling insulation until all systems above the acoustical ceiling have been approved by the A/E.
- E. Fit ceiling insulation in place over all acoustical ceiling panels. Omit at recessed light fixtures.
- F. Repair tears or rips in facing material before covering.
- G. Give leftover insulation to the Owner for maintenance stock.

3.3 INSTALLATION OF PERIMETER AND UNDER SLAB INSULATION

- A. On vertical surfaces, set units in adhesive applied in accordance with manufacturer's instructions. Use type of adhesive recommended by the manufacturer of insulation. The insulation is to be continuous around the perimeter of the building.
- B. Protect top surface of horizontal insulation from damage during concrete work by application of protection board.

3.4 INSTALLATION OF CAVITY WALL

- A. On units of specified insulation, install small pads of adhesive spaced approximately 1 foot 0 inches on center both ways on inside face, as recommended by the manufacturer. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown.

3.5 INSTALLATION OF GENERAL BUILDING INSULATION

- A. Apply insulation units to substrate by method indicated, complying with manufacturer's recommendations. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
- B. Seal joints between closed cell (non-breathing) insulation units by applying mastic or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with mastic or sealant.
- C. Set vapor retarder faced units with vapor retarder to warm side of construction, except as otherwise indicated. Do not obstruct ventilation spaces, except for firestopping.
 - 1. Tape joints and ruptures in vapor retarder, and seal each continuous area of insulation to surrounding construction to ensure airtight installation.
- D. Set reflective foil faced units, when specified, accurately with air space in front of foil as shown. Provide not less than 0.75 inch air space where possible.
- E. Place loose glass fiber insulation into spaces and onto surfaces as shown, either by pouring or by machine blowing. Level horizontal applications to uniform thickness as indicated, lightly settled to uniform density, but not excessively compacted.
- F. Stuff loose glass fiber insulation into miscellaneous voids and cavity spaces, such as door and window heads and jambs, in order to provide continuous insulation barrier. Compact to approximately 40 percent of normal maximum volume to a density of approximately 2.5 pounds per cubic foot.

3.6 INSTALLATION OF SOUND BLANKETS

- A. Sound attenuation blankets shall be installed in partition walls as indicated on the Drawings. Blankets shall be applied to cavity side of one base layer of partition and installed between console boxes and electrical devices where they occur back to back offset or not. Fill with continuous bead of acoustical sealant at all openings and cutouts, open spaces between drywall and fixtures, cabinet ducts, and other flush or penetrating items.
- B. Sound attenuation blankets shall be installed in ceilings as indicated on the Drawings, following manufacturer's recommendations and instructions. Install blankets as ceiling work progresses. Butt ends of blankets closely together and fill all voids.

3.7 PROTECTION

- A. **General:** Protect installed insulation and vapor retarders from harmful weather exposures and from possible physical abuses, where possible by non-delayed installation of concealing work or, where that is not possible, by temporary covering or enclosure.

END OF SECTION

SECTION 072312

FIBERGLASS ASPHALT SHINGLES (LAMINATED)

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

- A. The extent of shingles is indicated on the Drawings and is hereby defined to include units employed as weather protection for walls as well as for steep roofs.
- B. Refer to other sections for work related to that specified under this heading. Coordinate this work with that of other trades for timely execution.

1.2 QUALITY ASSURANCE

- A. UL Listing: Provide labeled materials which have been tested and listed by UL for class and rating indicated for each shingle type required.

1.3 SUBMITTALS

- A. Equals will be acceptable provided specification materials and samples are submitted to the A/E, and the A/E finds that the materials and color range available are of the same quality as that of the specified products.
- B. Product Data: Submit technical product data, installation instructions and recommendations from the shingle manufacturer, including data that materials comply with requirements.
- C. Samples: Submit full range of samples for color and texture selection.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's unopened, labeled bundles, rolls or containers.
- B. Store materials to avoid water damage, and store rolled goods on end. Comply with manufacturer's recommendations for job-site storage and protection. Do not stack bundles more than 4 feet high. Store on raised platforms.

1.5 JOB CONDITIONS

- A. Substrate: Proceed with shingle work only after substrate construction and penetrating work have been completed.
- B. Weather Conditions: Proceed with shingle work only when weather conditions are in compliance with manufacturer's recommendations and when substrate is completely dry.

1.6 WARRANTY

- A. Provide shingle manufacturer's limited warranty covering replacement of defective materials for a period of thirty (30) years.
- B. Provide installer's warranty covering workmanship of shingle and sheet metal installation for a period of two (2) years from the date of substantial completion.

PART 2 PRODUCTS

2.1 ASPHALT SHINGLE MATERIALS

- A. Laminated Strip Shingles, UL Class "A," Heavyweight: Mineral surfaced, self sealing, laminated layer asphalt fiberglass strip shingles complying with ASTM D3018, Type 1, and ASTM D3462 approximately 240 pounds per square. Provide shingles bearing UL Class "A" external fire exposure label and UL "Wind Resistant" label. The colors shall be selected by the A/E.
- B. Manufacturers
 - 1. GAF: Timberline
 - 2. Celotex: Dimensional Shake Series
 - 3. Certaineed Corporation: Landmark Series
 - 4. Owens-Corning Roofing Systems: Oakridge Series
 - 5. Tamko Building Products: Heritage Series
 - 6. Substitutions: Approved equal
- C. Underlayment
 - 1. Primary: Asphalt Saturated Roofing Felt: No. 15, unperforated organic felt, complying with ASTM D226 Type I, 36 inches wide, approximate weight 15 pounds per square or GAF FeltBuster® High-Traction Synthetic Roofing Felt in lieu of No. 15 roofing felt.
 - 2. Secondary:
 - a. Single layer of 36 mil. Rubberized asphalt on 4 mil. Polyethylene carrier sheet.
 - b. Approved products:
 - (1) Aquasel WIP by Mirafi, Inc., Charlotte, NC, 800-234-0484
 - (2) Ice and Water Shield by WR Grace, Cambridge, MA, 800-521-2737
 - (3) Tamko, Moisture Guard Plus.
- D. Asphalt Plastic Cement: fibrated asphalt cement complying with ASTM D2822, designed for trowel application.
- E. Hip and Ridge Shingles: Manufacturer's standard factory precut units to match shingles.
- F. Nails: Hot dip galvanized, 11 or 12 gauge, sharp pointed, conventional roofing nails with barbed shanks, minimum 3/8 inch diameter head, and of sufficient length to penetrate 3/4 inch into solid decking or to penetrate through plywood sheathing.

- G. Sheet Metal Valley Flashing: Minimum 0.024 inch mill finish aluminum sheet, 24 inches wide minimum.
- H. Metal Drip Edge: Minimum 0.024 inch baked enamel finish aluminum sheet, brake formed to provide 3 inches roof deck flange, and 1-1/2 inches fascia flange with 3/8 inch drip at lower edge, furnished in 8 foot or 10 foot lengths. Color shall be selected by A/E.
- I. Metal Flashing: 0.024 inch mill finish or pre-finish sheet aluminum, job cut to sizes and configurations required as indicated on Drawings.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine substrate and conditions under which shingling work is to be performed and notify Contractor in writing of unsatisfactory conditions. Do not proceed with shingling work until unsatisfactory conditions have been corrected.

3.2 PREPARATION OF SUBSTRATE

- A. Clean substrate of any projections and substances detrimental to shingling work. Cover knotholes or other minor voids in substrate with sheet metal flashing secured with roofing nails.
- B. Coordinate installation of shingles with flashing and other adjoining work to ensure proper sequencing. Do not install shingle roofing until all vent stacks and other penetrations through roofing have been installed and are securely fastened against movement.

3.3 INSTALLATION

- A. General: Comply with instructions and recommendations of shingle manufacturer, except to the extent that more stringent requirements are indicated. Do not install shingles on underlayment with damp or frozen surfaces, or when the air temperature will be below 40 degrees F for a period of 24 hours extended weather forecast.
- B. Underlayment:
 - 1. Primary:
 - (a) Apply one (1) layer of felt horizontally over the entire surface, lapping succeeding courses two inches (2") minimum and fastening with nails six inches (6") on center along bottom edge and ends, and eighteen inches (18") on center every twelve inches (12") up from bottom edge. It is not necessary to nail top edge except at ridge of roof.
 - (b) Do not leave exposed to weather more than fourteen (14) days after beginning of underlayment installation.
 - 2. Secondary:
 - (a) Lap end joints six inches (6") and side joints three inches (3").

- (b) Apply three (3) continuous thirty-six inch (36") wide sheets in valley centered over valley flashing.
 - (c) After installation of valley metal, sweep surface of secondary underlayment along edges of valley metal to remove dirt and debris so secondary underlayment will seal to surface. Immediately apply continuous strip of secondary underlayment over edges of valley metal. Leave eight inches (8") between strips at top of valley and diverge 3/32 inch per foot of valley.
 - (d) Do not leave exposed to weather more than fifteen (15) days after beginning of installation.
- C. Shingles: Install starter strip of roll roofing or inverted shingles with tabs removed; fasten shingles in pattern, weather exposure and number of fasteners per shingle as recommended by manufacturer. Use horizontal and vertical chalk lines to ensure straight coursing.
- 1. Comply with installation details and recommendations of the shingle manufacturer, ARMA Asphalt Roofing Manual, and NRCA Steep Roofing Manual. Install shingles with a 5 inch exposure and a 2 inch head lap. Use 4 specified fasteners per shingle.
- D. Flashing and Edge Protection: Install metal flashing, vent flashing and edge protection as indicated and in compliance with details and recommendations of the NRCA Steep Roofing Manual.
- E. Remove and replace any damaged or defective shingles.

END OF SECTION

SECTION 072467

RESIDENTIAL SIDING

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Preformed and prefinished vinyl siding for walls and soffits, with related flashings, accessory components, and underlayment as indicated in the drawings.
- B. Building paper underlayment over wood sheathed walls.

1.2 SUBMITTALS

- A. Submit manufacturer's product data and standard color samples for selection.
- B. Submit manufacturer's installation instructions.

PART 2 PRODUCTS

2.1 MANUFACTURERS (VINYL SIDING/SOFFITS)

- A. CertainTeed Vinyl Building Products Division.
- B. Heartland Building Products
- C. Mastic, Kusan, Inc., Co.
- D. Alside
- E. Substitutions: Approved equal

2.2 MATERIAL (WHERE APPLICABLE-SEE DRAWINGS)

- A. Horizontal Siding: CertainTeed Encore double type with 10 inch exposure; extruded polyvinyl chloride, minimum 0.040 inch thick; without integral backing material; wood grain pattern surface; color selected by A/E.
- B. Vertical Siding: CertainTeed Board & Batten, with 8 inch exposure; extruded polyvinyl chloride, minimum 0.048 inch thick; without integral backing material; wood grain pattern surface; color selected by A/E.
- C. Soffits: CertainTeed Universal Soffit, fully vented type (when used on soffits) and non-vented type (when used as siding or beam cladding); extruded polyvinyl chloride; 12 inch wide sheets; minimum 0.040 inch thick; ribbed for added strength and rigidity and to eliminate waves; color selected by A/E

2.3 ACCESSORY COMPONENTS

A. Accessory Components (Aluminum)

1. J-Channel, 1/2 inch thick
2. H-Divider
3. Starter Strip
4. Material/Finish: Same as siding and soffit.

B. Accessory Components (Vinyl):

1. J-Channel, 1/2 inch, lengths of 12 feet-6 inches
2. F-Channel, 1/2 inch (nominal), lengths of 12 feet-6 inches
3. Undersill trim, lengths of 12 feet-6 inches
4. "H" divider bar, lengths of 12 feet-6 inches
5. Starter strip, lengths of 12 feet-6 inches
6. Drip cap, lengths of 12 feet-6 inches
7. Quarter-round soffit molding, lengths of 12 feet-6 inches
8. Soffit cove trim, lengths of 12 feet-6 inches
9. Inside corner post, lengths of 10 feet
10. Outside corner, lengths of 10 feet
11. Window and door casing trim, lengths of 12 feet-6 inches

C. Nails and Screws: Manufacturer's standard corrosion resistant type; size and strength to securely and rigidly retain siding, soffits and accessory components in place.

D. Vapor Barrier: Plastic vapor barrier (Amor Wrap, Tyvek, or Typar or approved equal) recommended for use by siding manufacturer.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install 1 layer of underlayment horizontally on wood surfaces to receive preformed siding. Weather lap edges and ends minimum 6 inches. Stagger vertical joints of each layer, and joints of 1 layer to next. Securely nail or screw in place.
- B. Install siding and soffits in accordance with manufacturer's instructions. Securely fasten in place, properly aligned, leveled, and plumb.
- C. Fabrication of component profile on site not permitted.
- D. Ensure site cuttings or burred edges do not remain on finish surfaces.
- E. Use concealed fasteners except where approved by A/E.
- F. Place sealant or gaskets to arrest weather penetration. Maintain neat appearance.
- G. Infill exposed ends of all outside corners with prefinished aluminum Caps.

END OF SECTION

SECTION 072600

FLASHING AND SHEET METAL

PART 1 GENERAL

- 1.1 The types of work specified in this section include the following:
 - A. Gutters and downspouts (rain drainage)
 - B. Exposed metal trim/fascia units
 - C. Miscellaneous sheet metal accessories
- 1.2 **PRODUCT DATA:** Submit the manufacturer's product specifications, installation instructions, and general recommendations for each specified sheet material and fabricated product.
- 1.3 **JOB CONDITIONS:** Coordinate work of this section with interfacing and adjoining work for proper sequencing of each installation. Ensure best possible weather resistance and durability of the work and protection of materials and finishes.

PART 2 PRODUCTS

2.1 FLASHING AND SHEET METAL MATERIALS

- A. Sheet Metal Flashing/Trim/Gutters (Shop Finish):
 1. Aluminum: ASTM B209, Alloy 3003, Temper H14, as follows:
 - a. Edge Strips: 0.019 inches thick
 - b. Coping: 0.032 inches (20 gage)
 - c. Valley Flashing: 0.032 inches (20 gage) pre-finished aluminum
 - d. Fascia Trim: 0.019 inches thick
 - e. Gutters: 0.027 inch thick
 - f. Concealed Gutter Fasteners: 0.040 inches thick
 - g. Downspouts: 0.027 inches thick
 - h. Downspout Straps: 0.040 inches thick
 - i. Cleats: 0.024 inch thick
 - j. Metal Flashing: 0.024 mill finish or as indicated on Drawings
 - k. Misc. Cladding and Lineset Covers: 0.027 inch thick
- B. Miscellaneous Materials and Accessories:
 1. Fasteners: Same metal as flashing/sheet metal, or other noncorrosive metal as recommended by the sheet manufacturer. Match Finish of exposed heads with material being fastened.
 2. Bituminous Coating: SSPC Paint 12, solvent type bituminous mastic, nominally free of sulfur, compounded for 15 mil dry film thickness per coat.
 3. Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.

4. Elastomeric Sealant: Generic type recommended by the manufacturer of metal and fabricator of components being sealed;
5. Epoxy Seam Sealer: 2 part noncorrosive metal seam cementing compound, recommended by the manufacturer for exterior/interior nonmoving joints, including riveted joints.
6. Adhesives: Type recommended by flashing sheet manufacturer for waterproof/weather resistant seaming and adhesive application of flashing sheet.
7. Paper Slip Sheet: 5 pound rosin sized building paper
8. Polyethylene Underlayment: 6 mil carbonated polyethylene film;
9. Reglets: Metal or plastic units of the type and profile indicated, compatible with flashing indicated, uncorrosive.
10. Metal Accessories: Provide sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of work, matching or compatible with material being installed, noncorrosive, size and gauge required for performance.
11. Roofing Cement: ASTM D2822, asphaltic

2.2 FABRICATED UNITS

A. General Metal Fabrication:

1. Shop fabricate work to the greatest extent possible. Comply with the details shown and with applicable requirements of the SMACNA "Architectural Sheet Metal Manual" and other recognized industry practices. Fabricate for waterproof and weather resistant performance with expansion provisions for running work adequate to permanently prevent leakage, damage, or deterioration of the work. Formwork shall fit substrates. Comply with the material manufacturer's instructions and recommendations. Form exposed sheet metal work without excessive oil canning, buckling, and tool marks, true to the line and levels indicated, with exposed edges folded back to form hems.
2. Seams: Fabricate nonmoving seams in sheet metal with flat lock seams. For metal other than aluminum, seam tin edges, form seams, and solder. Form aluminum seams with epoxy seam sealer; rivet joints for additional strength where required.
3. Expansion Provisions: Where lapped or bayonet type expansion provisions in work cannot be used, or would not be water/weatherproof enough, form expansion joints of intermeshing hooked flanges not less than 1 inch deep and filled with mastic sealant (concealed within joints).
4. Sealant Joints: Where movable, nonexpansion type joints are indicated or required for proper performance of work, form metal to provide for proper installation of elastomeric sealant in compliance with industry standards.
5. Separations: Provide for separation of metal from noncompatible metal or corrosive substrates by coating concealed surfaces at locations of contact with bituminous coating or other permanent separation as recommended by the manufacturer/ fabricator.
6. Shop Finish, Sheet Metal and Rain Drainage: Provide the manufacturer's standard baked-on acrylic shop finish on sheet metal rain drainage units (gutters and similar exposed units); 1.0 mil dry film thickness.

PART 3 EXECUTION

3.1 INSTALLATION REQUIREMENTS

- A. General: Except as otherwise indicated, comply with the manufacturer's installation instructions and recommendations and with the SMACNA "Architectural Sheet Metal Manual." Anchor units of work securely in place by the methods indicated, make provisions for work that is securely in place by the methods indicated, and provide for thermal expansion of metal units. Conceal fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weatherproof.
- B. Underlayment: Where aluminum is to be installed directly on cementitious or wood substrates, install a course of paper slip sheet and a course of polyethylene underlayment.
- C. Gutter Expansion Joints: Maximum length of guttering is 50'-0" without Gutter Expansion Joints.

3.2 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces, removing substances that might cause corrosion of metal or deterioration of finishes.
- B. Protect flashings and sheet metal work during construction to ensure that work will be without damage or deterioration, other than natural weathering, at the time of substantial completion.

END OF SECTION

SECTION 072724

ATTIC INSULATION BAFFLES

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Attic insulation baffles.

1.2 SUBMITTALS

- A. Indicate on shop drawings, configuration and dimension of components, adjacent construction, required clearances and tolerances, and other affected work.
- B. Provide product data on shape of components, materials and finishes, anchor types and locations.
- C. Submit manufacturer's installation instructions.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS - ATTIC INSULATION BAFFLE

- A. Air Vent, Inc., 4801 N. Prospect Road, Peoria, Illinois 61614
- B. Ampcor, 111 Fellowship Road, Taylorsville, Mississippi 39168
- C. Substitutions: Approved equal

2.2 ATTIC INSULATION BAFFLE

- A. Manufacturer: Air Vent
- B. Model: Air flash insulation baffle, No. AF 364 (16 inch on center) or No. AF 344 (24 inch on center)
- C. Material: Preformed ABS plastic
- D. Size: Fabricated for 16 or 24 inch on center trusses with 6 inch depth of baffle flap.
- E. Ventilation: One inch air passage along underside of roof sheathing providing 11 square inches per linear foot of net free area.

2.3 ANCHOR

- A. Furnish anchorage of screws or nails which are annular threaded or barbed or material compatible to flange which is penetrated.
- B. Special nails supplied by the manufacturer.

PART 3 EXECUTION

3.1 INSPECTION

- A. Verify that trusses and rafters, wood blocking, and other items affecting work of this section are in place and positioned correctly.
- B. Beginning of installation means acceptance of existing conditions.

3.2 INSTALLATION

- A. Install components in accordance with manufacturer's instructions.
- B. Coordinate installation of insulation baffle with work of other sections for timely installation.

END OF SECTION

SECTION 073905

JOINT SEALERS

PART 1 GENERAL

- 1.1 Submit standard color charts to the A/E for color selections. Submit full literature for the A/E's comparison and approval.
- 1.2 Examine the Drawings and other sections of the specifications to determine the full scope of the work involved.
- 1.3 The manufacturer of the approved product shall submit written confirmation that his product will perform under the joint design set out in the Drawings.

PART 2 PRODUCTS

2.1 INTERIOR SEALANT (WHERE APPLICABLE, REFER TO DRAWINGS)

A. Aluminum Windows

1. Pecora: Dynatrol I
2. Sonneborn: Sonolastic NP-1
3. Tremco: Dymonic

B. Hollow Metal Frames and Wood Frames

1. Pecora: AC-20
2. Sonneborn: Sonolac
3. Tremco: Acrylic Latex 834

C. Plumbing Fixtures, Tub and Shower Enclosure/Joints at Tile, Splashbacks at Countertops

1. Pecora: 898 Silicone Sanitary Sealant
2. Sonneborn: Sonolastic Omnipus
3. Tremco: Proglaze White

D. Metal Thresholds

1. Pecora: BC-158
2. Sonneborn: Multi-Purpose Sealant
3. Tremco: Dymonic

2.2 EXTERIOR SEALANT (WHERE APPLICABLE, REFER TO DRAWINGS)

A. Aluminum Windows/Aluminum Flashing and Trim

1. Pecora: 895
2. Sonneborn: Sonolastic NP-1

3. Tremco: Spectrum 2
 - B. Hollow Metal Frames
 1. Pecora: Dynatrol I
 2. Sonneborn: Sonolac
 3. Tremco: Dymonic
 - C. Roof Vents, Flashing and Gutters
 1. 791 by down Corning
 2. Sikaflex 15 LM by Sika Corp.
- 2.3 PRIMER (WHERE APPLICABLE, REFER TO DRAWINGS)
- A. Aluminum Windows
 1. Pecora: P120
 2. Tremco: No. 6
 - B. Field Conditions
 1. Primer required for mill finish aluminum surfaces.
 2. Not required for anodized surfaces and brick surfaces. Provide field testing on anodized surfaces when recommended by sealant manufacturer.
- 2.4 CONTROL JOINT SEALANT (IF REQUIRED)
- A. Pecora: NR-200
 - B. Sonneborn: Paving Joint Sealant
 - C. Tremco: THC-900
- 2.5 BACKUP (IF REQUIRED)
- A. Pecora: Green Rod
 - B. Sonneborn: Sonofoam Backer Rod
 - C. Dow: Gray Rod
- 2.6 COLOR: As selected by Architect from manufacturer's standard colors.

PART 3 EXECUTION

- 3.1 Clean surfaces that are to receive sealant. Remove existing sealant at windows and prepare existing surfaces in accordance with manufacturer's instructions. Pack joints that are more than 3/8 inch deep or that are not properly backed to within 3/8 inch of the surface. Prime surfaces as required by the manufacturer.

- 3.2 Joints shall be a minimum of 1/4 inch wide. Joint thickness shall be 1/2 of the width. Sealant depth shall be equal to the joint width for joints up to 1/2 inch wide. For joints over 1/2 inch wide, the sealant depth shall be 1/2 of the joint width but not less than 1/2 inch. In joints over 1/2 inch in depth, use backup rod.
- 3.3 If control joints are required, fill with specified backup before installing sealant.
- 3.4 Adequately protect adjacent surfaces. Use masking tape only if adequate protection cannot be provided by other means.
- 3.5 Size gun nozzles to fit joints. Apply sealant with enough pressure so that all voids are completely filled. Leave joints slightly concave.
- 3.6 Finish caulking completely before painting is started. Completely remove sealant on adjacent surfaces. Replace any surface affected by sealants that cannot be cleaned.

END OF SECTION

DIVISION 8

DOORS AND WINDOWS

COMMERCIAL STEEL DOORS AND FRAMES

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Steel frame products including frames.
- B. Steel doors, swing type, flush, with or without embossed face sheets, with or without glazed or louvered openings, fire-rated, with or without temperature rise ratings, and non-rated.

1.2 SUBMITTALS

- A. Submit shop drawings for A/E's approval prior to fabrication.
- B. Indicate frame configuration, anchor types and spacings, location of cutouts for hardware, reinforcement, and conditions at openings, details of joints and connections, and finish. Show anchorage and accessory items.
- C. Indicate door elevations, internal reinforcement, closure method, and cut outs for glazing and louvers.
- D. Submit sample of frame and door construction if requested by the A/E.
- E. Submit sample of weather-stripping.

1.3 DELIVERY, STORAGE AND PROTECTION

- A. Protect doors and frames with resilient packaging, carton, or crate for protection during transit and job storage.
- B. Break seal on-site to permit ventilation.
- C. Inspect hollow metal work upon delivery for damage. Minor damages may be repaired provided refinished items are equal in all respects to new work and acceptable to the A/E; otherwise, remove and replace damaged items as directed.
- D. Store doors and frames at building site under cover. Place units on minimum 4 inch high wood blocking. Avoid use of non-vented plastic or canvas which could create a humidity chamber. If cardboard wrapper on door becomes wet, remove carton immediately. Provide 1/4 inch spaces between stacked doors to promote air circulation.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Ceco Door
9159 Telecom Drive
Milan, TN 38358
888.264.7474
www.cecodoor.com
- B. Steelcraft
9017 Blue Ash Road
Cincinnati, OH 45242
877.671.7011
www.steelcraft.com
- C. Metal Products, Inc.
319 N Hills Road
Corbin, KY 40701
606.523.0461
- D. Approved equal (Substitutions must be made during bidding period for approval at least ten days prior to bid date).

2.2 MATERIALS

- A. Steel: Doors shall be fabricated from tension leveled steel to ASTM A924-97 (M-97), galvanized to ASTM A653-97 (M-97), Commercial Steel (CS), Type B, coating designation A40 (ZF120), known commercially as paintable Galvanneal.
- B. Door Cores:
 - 1. Polystyrene: Rigid extruded, fire retardant, closed cell board, Type 1, density: 1 to 2 pcf (16 to 32 kg/m³), thermal values: R 6.0 (RSI 1.06) (minimum), conforming to ASTM C578.
 - 2. Polyisocyanurate: Rigid foam, closed cell, faced board, thermal value: R12.3 (RSI 2.17) (minimum), conforming to ASTM C1289.
- C. Frames:
 - 1. Exterior Frames: Level 2, 16 gage (minimum) thick material, hot dipped zinc coated with integral kerf profile to receive weather-stripping. Frames shall be prefinished to match door and screen door.
 - 2. Interior Frames: Knocked-down type construction.

2.3 CONSTRUCTION

- A. General:
 - 1. Doors shall be swinging, 1.75" (44.4mm) thick, of the types and sizes indicated on the Architect's schedules or drawings.
 - 2. Exterior doors shall be:
 - a. Fabricated from [16] gage steel.
 - b. Internally reinforced with 20 gage continuous interlocking steel stiffeners at 6" (150mm) on center, securely welded to each face sheet at 6" (150mm) on center maximum, with voids between

- stiffeners filled and sound deadened with 1.5 pcf (24kg/m³) loose batt type fiberglass material.
 - c. Stiffened, insulated and sound deadened with polystyrene core laminated under pressure to each face sheet.
- 3. Longitudinal edges of exterior doors shall be:
 - a. Continuously welded the full height of the door, filled and ground smooth with no visible seams.
 - b. Mechanically interlocked, adhesive assisted with edge seams [visible] [tack welded, filled and sanded flush with no visible seam].
- 4. Interior doors shall be:
 - a. Fabricated from [16] gage steel.
 - b. Internally reinforced with 20 gage continuous interlocking steel stiffeners at 6" (150mm) on center, securely welded to each face sheet at 6" (150mm) on center maximum, with voids between stiffeners filled and sound deadened with 1.5 pcf (24kg/m³) loose batt type fiberglass material.
 - c. Stiffened, insulated and sound deadened with [honeycomb] [polystyrene] core laminated under pressure to each face sheet.
 - d. Stiffened, insulated and sound deadened with Fleming's proprietary core where Temperature Rise Rated (TRR) fire labeled doors are specified on the Architect's schedules.
- 5. Longitudinal edges of interior doors shall be:
 - a. Continuously welded the full height of the door filled and ground smooth with no visible seams.
 - b. Mechanically interlocked, adhesive assisted with edge seams [visible] [tack welded, filled and sanded flush with no visible seam].
- 6. Acoustic doors shall be:
 - a. Face sheets for acoustic steel doors shall be fabricated from 16 gage steel.
 - b. Interior voids of acoustic doors shall be completely filled, stiffened, insulated and sound deadened with Fleming proprietary sound attenuating core.
 - c. Longitudinal edges mechanically interlocked, adhesive assisted, with edge seams [visible] [tack welded, filled and sanded flush with no visible seam].
- 7. Door faces of all steel doors shall be fabricated without visible seams, free of scale, pitting, coil brakes, buckles and waves.
- 8. Formed edges shall be true and straight with a minimum radius for the thickness of steel used.
- 9. Lock and hinge edges shall be beveled 1/8" in 2" (3mm in 50mm) unless builders' hardware or door swing dictates otherwise.
- 10. Top and bottom of doors shall be provided with inverted, recessed, 16 gage steel end channels, welded to each face sheet at 6" (150mm) on center maximum. [For acoustic doors, end channels shall be fabricated from 12 gage steel.]
- 11. Exterior doors shall be provided with factory installed flush PVC top caps. Fire labeled exterior doors shall be provided with factory installed flush steel top caps.
- 12. Top and bottom of [acoustic] [lead-lined] doors shall be provided with 16 gage continuous flush steel non-removable end caps welded securely in place.
- 13. Unless ineligible due to design, size, hardware or glazing specified on the Architects' or Hardware Suppliers' schedules or details, fire labeled doors

shall be provided for those openings requiring fire protection ratings and temperature rise ratings, as determined and scheduled by the Architect.

B. Hardware Preparations:

1. Doors shall be factory blanked, reinforced, drilled and tapped for fully templated mortised hardware only, in accordance with the final approved schedule and templates provided by the hardware supplier.
2. Doors shall be factory blanked and reinforced only for mortised hardware that is not fully templated.
3. Doors shall be factory reinforced only for surface mounted hardware.
4. Templated holes .5" (12.7mm) diameter and larger shall be factory prepared, except mounting and through bolt holes, which shall be by the contractor responsible for installation on site, at the time of application. Templated holes less than .5" (12.7mm) diameter shall be factory prepared only when required for the function of the device (for knobs, levers, cylinders, thumb or turn pieces) or when these holes over-lap function holes.
5. Drilling and tapping for surface mounted hardware or mortised hardware that is not fully templated shall be by the contractor responsible for installation on site, at the time of application.
6. Hinge and pivot reinforcements shall be 10 gage steel minimum high frequency type reinforcing.
7. Doors in excess of 96" (2450mm) rabbet height shall be prepared for 4.5" (114.3mm) heavy weight (.180"/4.6mm) hinges minimum.
8. Hinge reinforcements for [acoustic] [lead-lined] doors shall be 10 gage minimum with each cutout provided with 4.5" (114.3mm) heavy weight (.180"/4.6mm) high frequency type reinforcing.
9. Lock, strike and flush bolt reinforcements shall be 16 gage steel minimum.
10. Reinforcements for concealed closers and holders shall be 12 gage steel minimum.
11. For surface mounted hardware, reinforcements shall be 16 gage steel minimum.
12. All pairs of fire labeled doors shall be provided with 12 gage steel surface mounted flat bar astragal, shipped loose for application on site, by the contractor responsible for installation.
13. Acoustic doors shall be reinforced for and provided with Fleming surface mounted adjustable automatic door bottoms, shipped loose for application on site, by the contractor responsible for installation.
14. Pairs of acoustic doors shall be provided with Fleming surface mounted over-lapping acoustic astragal and where fire labeled assemblies are specified, an additional 12 gage steel over-lapping flat bar astragal, each shipped loose, for application on site, by the contractor responsible for installation.
15. Clearance (undercut) beneath acoustic doors shall be .25" (6.4mm) maximum, measured from the underside of the door to the top of the finished floor (exclusive of floor coverings) or top of threshold, where specified in the final approved hardware list.
16. Floor below acoustic assemblies shall provide a level, smooth and solid surface.

2.4 FRAME PRODUCTS

A. Materials:

1. Steel: Frame product shall be fabricated from tension leveled steel to ASTM A924 -97 (M-97), galvanized to ASTM A653-97 (M-97), Commercial Steel

(CS), Type B, coating designation A40 (ZF120), known commercially as paintable Galvanneal.

2. Primer: Rust inhibitive touch-up only.
3. Lead: Cast or rolled pure sheet lead meeting ASTM B29 or ASTM B749.
4. Miscellaneous:
 - a. Door Silencers: GJ-64 or equal, Single Stud rubber/neoprene type.
 - b. Thermal Breaks: Rigid polyvinylchloride (PVC) extrusion.
 - c. Fiberglass: Loose batt type, density: 1.5 pcf (24kg/m³)(minimum), conforming to ASTM C665.

B. Construction:

1. Exterior and frame products shall be supplied knocked-down (KD).
2. Interior frame product shall be supplied knocked-down drywall (KD-DW).
3. Interior and exterior sections of thermally broken frames shall be separated by a continuous PVC thermal break.
 - a. Thermally broken sections shall not be assembled by means of screws, grommets or other fasteners.
 - b. Where thermally broken welded frame product is specified, welds shall not cause thermal transfers between interior and exterior surfaces of the frame sections.
 - c. Closed sections (mullions and center rails) of thermally broken frames shall be factory insulated with 1.5 pcf (24kg/m³) loose batt type fiberglass material.
4. Insulation of open sections (jambs, heads and sills) shall be provided and installed by the contractor responsible for installation.
5. Adjustable jamb depth frames shall be provided with 2-piece, 14 gage galvanneal steel sliding angle bracket assemblies, welded to each frame section. Each sliding bracket assembly shall be supplied with two (2) machine screws installed for permanent setting of required jamb depth. Jambs up to 7'2" (2200 rabet height and heads for pairs shall receive three (3) assemblies each. Jambs over 7'2" (2200), four (4) assemblies and single heads two (2) assemblies.
6. Jambs, heads, mullions, sills and center rails shall be straight and uniform throughout their lengths.
7. Factory assembled frame product shall be square, free of defects, warps or buckles.
8. Knocked-down (KD) and Knocked-down drywall (KD-DW) frames shall be shipped unassembled.
9. Corner joints shall be accurately mitered and tightly fitted with integral door stops mitered or butted when assembled.

2.5 ACCESSORIES

- A. Provide completely thermally broken aluminum threshold.
- B. Weatherstripping: As recommended by door manufacturer.
- C. Adjustable vinyl sweeps with extended inner leg to provide tight seal.

2.6 FINISH COAT

- A. Door skins shall be painted with polyester powder paint, electrostatically applied and baked for 20 minutes at 350 degrees Fahrenheit.

- B. Color to be selected from manufacturer's standard range.

2.7 WARRANTY

- A. Doors and Frames shall be warranted for a period of one (1) full year from date of installation. The warranty shall cover the entire door against defects in design, material and workmanship.

PART 3 EXECUTION

3.1 INSTALLATION

- A. General: Install steel frames, doors, and accessories in accordance with final shop drawings, manufacturer's data, and as specified herein.
- B. Doors and Frames
 1. Comply with provisions of SDI-105, "Recommended Erection Instructions for Steel Frames," unless otherwise indicated.
 2. Doors shall be mounted in frames with 1/8 inch clearance at heads and jambs and allow 3/4 inch clearance above floor finish.
- C. Coordinate with masonry or wallboard wall construction for anchor placement.

3.2 TOLERANCES

- A. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

3.3 ADJUSTING AND CLEANING

- A. Finish Coat Touchup: Immediately after erection and glazing, sand smooth any damaged areas of finish coat and apply touchup of specified paint.
- B. Check and readjust operating finish hardware items, leaving steel doors and frames undamaged and in complete and proper operating condition.
- C. Adjust door for a tight seal against weather-stripping and threshold completely around perimeter of door slab.

END OF SECTION

SECTION 082216

BIRCH VENEER FLUSH WOOD DOORS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Flush wood doors, non-rated.

1.2 REFERENCES

- A. AWI - Quality Standards of Architectural Woodwork Institute.

1.3 SUBMITTALS

- A. Shop Drawings: Indicate door opening criteria, elevations, sizes, types, swings, stile and rail reinforcement, internal blocking for hardware attachment and undercuts required.
- B. Product Data: Submit the door manufacturer's product data specifications for each type of wood door.
 - 1. Include core material and edge construction; trim for openings; veneer species, type, and characteristics; factory machined criteria; and similar components.
- C. Manufacturer's Installation Instructions: Indicate special installation instructions.

1.4 QUALITY ASSURANCE

- A. Perform work in accordance with AWI Quality Standard Section 1300 Premium Grade. Designations for grade and core construction under types of doors refer to this standard.
- B. Contractor's Option: Contractor has the option to field fit and machine wood doors or to furnish prefitted and premachined wood doors specified elsewhere in this section. All field fitting and machined wood doors shall meet AWI standards for hanging or meet requirements specified in this section.
- C. Manufacturer: Obtain doors from a single manufacturer to ensure uniformity in quality of appearance and construction, unless otherwise indicated.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum 3 year's documented experience.

1.6 DELIVERY, STORAGE, AND PROTECTION

- A. Deliver, store, protect, and handle products at site in accordance with manufacturer's recommendations.
- B. Package, deliver, and store doors in accordance with AWI Section 1300.
- C. Protect wood doors during transit, storage, and handling to prevent damage, soiling, and deterioration.
 - 1. Store flat on a level surface in a clean, dry, well ventilated area protected from sunlight.
 - 2. Doors should not be subjected to extremes of heat or humidity conditions. Relative humidity should not be less than 30 percent or more than 60 percent.
 - 3. Cover to keep clean, but permit air circulation.
 - 4. Seal door edges at earliest time permitted in accordance with Section 09900.
 - 5. Do not drag one door across another.
- D. Identify each door with individual opening numbers which correlates with designation system used on shop drawings for door frames and hardware, using temporary, removable, or concealed markings.

1.7 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated on shop drawings.

1.8 COORDINATION

- A. Coordinate work under provisions of Division 1.
- B. Coordinate the work with door opening construction, door frame and door hardware installation.

1.9 WARRANTY

- A. **Warranty:** Submit written agreement on door manufacturer's standard form signed by the manufacturer, installer, and Contractor agreeing to repair or replace defective doors that have warped (bowed, cupped, or twisted beyond specified installation tolerances) or that show telegraphing of core construction below in face veneers or that do not conform to tolerance limitations of AWI. The warranty shall also include refinishing and reinstallation that may be required because of repair or replacement of defective doors.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Mohawk Flush Doors, Inc.
- B. Marshfield Door Systems, Inc.

- C. Agloma Hardwoods, Inc.
- D. Fenestra Corporation
- E. Approved equal

2.2 DOOR TYPES

- A. Flush Interior Doors: 1-3/8 inches thick, solid or hollow core construction, non-rated; indicated on the Door Schedule.

2.3 DOOR CONSTRUCTION (AWI QUALITY STANDARD)

- A. Hollow Core: (Allowed for closet doors only unless otherwise noted on Drawings): AWI Section 1300, Type SHC-Standard, 3 ply.

1. Stiles (Vertical Edges): One inch wide, minimum.
2. Top and Bottom Rails: 2-1/4 inches wide, minimum
3. Lock Block: 3-1/4 inches by 30 inches, minimum.
4. Stiles, Rails, and Lock Block: Solid lumber only.
5. Weyerhaeuser: DHC-2
6. Agloma: Architectural Hollow Core
7. Fenestra: NH7
8. Mohawk: MSHC
9. American: Premdor Standard Honeycomb Hollow Core

- B. Solid Core (Provide for all interior doors unless otherwise noted on Drawings): AWI Section 1300, Type PC-7, 7-ply.

1. Stiles (Vertical Edges): 1 inch wide, minimum.
2. Top and Bottom Rails: 1-1/8 inches wide, minimum; lumber only.
3. Stiles: Of matching wood species, solid lumber only.
4. Weyerhaeuser: Solid Particleboard Core Door (DPC-1)
5. Agloma: PC-7 Particle Core
6. Fenestra: GP7
7. Mohawk: MPC7
8. American: Premdor Standard Particleboard Core

2.4 FLUSH DOOR FACING

- A. Veneer Facing-Interior Doors: AWI premium grade; natural birch species wood, rotary cut, for paint or transparent finish.

2.5 ADHESIVES

- A. Interior Doors: AWI, Type I, melamine fortified urea glue
- B. Process: Cold press method

2.6 FABRICATION

- A. Fabricate non-rated doors in accordance with AWI Quality Standards requirements.
- B. Provide lock blocks at lock edge for hardware re-enforcement and at top of door for closer reinforcement.
- C. Vertical Exposed Edge of Stile and Rails: Hardwood
- D. Fit door edge trim to edge of stiles after applying veneer facing.
- E. Bond edge banding to cores.
- F. Premachined Doors for Finish Hardware (Contractor's Option)
 - 1. Prefit and premachine wood at the factory in accordance with hardware requirements and dimensions.
 - 2. Prefitting shall comply with AWI tolerance requirements. Machine doors for hardware that requires cutting. Comply with the final hardware schedules, door frame shop drawings, hardware templates, and other essential information to ensure proper fit of doors and hardware. Take accurate field measurement of hardware mortises in metal frames to verify dimensions and alignment before proceeding with machining in the factory. Do not machine for surface hardware.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify frame opening conditions prior to order and installation.
- B. Installer must examine door frames and verify that frames are the correct type and have been installed for proper hanging of corresponding doors and must notify the Contractor in writing of conditions detrimental to the proper and timely installation of wood doors. Do not proceed with installation until unsatisfactory conditions have been corrected in a manner acceptable to the installer.
- C. Do not install doors in frame openings that are not plumb or are out of tolerance for size of alignment.

3.2 INSTALLATION

- A. Install doors in accordance with manufacturer's instructions.
- B. Condition doors to the average prevailing humidity in the installation area prior to hanging.
- C. Machine cut relief for hinges and closers and coring for handsets and cylinders from templates furnished by the hardware supplier.
- D. Trim door width by cutting equally on both jamb edges.

- E. Trim door height by cutting equally on top and bottom edges to a maximum of 3/4 inch total.
- F. Pilot drill screw and bolt holes. Use threaded through bolts for half surface hinges.
- G. Prepare doors to receive finish hardware in accordance with AWI requirements. Machine cut for hardware. Core for handsets and cylinders.
- H. Coordinate installation of doors with installation of frames and hardware specified.
- I. Conform to AWI requirements for fit tolerances.
 - 1. Fit to frames and machine for hardware to whatever extent not previously worked at factory for proper fit and uniform clearance at each edge. For non-rated doors, provide clearances of 1/8 inch at jambs and heads, 1/8 inch at meeting stiles for pairs of doors, and 3/4 inch from the bottom of the door to top of specified floor finish or covering. Provide 1/4 inch clearance from the bottom of the door to top of threshold, if any.
- J. Seal cut surfaces immediately after fitting and machining.
- K. Job Site Finished Doors: Refer to other sections in this manual for finishing requirements.

3.3 INSTALLATION TOLERANCES

- A. Maximum Diagonal Distortion (Warp): 1/8 inch measured with straight edge or taugth string, corner to corner, over an imaginary 36 inch by 84 inch surface area.
- B. Maximum Vertical Distortion (Bow): 1/8 inch measured with straight edge or taugth string, top to bottom, over an imaginary 36 inch by 84 inch surface area.
- C. Maximum Width Distortion (Cup): 1/8 inch measured with straight edge or taugth string, edge to edge, over an imaginary 36 inch by 84 inch surface area.

3.4 ADJUSTING AND CLEANING

- A. Adjust work under provisions of Division 1.
- B. Adjust for smooth and balanced door movement.
- C. Rehang or replace doors that do not swing or operate freely.
- D. Refinish or replace doors damaged during installation.
- E. Follow the manufacturer's procedures for protecting installed wood doors from damage or deterioration until acceptance of the work.

END OF SECTION

SECTION 082305

ACCESS DOORS

PART 1 GENERAL

1.1 SECTION INCLUDES

Work includes the following items as indicated on the drawings:

- A. Non-rated access door and frame units.
- B. Wall and ceiling locations.

1.2 SUBMITTALS FOR REVIEW

- A. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, and details of adjoining work.
- B. Shop Drawings: Indicate exact position of all access door units.

1.3 SUBMITTALS FOR INFORMATION

- A. Manufacturer's Installation Instructions: Indicate installation requirements, rough-in dimensions and anchoring requirements.

1.4 SUBMITTALS AT PROJECT CLOSEOUT

- A. Record actual locations of all access units.

PART 2 PRODUCTS

2.1 MANUFACTURERS - WALL AND CEILING UNITS

- A. Milcor
- B. Larsen's Manufacturing Company
- C. J. L. Industries

2.2 ACCESS UNITS - WALLS (WHERE APPLICABLE, REFER TO DRAWINGS)

- A. Non-Fire Rated Door and Frame Unit: Formed steel:
 - 1. In Concrete or Masonry:
 - a. Size: 12 by 12 inches
 - (1) Milcor: 3202-014, Style M
 - (2) Larsen: L-MP
 - (3) J. L. Industries: TM

- b. Size: 16 by 16 inches
 - (1) Milcor: 3202-020, Style M
 - (2) Larsen: L-MP
 - (3) J. L. Industries: TM
- c. Size: 24 by 24 Inches
 - (1) Milcor: 3202-030, Style M
 - (2) Larsen: L-MP
 - (3) J. L. Industries: TM

2. In Gypsum Board:

- a. Size: 12 by 12 inches
 - (1) Milcor: 3202-014, Style M
 - (2) Larsen: L-MP
 - (3) J. L. Industries: TM
- b. Size: 16 by 16 inches
 - (1) Milcor: 3202-020, Style M
 - (2) Larsen: L-MP
 - (3) J. L. Industries: TM
- c. Size: 24 by 24 inches
 - (1) Milcor: 3202-030, Style M
 - (2) Larsen: L-MP
 - (3) J. L. Industries: TM
- d. Size: 24 by 30 inches
 - (1) Milcor: 3202-032, Style M
 - (2) Larsen: L-MP
 - (3) J. L. Industries: TM

2.3 ACCESS UNITS - CEILINGS (WHERE APPLICABLE, REFER TO DRAWINGS)

A. Non-Fire Rated Door and Frame Unit: Formed Steel:

1. In Gypsum Board:

- a. Size: 12 by 12 inches
 - (1) Milcor: 3203-012, Style DW
 - (2) Larsen: L-CPA/L-CPB
 - (3) J. L. Industries: FRC
- b. Size: 24 by 24 Inches
 - (1) Milcor: 3203-019, Style DW
 - (2) Larsen: L-CPA/L-CPB
 - (3) J. L. Industries: FRC
- c. Size: 24 by 30 Inches
 - (1) Milcor: Special Order, Style DW
 - (2) Larsen: L-CPA/L-CPB
 - (3) J. L. Industries: FRC
- d. Size: 24 by 36 Inches
 - (1) Milcor: 3203-036, Style DW
 - (2) Larsen: L-CPA/L-CPB
 - (3) J. L. Industries: FRC

B. Insulated Fire Rated Door and Frame Unit: Formed Steel:

1. In Gypsum Board:
 - a. Size: 22 by 30 inches
 - (1) Milcor: UFR
 - (2) Larsen: L-FRAP
 - (3) J. L. Industries: FD

2.4 FABRICATION - WALL AND CEILING UNITS

- A. Fabricate frames, flanges, and door panels, 14 gage galvanized steel for primed painted.
- B. Weld, fill, and grind joints to ensure flush and square unit.
- C. Hardware:
 1. Hinge: 175 degree steel hinge(s) with pin.
 2. Lock: Cylinder lock with latch, 2 keys for each unit.

2.5 FINISHES

- A. Base Metal Protection: Galvanized, hot dipped finish.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify all existing conditions before starting work.
- B. Verify that rough openings for door and frame are correctly sized and located.

3.2 INSTALLATION

- A. Install units in accordance with manufacturer's instructions.
- B. Install frames plumb and level in opening. Secure rigidly in place.
- C. Position unit to provide convenient access to concealed work requiring access.

END OF SECTION

SECTION 082410

ALUMINUM ENTRANCES AND STOREFRONTS

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

- A. The extent of aluminum entrances and storefronts is shown on the Drawings and schedules.
- B. The types of aluminum entrances and storefronts required include the following:
 - 1. Exterior entrance doors
 - 2. Vestibule doors matching entrance doors
 - 3. Frames for exterior entrances
 - 4. Storefront type framing system
- C. Related materials that are incorporated into the work of this section or that must match the materials called for in this section are specified in the following sections:
 - 1. Glazing: Refer to Section 08800, Glass and Glazing, for glazing requirements for aluminum entrances and storefronts, including doors that are specified herein to be factory pre-glazed.
 - 2. Aluminum Window Wall: Specified elsewhere in Division 8.
 - 3. Mortise Lock Cylinders: Specified in Section 08700, Hardware.

1.2 PERFORMANCE AND TESTING

- A. Thermal Movement: Fabricate exterior components from the manufacturer's stock systems that have been designed to provide for expansion and contraction resulting from ambient temperature range of 120 degrees F.
- B. Wind Loading: Fabricate exterior components from the manufacturer's stock systems that have been tested in accordance with ASTM E330 to withstand a uniform pressure of at least 20 psf inward and 20 psf outward.
- C. Weather Resistance: Fabricate exterior storefront components from the manufacturer's stock systems that have been tested to demonstrate permanent resistance to leakages as follows, with a test pressure differential of 10 percent of design loading (excluding operable door edges):
 - 1. Air Infiltration: Not more than 0.06 cfm per square foot, tested in accordance with ASTM E283.
 - 2. Water Infiltration: No uncontrolled water penetration, tested in accordance with ASTM E331.

1.3 QUALITY ASSURANCE

- A. Drawings: Drawings, elevations, and details showing spacing of members as well as profile and similar dimensional requirements of aluminum entrances and storefront work. Minor deviations will be accepted in order to utilize the manufacturer's standard products when, in the A/E's sole judgment, such deviations do not materially detract from the design concept or intended performances.

- B. **Field Measurement:** Wherever possible, take field measurements prior to preparation of shop drawings and fabrication to ensure proper fitting of work. However, proceed with fabrication and coordinate installation tolerances as necessary when field measurements might delay work.

1.4 STANDARDS

- A. Comply with applicable provisions of "Metal Curtain Wall, Window, Storefront, and Entrance Guide Specifications Manual" by AAMA and the "Entrance Manual" of the NAAMM.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. **Product Data:** Submit the manufacturer's specifications, standard details, and installation recommendations for components of aluminum entrances and storefronts required for the project, including data that products have been tested and comply with performance requirements.
- C. **Shop Drawings:** Submit shop drawings for fabrication and installation of aluminum entrances and storefronts, including elevations, detail sections of typical composite members, anchorages, reinforcement, expansion provisions, and glazing.
- D. **Samples:** Submit samples of each type and color of aluminum finish on 12 inches long sections of extrusions or formed shapes and on 6 inches square sheets of flat infill materials, as applicable

1.6 WARRANTY

- A. Provide a written warranty signed by the manufacturer, installer, and Contractor, agreeing to replace aluminum entrances and storefront which fail in materials or workmanship within the acceptable time period indicated below. Failure of materials or workmanship includes excessive leakage or air infiltration, excessive deflections, faulty operation of entrances, deterioration of finish or construction in excess of normal weathering, and defects in hardware, weather-stripping, and other components of the work. The time period shall be 1 year from the date of substantial completion.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with requirements, provide products of one of the following, or equal:
 - 1. Amarlite, Anaconda Aluminum Division
 - 2. Howmet Aluminum Corporation
 - 3. Kawneer Company, Inc.
 - 4. PPG Industries, Inc.
 - 5. Tubelite Division, Indal, Inc.
 - 6. Substitutions: Under provisions of Section 01600

2.2 MATERIALS AND ACCESSORIES

- A. Aluminum Members: Alloy and temper recommended by the manufacturer for strength, corrosion resistance, and application of required finish; ASTM B221 for extrusions, ASTM B209 for sheet/plate.
- B. Fasteners: Aluminum, nonmagnetic, stainless steel, or other materials warranted by the manufacturer to be noncorrosive and compatible with aluminum components.
 - 1. Do not use exposed fasteners except where unavoidable for application of hardware. Match finish of adjoining metal.
 - 2. Provide Phillips flat head machine screws for exposed fasteners.
- C. Concealed Flashing: Dead soft stainless steel, 26 gauge minimum, type selected by the manufacturer for compatibility.
- D. Brackets and Reinforcements: The manufacturer's high strength aluminum units where feasible; otherwise, nonmagnetic stainless steel or hot dip galvanized steel, complying with ASTM A386.
- E. Concrete/Masonry Inserts: Cast iron, malleable iron, or hot dip galvanized steel complying with ASTM A386.
- F. Bituminous Coatings: Cold applied asphalt mastic complying with SSPC-PS 12, compounded for 30 mil thickness per coat.
- G. Protective Coatings: As recommended by the material manufacturers and the finish coating applicator.
- H. Weather-stripping
 - 1. Compression Weather-stripping: The manufacturer's standard replaceable stripping of either molded neoprene gaskets, complying with ASTM D2000, or molded PVC gaskets, complying with ASTM D2287 in door stops.
 - 2. Sliding Weather-stripping: The manufacturer's standard replaceable stripping of wool, polypropylene, or nylon woven pile, with nylon fabric and aluminum strip backing, complying with AAMA 701.2 where stops do not occur.
- I. Glass and Glazing Materials: Provide glass and glazing materials complying with the requirements of Section 08800, Glass and Glazing.
- J. Glazing Panels: The manufacturer's standard flush laminated panels of the thickness shown, fabricated with resin impregnated kraft paper, honeycomb or rigid closed cell urethane core, laminated with waterproof glue between 2 sheets of aluminum, or flush panel of proprietary thermoplastic core cast between aluminum sheets. Finish of glazed panels shall match that specified for the main framing members.

2.3 HARDWARE

- A. Provide the door manufacturer's standard heavy duty hardware units as shown, scheduled, or required for operation of each door, including the following items of the sizes, number, and type recommended by the manufacturer for the service required, finished to match door, unless otherwise indicated.

1. Offset Pivots: Include intermediate pivot for doors over 7 feet 6 inches; cast aluminum alloy with steel pins and oilite bearings (ball bearing bottom pivots).
2. Overhead Closers: Units complying with ANSI A156.4 of the concealed, single acting, Grade 2, independently hung, concealed arm and track, selective hold open type.
3. Deadlatches: Standard mortise type with stainless steel strike box.
4. Thumb Turns: Inside cylinders of cast aluminum alloy.
5. Panic Hardware: Concealed rod devices equipped with full width crash bar with "dogging" feature to lock rod in the open position.
6. Flushbolts: Standard edge mortised type for inactive leaves of pairs of doors. Provide at both top and bottom of doors.
7. Pull Handles: Standard aluminum units of the style shown or as recommended by the manufacturer if not shown.
8. Push Bars: Standard aluminum units of style indicated, or single bar with push plate full door width of type shown, or as recommended by the manufacturer if not shown.
9. Thresholds: Extruded aluminum in mill finish, complete with anchors and clips, coordinated with pivots of the size shown or the manufacturer's standard if not shown.
10. Finish: Exposed hardware finishes matching and of comparable quality to that specified for the entrance door.

2.4 FABRICATION

A. General

1. Sizes and Profiles: Required sizes for door and frame units, including profile requirements, are shown on the Drawings. Any variable dimensions are indicated, together with maximum and minimum dimensions required to achieve design requirements and coordination with other work.
2. Prefabrication: To the greatest extent possible, complete fabrication, assembly, finishing, hardware application, and other work before shipment to the project site. Disassemble components only as necessary for shipment and installation. Pre-glaze door and frame units to the greatest extent possible, in coordination with installation and hardware requirements. Do not drill and tap for surface mounted hardware items until time of installation at the project site.
3. Sequence: Complete cutting, fitting, forming, drilling, and grinding of metal work prior to cleaning, finishing, surface treatment, and application of finishes. Remove arrises from cut edges, and ease edges and corners to radius of approximately 1/64 inch.
4. Welding: Comply with AWS recommendations to avoid discoloration; grind exposed welds smooth and restore mechanical finish.
5. Reinforcing: Install reinforcing as necessary for performance requirements; separate dissimilar metals with bituminous paint or other separators that will prevent corrosion.
6. Continuity: Maintain accurate relation of planes and angles, with hairline fit of contacting members.
7. Fasteners: Conceal fasteners wherever possible.
8. Weather-stripping: For exterior doors, provide compression weather stripping against fixed stops; at other edges, provide sliding weather-stripping retained in adjustable strip mortised into door edge. Provide heavy duty, hollow, compression weather-stripping in bottom door rail, adjustable for contact with threshold.

2.5 STOREFRONT FRAMING SYSTEM:

- A. General: Inside/outside matched resilient flush glazed system fabricated for stick type erection procedure with provision for glass replacement.
- B. Thermal Break Construction: Fabricate aluminum storefront framing system with integrally concealed, low conductance thermal barrier, located between exterior materials and exposed interior members, in a manner which eliminates direct metal to metal contact. Provide manufacturer's standard construction which has been in use for similar projects for a period of not less than 3 years.
- C. Stile and Rail Type Aluminum Doors:
 - 1. Frame: Provide tubular frame members, fabricated with mechanical joints using heavy inserted reinforcing plates and concealed tie rods or J-bolts, or fabricate with structurally welded joints, at the manufacturer's option.
 - 2. Style: Except as otherwise shown or scheduled, provide doors 1-3/4 inches thick, medium stile (3-1/2 inches nominal width with 7 inches nominal bottom rail), as described in AAMA publications.
 - 3. Glazing: Fabricate doors to facilitate replacement of glass or panels without disassembly of door stiles and rails. Provide snap on extruded aluminum glazing stops, with exterior stops anchored for non-removal.
- D. Panel Doors (When Indicated):
 - 1. Core and Faces: Fabricate core of closed cell polyurethane insulation, or rigid, noncombustible mineral insulation board. Furnish with 1/8 inch tempered hardboard each side for impact reinforcement. Fabricate faces of aluminum sheet of 0.064 inch minimum thickness, laminated to core with waterproof glue to form door panel thickness of 1 inch.
 - 2. Lights: Provide glazed openings in doors when indicated, with manufacturer's standard aluminum moldings and stops, with removable stops on the inside.
- E. Flush Type Aluminum Doors (when indicated)
 - 1. Frame: Provide tubular frame members, fabricated with reinforced mechanical or welded joints in accordance with the manufacturer's standard fabrication methods; limit frame exposure to 3/4 inch maximum width on door faces.
 - 2. Core: Fabricate core of closed cell polyurethane insulation, or rigid, noncombustible mineral insulation board. Furnish with 1/8 inch tempered hardboard each side for impact reinforcement.
 - 3. Faces: Fabricate faces of aluminum sheet of 0.064 inch minimum thickness, mechanically interlocked with frame members or laminated to core and framing with waterproof glue to form door thickness of 1-3/4 inches.
 - 4. Lights: Provide glazed openings in doors when indicated, with manufacturer's standard aluminum moldings and stops, with removable stops on the inside.

2.6 FINISHES

- A. Anodized Aluminum Finishes: This finish is to be applied to all stile and rail door components (but not the frames).
 - 1. Class I, Color Anodized Finish: AA-M12C22A42/44 (smooth specular mechanical finish; chemical etch, medium matte; 0.7 mil minimum thick anodic coating).

2. Protect anodized finishes promptly after drying as recommended by the manufacturer.
- B. Fluoropolymer Coating: This finish shall be applied to all framing members, flush aluminum doors, and glazing panels. It shall be coordinated with the requirements of the window wall specified in Section 08901, Window Wall, to ensure the matching of the 2 systems.
1. Fluoropolymer Coating: The manufacturer's special pigmented, 2 coat baked system of thermoplastic polymer of vinylidene fluoride (Kynar 500 Resin), 1.2 mils dry film thickness, medium gloss at 60 degrees F, ASTM D523; match A/E's color sample; comply with AAMA 605.1. The finish shall carry a 20 year fade resistance guarantee.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Comply with the manufacturer's instructions and recommendations for installation of aluminum entrances and storefronts.
- B. Set units plumb, level, and true to line, without warp or rack of framing members, doors, or panels. Anchor securely in place, separating aluminum and other corrodible metal surfaces from sources of corrosion or electrolytic action at points of contact with other materials.
- C. Set sill members and other members in a bed of compound or with joint fillers or gaskets to provide weathertight construction.
- D. Refer to Section 08800, Glass and Glazing, for installation of glass and other panels shown to be glazed into doors and framing and not pre-glazed by the manufacturer.

3.2 ADJUSTMENT AND CLEANING

- A. Adjust operating hardware to function properly, without binding, and to provide tight fit at contact points and weather-stripping.
- B. Clean completed system, inside and out, promptly after erection and installation of glass and sealants. Remove excess glazing and sealant compounds, dirt, and other substances from aluminum surfaces.
- C. Remove protective coating when the completion of construction activities no longer requires its retention, or otherwise protect materials and finishes as recommended by the manufacturer. Repair finishes that are damaged. Replace members having damaged finishes that cannot be satisfactorily repaired.
- D. Institute protective measures and other precautions required to ensure that aluminum entrances and storefronts will be without damage or deterioration other than normal weathering at the time of acceptance.

END OF SECTION

FIXED ALUMINUM WINDOWS WITH INSULATED GLASS

PART 1 GENERAL

1.1 RELATED DOCUMENTS:

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

1.2 SUMMARY

- A. Section includes Kawneer Architectural Aluminum Windows including perimeter trims, stools, accessories, shims and anchors, and perimeter sealing of window units.
 - 1. Types of aluminum windows include:
 - a. Series 8225TL Thermal Windows
 - b. Fixed Window
 - c. 2-1/4" (57.2 mm) frame depth, with 0.090" (2.3 mm) wall thickness
 - d. AW-PG100-FW
- B. Related Sections:
 - 1. 07905 "Joint Sealants"

1.3 DEFINITIONS

- A. Definitions: For fenestration industry standard terminology and definitions refer to American Architectural Manufacturers Association (AAMA) – AAMA Glossary (AAMA AG).

1.4 PERFORMANCE REQUIREMENTS

- A. General Performance: Aluminum-framed window system shall withstand the effects of the following performance requirements without failure due to defective manufacture, fabrication, installation, or other defects in construction.
- B. Window System Performance Requirements:
 - 1. Provide aluminum windows of performance indicated that comply with AAMA/WDMA/CSA 101/I.S.2/A440 (NAFS).
 - a. Performance Class and Grade: AW-PG100-FW.
 - 2. Air Infiltration: The test specimen shall be tested in accordance with ASTM E 283 at a minimum window size of 60" x 99" (1524 x 2515 mm). The air infiltration rate shall not exceed 0.10 cfm/ft² at a static air pressure differential of 6.24 psf (300 Pa).
 - 3. Water Resistance: The test specimen shall be tested in accordance with ASTM E 547 and ASTM E 331 at a minimum window size of 60" x 99" (1524 x 2515 mm). There shall be no leakage as defined in the test method at a static air pressure differential of 12 psf (574 Pa).

4. Uniform Load Deflection: A minimum static air pressure difference of 100 psf (4788 Pa) shall be applied in the positive and negative direction in accordance with ASTM E 330. There shall be no deflection in excess of $L/175$ of the span of any framing member.
 5. Uniform Load Structural Test: A minimum static air pressure difference of 150 psf (7182 Pa) shall be applied in the positive and negative direction in accordance with ASTM E 330. The unit shall be evaluated after each load.
 6. Component Testing: Window components shall be tested in accordance with procedures described in AAMA/WDMA/CSA 101/I.S.2/A440 (NAFS).
 7. Energy Efficiency:
 - a. Thermal Transmittance Test (U-Factor): When tested in accordance with AAMA 1503, the conductive thermal transmittance (U-Factor) shall not be more than .58 BTU/hr/sf/°F.
 8. Condensation Resistance Test (CRF): When tested in accordance with AAMA 1503 with clear glass, the condensation resistance factor (CRF) shall not be less than (CRF_f 59) frame and (CRF_g 57) glass.
 9. Forced Entry Resistance: All windows shall conform to ASTM F588, Grade 10.
 10. Sound Performance: When tested in accordance with ASTM E 90, the STC shall not be less than (34) and OITC not less than (28) based on 1" (25.4 mm) IG with 1/2" (12.7 mm) air space.
 11. Thermal Barrier Tests: Testing shall be in general accordance with AAMA 505 Dry Shrinkage and Composite Thermal Cycling test procedure, AAMA TIR-A8, Structural Performance of Composite Thermal Barrier systems.
- C. Environmental Product Declarations (EPD): Shall have a Type III product specific EPD created from a Product Category Rule specific to North America.

1.5 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
 1. Recycled Content:
 - a. Provide documentation that aluminum has a minimum of 50% mixed pre- and post-consumer recycled content with a sample document illustrating project specific information that will be provided after product shipment.
 - b. Once product has shipped, provide project specific recycled content information, including:
 - 1) Indicate recycled content; indicate percentage of pre- and post-consumer recycled content per unit of product.
 - 2) Indicate relative dollar value of recycled content product to total dollar value of product included in project.
 - 3) Indicate location recovery of recycled content.
 - 4) Indicate location of manufacturing facility.
 2. Environmental Product Declaration (EPD):
 - a. Include a Type III Product-Specific EPD created from a Product Category Rule specific to North America.

- B. Shop Drawings: Include plans, elevations, sections, details, hardware, attachments to other work, operational clearances and installation details.
- C. Samples for Initial Selection: For units with factory-applied color finishes including samples of hardware and accessories involving color selection
- D. Samples for Verification: For aluminum windows and components required.
- E. Product Schedule: For aluminum windows. Use same designations indicated on Drawings.
- F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency for each type, class, grade, and size of aluminum window. Test results based on use of downsized test units will not be accepted.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An installer which has had successful experiences with installation of the same or similar units required for this project and other projects of similar size and scope.
- B. Manufacturer Qualifications: A manufacturer capable of fabricating aluminum windows that meet or exceed performance requirements indicated and of documenting this performance by inclusion of test reports, and calculations.
- C. Source Limitations: Obtain aluminum windows through one source from a single manufacturer.
- D. Product Options: Drawings indicate size, profiles, and dimensional requirements of aluminum windows and are based on the specific system indicated. Refer to Division 01 Section "Product Requirements." Do not modify size and dimensional.
 - 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
- E. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Build mockup for type(s) of window(s) indicated, in location(s) shown on Drawings.
- F. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify aluminum window openings by field measurements before fabrication and indicate measurements on Shop Drawings.

1.8 WARRANTY

- A. **Manufacturer's Warranty:** Submit, for Owner's acceptance, manufacturer's standard warranty.
1. **Warranty Period:** Two (2) years from Date of Substantial Completion of the project provided however that the Limited Warranty shall begin in no event later than six months from date of shipment by manufacturer.
- B. **Insulating Glass:** Warranted to be free from defects (excluding breakage) for a period of five (5) years.

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. **Basis-of-Design Product:**
1. Kawneer Company Inc. www.kawneer.com
 2. Series 8225TL Thermal Windows – Fixed
 3. 2-1/4" (57.2 mm) frame depth, with 0.090" (2.3 mm) wall thickness
 4. AW-PG100-FW
- B. **Substitutions:** Under provisions of Section 01600.

2.2 MATERIALS

- A. **Aluminum Extrusions:** Alloy and temper recommended by glazed aluminum curtain wall and storefront system manufacturer for strength, corrosion resistance, and application of required finish, and complying with ASTM B 221: 6063-T6, 6105-T5, or 6061-T6 alloy and temper. Wall thickness at any location for the main frame to be not less than 0.070" (1.78 mm).
1. **Recycled Content:** Shall have a minimum of 50% mixed pre- and post-consumer recycled content.
 - a. Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
 - b. Indicate relative dollar value of recycled content product to total dollar value of product included in project.
 - c. Indicate location recovery of recycled content.
 - d. Indicate location of manufacturing facility.
- B. **Thermal Barrier:** The thermal barrier shall be Kawneer IsoLock™ with a nominal 3/8" (9.5 mm) separation consisting of a two-part, chemically curing high density polyurethane which is mechanically and adhesively bonded to the aluminum.
- C. **Fasteners:** Aluminum, nonmagnetic stainless steel or other materials to be non-corrosive and compatible with aluminum window members, trim, hardware, anchors, and other components.
- D. **Anchors, Clips, and Accessories:** Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated.

- E. Reinforcing Members: Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated.
- F. Sealant: For sealants required within fabricated windows, provide window manufacturer's standard, permanently elastic, non-shrinking, and non-migrating type recommended by sealant manufacturer for joint size and movement.

2.3 WINDOW SYSTEM

- A. Series 8225TL Thermal Windows - Fixed.

2.4 GLAZING

- A. Glass and Glazing Materials: Refer to Division 08 Section "Glazing" for glass units and glazing requirements applicable to glazed aluminum window units.
- B. Glazing System: Glazing method shall be a wet/dry type in accordance with manufacturer's standards. Exterior glazing shall be silicone back bedding sealant. Interior glazing shall be snap-in type glazing beads with an interior gasket in accordance with AAMA 702 or ASTM C864.

2.5 HARDWARE

- A. General: None required.
- B. Optional Muntin Grids: Extruded aluminum profiles. 6063-T6 alloy and temper as follows:
 - 1. True Muntins
 - 2. Between The Glass Muntins
 - 3. Applied Muntins
- C. Optional Dual glazing (Interior Access Panels): Extruded aluminum profiles, 6063-T6 alloy and temper, mitered and fastened joints. Optional Dual Glazing (Interior Access Panels) shall be lift-off or hinged type.
- D. Optional Venetian Blinds: 1" (25.4 mm) aluminum venetian blinds with braided ladder cords. Finish shall be (BRONZE) baked on polyester powder coat conforming to AAMA 2604. Provide tilt control knob with slip mechanism to prevent over tilting.
- E. Optional Exterior Panning and Interior Trims: Extruded aluminum, 6063-T6 alloy and temper, extruded to profiles and details indicated. Seal exterior joints with manufacturer's standard sealant to assure water-tight joints.
 - 1. Exterior Panning and Trims: All panning profiles shall be a minimum thickness of 0.062" (1.57 mm) to match the profiles as shown the drawings. Any profile variations shall be submitted to the architect and/or owner for approval 10 days prior to bid date. All panning shall be factory fabricated for field assembly. All corner joinery shall be factory cut. Joinery at the sill shall be coped and butt-type construction. All preparations for assembly shall be

completed by the window manufacturer. Upon assembly, panning frame joints shall be back-sealed to prevent moisture penetration.

2. Interior Trims: The interior face trim minimum wall thickness shall be 0.062" (1.57 mm). The face trim shall snap-fit onto concealed mounting clip. Exposed fasteners shall not be accepted. The mounting clip shall be extruded aluminum of 6063-T6 alloy and temper. The minimum wall thickness shall be 0.062" (1.57 mm). The trim clips shall be provided in 4" (101.6 mm) lengths and spaced a maximum of 18" (457.2 mm) center to center.

2.6 ACCESSORIES

- A. General: None required.

2.7 FABRICATION

- A. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:
 1. Profiles that are sharp, straight, and free of defects or deformations.
 2. Accurately fit joints; make joints flush, hairline and weatherproof.
 3. Means to drain water passing joints, condensation within framing members, and moisture migrating within the system to exterior.
 4. Physical and thermal isolation of glazing from framing members.
 5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
 6. Provisions for field replacement of glazing.
 7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- B. Window Frame Joinery: Screw-spline, factory-sealed frame and corner joints.
- C. Fabricate aluminum windows in sizes indicated. Include a complete system for assembling components and anchoring windows.
- D. Fabricate aluminum windows that are re-glazable without dismantling framing.
- E. Mullions: Provide mullions and cover plates as shown, matching window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections, as indicated. Provide mullions and cover plates capable of withstanding design loads of window units.
- F. Sub frames: Provide sub frames with anchors for window units as shown, of profile and dimensions indicated but not less than 0.093" (2.4 mm) thick extruded aluminum. Miter or cope corners, and join with concealed mechanical joint fasteners. Finish to match window units. Provide sub frames capable of withstanding design loads of window units.
- G. Factory-Glazed Fabrication: Glaze aluminum windows in the factory where practical and possible for applications indicated. Comply with requirements in Division 08 Section "Glazing" and with AAMA/WDMA/CSA 101/I.S.2/A440 (NAFS).

- H. Glazing Stops: Provide snap-on glazing stops coordinated with Division 08 Section "Glazing" and glazing system indicated. Provide glazing stops to match frame.

2.8 ALUMINUM FINISHES

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- B. Factory Finishing:
 - 1. Kawneer Permanodic™ AA-M10C21A44 / AA-M45C22A44, AAMA 611, Architectural Class I Color Anodic Coating (Color BRONZE).

PART 1 EXECUTION

1.1 EXAMINATION

- A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work. Verify rough opening dimensions, levelness of sill plate and operational clearances. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weather tight window installation.
 - 1. Masonry Surfaces: Visibly dry and free of excess mortar, sand, and other construction debris.
 - 2. Wood Frame Walls: Dry, clean, sound, well nailed, free of voids, and without offsets at joints. Ensure that nail heads are driven flush with surfaces in opening and within 3 inches (76.2 mm) of opening.
 - 3. Metal Surfaces: Dry; clean; free of grease, oil, dirt, rust, corrosion, and welding slag; without sharp edges or offsets at joints.
 - 4. Proceed with installation only after unsatisfactory conditions have been corrected.

1.2 INSTALLATION

- A. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing windows, hardware, accessories, and other components.
- B. Install aluminum framed window system level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.
- C. Set sill members in bed of sealant or with gaskets, as indicated, for weather tight construction.
- D. Install aluminum framed window system and components to drain condensation, water penetrating joints, and moisture migrating within system to the exterior.
- E. Separate aluminum from dissimilar materials to prevent corrosion or electrolytic action at points of contact.

3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections and prepare test reports.
 - 1. Testing and inspecting agency will interpret tests and state in each report whether tested work complies with or deviates from requirements.
- B. Testing Services: Testing and inspecting of installed windows shall take place as follows:
 - 1. Testing Methodology: Testing Standard shall be per AAMA 502 including reference to ASTM E 783 for Air Infiltration Test and ASTM E 1105 for Water Penetration Test.
 - a. Air Infiltration Test: Conduct test in accordance with ASTM E 783 at a minimum uniform static test pressure of 1.57 psf (75 Pa) for CW or 6.24 psf (300 Pa) for AW. The maximum allowable rates of air leakage for field testing shall not exceed 1.5 times the project specifications.
 - b. Water Infiltration Test: Water penetration resistance tests shall be conducted in accordance with ASTM E 1105 at a static test pressure equal to 2/3 the specified water test pressure.
 - 2. Testing Extent: Architect shall select window units to be tested as soon as a representative portion of the project has been installed, glazed, perimeter caulked and cured. Conduct tests for air infiltration and water penetration with manufacturer's representative present.
 - 3. Test Reports: Shall be prepared according to AAMA 502.

3.4 ADJUSTING, CLEANING, AND PROTECTION

- A. Adjust operating sashes, screens, hardware, and accessories for a tight fit at contact points and weather stripping for smooth operation and weather tight closure. Lubricate hardware and moving parts.
- B. Clean aluminum surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
- C. Clean glass immediately after installing windows. Comply with manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels, and clean surfaces.
- D. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.
- E. Protect window surfaces from contact with contaminating substances resulting from construction operations. In addition, monitor window surfaces adjacent to and below exterior concrete and masonry surfaces during construction for presence of dirt, scum, alkaline deposits, stains, or other contaminants. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written recommendations.

END OF SECTION

SECTION 084711

DOOR HARDWARE

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

1. Mechanical and electrified door hardware
2. Electronic access control system components

B. Section excludes:

1. Windows
2. Cabinets (casework), including locks in cabinets
3. Signage
4. Toilet accessories
5. Overhead doors

C. Related Sections:

1. Division 01 Section "Alternates" for alternates affecting this section.
2. Division 06 Section "Rough Carpentry"
3. Division 06 Section "Finish Carpentry"
4. Division 07 Section "Joint Sealants" for sealant requirements applicable to threshold installation specified in this section.
5. Division 08 Sections:
 - a. "Metal Doors and Frames"
 - b. "Flush Wood Doors"
 - c. "Interior Aluminum Doors and Frames"
 - d. "Aluminum-Framed Entrances and Storefronts"
6. Division 26 "Electrical" sections for connections to electrical power system and for low-voltage wiring.
7. Division 28 "Electronic Safety and Security" sections for coordination with other components of electronic access control system and fire alarm system.

1.02 REFERENCES

A. UL LLC

1. UL 10B - Fire Test of Door Assemblies
2. UL 10C - Positive Pressure Test of Fire Door Assemblies
3. UL 1784 - Air Leakage Tests of Door Assemblies
4. UL 305 - Panic Hardware

B. DHI - Door and Hardware Institute

1. Sequence and Format for the Hardware Schedule
2. Recommended Locations for Builders Hardware
3. Keying Systems and Nomenclature
4. Installation Guide for Doors and Hardware

C. NFPA – National Fire Protection Association

1. NFPA 70 – National Electric Code
2. NFPA 80 – 2016 Edition – Standard for Fire Doors and Other Opening Protectives
3. NFPA 101 – Life Safety Code
4. NFPA 105 – Smoke and Draft Control Door Assemblies
5. NFPA 252 – Fire Tests of Door Assemblies

D. ANSI - American National Standards Institute

1. ANSI A117.1 – 2017 Edition – Accessible and Usable Buildings and Facilities
2. ANSI/BHMA A156.1 - A156.29, and ANSI/BHMA A156.31 - Standards for Hardware and Specialties
3. ANSI/BHMA A156.28 - Recommended Practices for Keying Systems
4. ANSI/WDMA I.S. 1A - Interior Architectural Wood Flush Doors
5. ANSI/SDI A250.8 - Standard Steel Doors and Frames

1.03 SUBMITTALS

A. General:

1. Submit in accordance with Conditions of Contract and Division 01 Submittal Procedures.
2. Prior to forwarding submittal:
 - a. Review drawings and Sections from related trades to verify compatibility with specified hardware.
 - b. Highlight, encircle, or otherwise specifically identify on submittals: deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.

B. Action Submittals:

1. Product Data: Submit technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
2. Riser and Wiring Diagrams: After final approval of hardware schedule, submit details of electrified door hardware, indicating:
 - a. Wiring Diagrams: For power, signal, and control wiring and including:
 - 1) Details of interface of electrified door hardware and building safety and security systems.

- 2) Schematic diagram of systems that interface with electrified door hardware.
 - 3) Point-to-point wiring.
 - 4) Risers.
3. Samples for Verification: If requested by Architect, submit production sample of requested door hardware unit in finish indicated and tagged with full description for coordination with schedule.
 - a. Samples will be returned to supplier. Units that are acceptable to Architect may, after final check of operations, be incorporated into Work, within limitations of key coordination requirements.
4. Door Hardware Schedule:
 - a. Submit concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate fabrication of other work critical in Project construction schedule.
 - b. Submit under direct supervision of a Door Hardware Institute (DHI) certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule published by DHI.
 - c. Indicate complete designations of each item required for each opening, include:
 - 1) Door Index: door number, heading number, and Architect's hardware set number.
 - 2) Quantity, type, style, function, size, and finish of each hardware item.
 - 3) Name and manufacturer of each item.
 - 4) Fastenings and other pertinent information.
 - 5) Location of each hardware set cross-referenced to indications on Drawings.
 - 6) Explanation of all abbreviations, symbols, and codes contained in schedule.
 - 7) Mounting locations for hardware.
 - 8) Door and frame sizes and materials.
 - 9) Degree of door swing and handing.
 - 10) Operational Description of openings with electrified hardware covering egress, ingress (access), and fire/smoke alarm connections.
5. Key Schedule:
 - a. After Keying Conference, provide keying schedule that includes levels of keying, explanations of key system's function, key symbols used, and door numbers controlled.
 - b. Use ANSI/BHMA A156.28 "Recommended Practices for Keying Systems" as guideline for nomenclature, definitions, and approach for selecting optimal keying system.
 - c. Provide 3 copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.

- d. Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.
- e. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion. Forward bitting list, key cuts and key system schematic directly to Owner, by means as directed by Owner.
- f. Prepare key schedule by or under supervision of supplier, detailing Owner's final keying instructions for locks.

C. Informational Submittals:

1. Provide Qualification Data for Supplier, Installer and Architectural Hardware Consultant.
2. Provide Product Data:
 - a. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.
 - b. Include warranties for specified door hardware.

D. Closeout Submittals:

1. Operations and Maintenance Data: Provide in accordance with Division 01 and include:
 - a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
 - b. Catalog pages for each product.
 - c. Final approved hardware schedule edited to reflect conditions as installed.
 - d. Final keying schedule
 - e. Copy of warranties including appropriate reference numbers for manufacturers to identify project.
 - f. As-installed wiring diagrams for each opening connected to power, both low voltage and 110 volts.

E. Inspection and Testing:

1. Submit written reports to the Owner and Authority Having Jurisdiction (AHJ) of the results of functional testing and inspection for:
 - a. Fire door assemblies, in compliance with NFPA 80.
 - b. Required egress door assemblies, in compliance with NFPA 101.

1.04 QUALITY ASSURANCE

A. Qualifications and Responsibilities:

1. Supplier: Recognized architectural hardware supplier with a minimum of 5 years documented experience supplying both mechanical and electromechanical door hardware similar in quantity, type, and quality to that indicated for this Project. Supplier to be recognized as a factory direct distributor by the manufacturer of the primary materials with a warehousing facility in the Project's vicinity. Supplier to have on staff, a certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) available to Owner, Architect, and Contractor, at reasonable times during the Work for consultation.
2. Installer: Qualified tradesperson skilled in the application of commercial grade hardware with experience installing door hardware similar in quantity, type, and quality as indicated for this Project.
3. Architectural Hardware Consultant: Person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and meets these requirements:
 - a. For door hardware: DHI certified AHC or DHC.
 - b. Can provide installation and technical data to Architect and other related subcontractors.
 - c. Can inspect and verify components are in working order upon completion of installation.
 - d. Capable of producing wiring diagram and coordinating installation of electrified hardware with Architect and electrical engineers.
4. Single Source Responsibility: Obtain each type of door hardware from single manufacturer.

B. Certifications:

1. Fire-Rated Door Openings:
 - a. Provide door hardware for fire-rated openings that complies with NFPA 80 and requirements of authorities having jurisdiction.
 - b. Provide only items of door hardware that are listed products tested by UL LLC, Intertek Testing Services, or other testing and inspecting organizations acceptable to authorities having jurisdiction for use on types and sizes of doors indicated, based on testing at positive pressure and according to NFPA 252 or UL 10C and in compliance with requirements of fire-rated door and door frame labels.
2. Smoke and Draft Control Door Assemblies:
 - a. Provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105
 - b. Comply with the maximum air leakage of 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) at tested pressure differential of 0.3-inch wg (75 Pa) of water.
3. Electrified Door Hardware
 - a. Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction.

4. Accessibility Requirements:

- a. Comply with governing accessibility regulations cited in "REFERENCES" article 087100, 1.02.D3 herein for door hardware on doors in an accessible route. This project must comply with all Federal Americans with Disability Act regulations and all Local Accessibility Regulations.

C. Pre-Installation Meetings

1. Keying Conference

- a. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including:
 - 1) Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
 - 2) Preliminary key system schematic diagram.
 - 3) Requirements for key control system.
 - 4) Requirements for access control.
 - 5) Address for delivery of keys.

2. Pre-installation Conference

- a. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
- b. Inspect and discuss preparatory work performed by other trades.
- c. Inspect and discuss electrical roughing-in for electrified door hardware.
- d. Review sequence of operation for each type of electrified door hardware.
- e. Review required testing, inspecting, and certifying procedures.
- f. Review questions or concerns related to proper installation and adjustment of door hardware.

3. Electrified Hardware Coordination Conference:

- a. Prior to ordering electrified hardware, schedule and hold meeting to coordinate door hardware with security, electrical, doors and frames, and other related suppliers.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site. Promptly replace products damaged during shipping.
- B. Tag each item or package separately with identification coordinated with final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package. Deliver each article of hardware in manufacturer's original packaging.
- C. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.

- D. Provide secure lock-up for door hardware delivered to Project. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.
- E. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.
- F. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

1.06 COORDINATION

- A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete.
- B. Installation Templates: Distribute for doors, frames, and other work specified to be factory or shop prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.
- D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

1.07 WARRANTY

- A. Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within published warranty period.
 - 1. Warranty does not cover damage or faulty operation due to improper installation, improper use or abuse.
 - 2. Warranty Period: Beginning from date of Substantial Completion, for durations indicated in manufacturer's published listings.
 - a. Mechanical Warranty
 - 1) Locks
 - a) Falcon: 10 years
 - 2) Exit Devices
 - a) Falcon: 10 years
 - 3) Closers
 - a) Falcon SC Series: 10 years
 - 4) Automatic Operators
 - a) Falcon: 1 year
 - b. Electrical Warranty
 - 1) Exit Devices
 - a) Falcon: 1 year

1.08 MAINTENANCE

- A. Furnish complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.
- B. Turn over unused materials to Owner for maintenance purposes.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. The Owner requires use of certain products for their unique characteristics and project suitability to ensure continuity of existing and future performance and maintenance standards. After investigating available product offerings, the Awarding Authority has elected to prepare proprietary specifications. These products are specified with the notation: "No Substitute."
 - 1. Where "No Substitute" is noted, submittals and substitution requests for other products will not be considered.
- B. Approval of manufacturers and/or products other than those listed as "Scheduled Manufacturer" or "Acceptable Manufacturers" in the individual article for the product category shall be in accordance with QUALITY ASSURANCE article, herein.
- C. Approval of products from manufacturers indicated in "Acceptable Manufacturers" is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer's product.
- D. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

2.02 MATERIALS

A. Fabrication

- 1. Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. provide screws according to manufacturer's recognized installation standards for application intended.
 - 2. Finish exposed screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work including prepared for paint surfaces to receive painted finish.
 - 3. Provide concealed fasteners wherever possible for hardware units exposed when door is closed. Coordinate with "Metal Doors and Frames", "Flush Wood Doors", "Stile and Rail Wood Doors" to ensure proper reinforcements. Advise the Architect where visible fasteners, such as thru bolts, are required.
- B. Provide screws, bolts, expansion shields, drop plates and other devices necessary for hardware installation.

1. Where fasteners are exposed to view: Finish to match adjacent door hardware material.

C. Cable and Connectors:

1. Where scheduled in the hardware sets, provide each item of electrified hardware and wire harnesses with number and gage of wires enough to accommodate electric function of specified hardware.
2. Provide Molex connectors that plug directly into connectors from harnesses, electric locking and power transfer devices.
3. Provide through-door wire harness for each electrified locking device installed in a door and wire harness for each electrified hinge, electrified continuous hinge, electrified pivot, and electric power transfer for connection to power supplies.

2.03 HINGES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:

- a. Ives 5PB series

2. Acceptable Manufacturers and Products:

- a. Hager 1191/1279 series
- b. McKinney T series
- c. Stanley F series

B. Requirements:

1. Provide hinges conforming to ANSI/BHMA A156.1.
2. Provide five knuckle, plain bearing hinges.
3. 1-3/4 inch (44 mm) thick doors, up to and including 36 inches (914 mm) wide:
 - a. Exterior: Standard weight, bronze or stainless steel, 4-1/2 inches (114 mm) high
 - b. Interior: Standard weight, steel, 4-1/2 inches (114 mm) high
4. Doors over 1-3/4 inch (44 mm) thick or over 36 inches (914 mm) wide:
 - a. Exterior: Bronze/stainless steel, 5 inches (127 mm) high
 - b. Interior: Steel, 5 inches (127 mm) high
5. Adjust hinge width for door, frame, and wall conditions to allow proper degree of opening.
6. Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height, and one additional hinge for each 30 inches (762 mm) of additional door height.
7. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
 - a. Steel Hinges: Steel pins

- b. Non-Ferrous Hinges: Stainless steel pins
- c. Out-Swinging Exterior Doors: Non-removable pins
- d. Out-Swinging Interior Lockable Doors: Non-removable pins
- e. Interior Non-lockable Doors: Non-rising pins

2.04 HINGES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:

- a. Ives 5BB series

2. Acceptable Manufacturers and Products:

- a. Hager BB1191/1279 series
- b. McKinney TB series
- c. Stanley FBB series

B. Requirements:

1. Provide hinges conforming to ANSI/BHMA A156.1.
2. Provide five knuckle, ball bearing hinges.
3. 1-3/4 inch (44 mm) thick doors, up to and including 36 inches (914 mm) wide:
 - a. Exterior: Standard weight, bronze or stainless steel, 4-1/2 inches (114 mm) high
 - b. Interior: Standard weight, steel, 4-1/2 inches (114 mm) high
4. 1-3/4 inch (44 mm) thick doors over 36 inches (914 mm) wide:
 - a. Exterior: Heavy weight, bronze/stainless steel, 5 inches (127 mm) high
 - b. Interior: Heavy weight, steel, 5 inches (127 mm) high
5. 2 inches or thicker doors:
 - a. Exterior: Heavy weight, bronze or stainless steel, 5 inches (127 mm) high
 - b. Interior: Heavy weight, steel, 5 inches (127 mm) high
6. Adjust hinge width for door, frame, and wall conditions to allow proper degree of opening.
7. Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height, and one additional hinge for each 30 inches (762 mm) of additional door height.
8. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
 - a. Steel Hinges: Steel pins
 - b. Non-Ferrous Hinges: Stainless steel pins
 - c. Out-Swinging Exterior Doors: Non-removable pins
 - d. Out-Swinging Interior Lockable Doors: Non-removable pins
 - e. Interior Non-lockable Doors: Non-rising pins

9. Provide hinges with electrified options as scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware. Locate electric hinge at second hinge from bottom or nearest to electrified locking component. Provide mortar guard for each electrified hinge specified.

2.05 CONTINUOUS HINGES

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Hager-Roton
 - b. ABH
 - c. McKinney

B. Requirements:

1. Provide aluminum geared continuous hinges conforming to ANSI/BHMA A156.26, Grade 1.
2. Provide aluminum geared continuous hinges, where specified in the hardware sets, fabricated from 6063-T6 aluminum.
3. Provide split nylon bearings at each hinge knuckle for quiet, smooth, self-lubricating operation.
4. Provide hinges capable of supporting door weights up to 450 pounds, and successfully tested for 1,500,000 cycles.
5. On fire-rated doors, provide aluminum geared continuous hinges classified for use on rated doors by testing agency acceptable to authority having jurisdiction.
6. Provide aluminum geared continuous hinges with electrified option scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware.
7. Provide hinges 1 inch (25 mm) shorter in length than nominal height of door, unless otherwise noted or door details require shorter length and with symmetrical hole pattern.

2.06 ELECTRIC POWER TRANSFER

A. Manufacturers:

1. Scheduled Manufacturer and Product:
 - a. Von Duprin EPT-10
2. Acceptable Manufacturers and Products:
 - a. No Substitute

B. Requirements:

1. Provide power transfer with electrified options as scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware.
2. Locate electric power transfer per manufacturer's template and UL requirements, unless interference with operation of door or other hardware items.

2.07 CYLINDRICAL LOCKS – GRADE 1

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Falcon T series
2. Acceptable Manufacturers and Products:
 - a. No Substitute

B. Requirements:

1. Provide cylindrical locks conforming to ANSI/BHMA A156.2 Series 4000, Grade 1, and UL Listed for 3-hour fire doors.
2. Cylinders: Refer to "KEYING" article, herein.
3. Provide locks with standard 2-3/4 inches (70 mm) backset, unless noted otherwise, with 1/2-inch latch throw. Provide proper latch throw for UL listing at pairs.
4. Provide locksets with separate anti-rotation thru-bolts, and no exposed screws.
5. Provide independently operating levers with two external return spring cassettes mounted under roses to prevent lever sag.
6. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
7. Provide electrified options as scheduled in the hardware sets.
8. Lever Trim: Solid cast levers without plastic inserts and wrought roses on both sides.
 - a. Lever Design: Dane.

2.08 SURFACE BOLTS

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Burns

- b. Rockwood
- c. DCI
- d. Trimco

B. Requirements:

1. Surface bolts to have 1" throw for maximum security with concealed mounting that prevents vandalism. Units to be constructed of heavy-duty steel and UL listed up to three (3) hours when used on the inactive door of a pair up to 8' in height.

2.09 CYLINDRICAL LOCKS – GRADE 2

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Falcon B series
2. Acceptable Manufacturers and Products:
 - a. No Substitute

B. Requirements:

1. Provide cylindrical locks conforming to ANSI/BHMA A156.2 Series 4000, Grade 2, and UL Listed for 3-hour fire doors.
2. Cylinders: Refer to "KEYING" article, herein.
3. Provide locks with standard 2-3/4 inches (70 mm) backset, unless noted otherwise, with 1/2-inch latch throw. Provide proper latch throw for UL listing at pairs.
4. Provide locksets with separate anti-rotation thru-bolts, and no exposed screws.
5. Provide independently operating levers with two external return spring cassettes mounted under roses to prevent lever sag.
6. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
7. Lever Trim: Solid cast levers without plastic inserts and wrought roses on both sides.
 - a. Lever Design: Dane.

2.10 EXIT DEVICES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Falcon 24/25 series
2. Acceptable Manufacturers and Products:

a. No Substitute

B. Requirements:

1. Provide exit devices tested to ANSI/BHMA A156.3 Grade 1 and UL listed for Panic Exit or Fire Exit Hardware.
2. Cylinders: Refer to "KEYING" article, herein.
3. Provide touchpad type exit devices, fabricated of brass, bronze, stainless steel, or aluminum, plated to standard architectural finishes to match balance of door hardware.
4. Touchpad must extend a minimum of one half of door width. No plastic inserts are allowed in touchpads.
5. Provide exit devices with deadlatching feature for security and for future addition of alarm kits and/or other electrified requirements.
6. Provide flush end caps for exit devices.
7. Provide exit devices with manufacturer's approved strikes.
8. Provide exit devices cut to door width and height. Install exit devices at height recommended by exit device manufacturer, allowable by governing building codes, and approved by Architect.
9. Mount mechanism case flush on face of doors or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits.
10. Provide cylinder or hex-key dogging as specified at non fire-rated openings.
11. Removable Mullions: 2 inches (51 mm) x 3 inches (76 mm) steel tube. Where scheduled as keyed removable mullion, provide type that can be removed by use of a keyed cylinder, which is self-locking when re-installed.
12. Provide factory drilled weep holes for exit devices used in full exterior application, highly corrosive areas, and where noted in hardware sets.
13. Provide electrified options as scheduled.
14. Provide exit devices with optional trim designs to match other lever and pull designs used on the project.

2.11 NARROW STILE DEADLOCK/DEADLATCH

A. Manufacturers and Products:

1. Scheduled Manufacturer:
 - a. Adams Rite
 - b. General Lock
2. Acceptable Manufacturers:
 - a. No Substitute

B. Requirements:

1. Provide narrow style aluminum door deadlocks/deadlatches.
2. Cylinders: Refer to "KEYING" article, herein.

3. Provide manufacturer's standard strikes unless extended lip strikes are necessary to protect trim.

2.12 PUSHBUTTONS

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Locknetics
2. Acceptable Manufacturers:
 - a. No Substitute

B. Requirements:

1. Provide push buttons as specified in hardware groups.

2.13 CYLINDERS

A. Manufacturers and Products:

1. Scheduled Manufacturer:
 - a. Falcon
2. Acceptable Manufacturers and Products:
 - a. No Substitute

B. Requirements:

1. Provide cylinders/cores compliant with ANSI/BHMA A156.5; latest revision; cylinder face finished to match lockset; manufacturer's series as indicated. Refer to "KEYING" article, herein.
2. Provide cylinders in the below-listed configuration(s), distributed throughout the Project as indicated.
 - a. Conventional Open: cylinder with small format interchangeable core (SFIC) core with open keyway

2.14 KEYING

A. Scheduled System:

1. Existing factory registered system:

- a. Provide cylinders/cores keyed into Owner's existing factory registered keying system. Comply with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.

B. Requirements:

1. Permanent Keying:

- a. Provide permanent cylinders/cores keyed by the manufacturer according to the following key system.
 - 1) Master Keying system as directed by the Owner.
- b. Forward bitting list and keys separately from cylinders, by means as directed by Owner. Failure to comply with forwarding requirements will be cause for replacement of cylinders/cores involved at no additional cost to Owner.
- c. Provide keys with the following features:
 - 1) Material: Nickel silver; minimum thickness of .107-inch (2.3mm)
- d. Identification:
 - 1) Mark permanent cylinders/cores and keys with applicable blind code for identification. Do not provide blind code marks with actual key cuts.
 - 2) Identification stamping provisions must be approved by the Architect and Owner.
 - 3) Stamp cylinders/cores and keys with Owner's unique key system facility code as established by the manufacturer; key symbol and embossed or stamped with "DO NOT DUPLICATE" along with the "PATENTED" or patent number to enforce the patent protection.
 - 4) Failure to comply with stamping requirements will be cause for replacement of keys involved at no additional cost to Owner.
 - 5) Forward permanent cylinders/cores to Owner, separately from keys, by means as directed by Owner.
- e. Quantity: Furnish in the following quantities.
 - 1) Change (Day) Keys: 4 per cylinder/core.
 - 2) Master Keys: 6.

2.15 DOOR CLOSERS

A. Manufacturers and Products:

- 1. Scheduled Manufacturer and Product:
 - a. Falcon SC70A series
- 2. Acceptable Manufacturers and Products:
 - a. No Substitute

B. Requirements:

1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. ISO 9000 certify closers. Stamp units with date of manufacture code.
2. Provide door closers with fully hydraulic, full rack and pinion action with aluminum cylinder.
3. Closer Body: 1-1/2-inch (38 mm) diameter with 5/8-inch (16 mm) diameter heat-treated pinion journal.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and backcheck.
7. Pressure Relief Valve (PRV) Technology: Not permitted.
8. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.16 DOOR TRIM

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Elmes
 - b. Trimco
 - c. Burns
 - d. Rockwood

B. Requirements:

1. Provide push plates, push bars, pull plates, pulls, and hands-free reversible door pulls with diameter and length as scheduled.

2.17 ELECTRO-HYDRAULIC AUTOMATIC OPERATORS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Falcon 82000 series
2. Acceptable Manufacturers and Products:

a. No Substitute

B. Requirements:

1. Provide low energy automatic operator units with hydraulic closer complying with ANSI/BHMA A156.19.
2. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
3. Provide units with conventional door closer opening and closing forces unless power operator motor is activated. Provide door closer assembly with adjustable spring size, back-check, and opening and closing speed adjustment valves to control door
4. Provide units with on/off switch for manual operation, motor start up delay, vestibule interface delay, electric lock delay, and door hold open delay.
5. Provide drop plates, brackets, and adapters for arms as required for details.
6. Provide actuator switches and receivers for operation as specified.
7. Provide weather-resistant actuators at exterior applications.
8. Provide key switches with LED's, recommended and approved by manufacturer of automatic operator as required for function described in operation description of hardware group below. Cylinders: Refer to "KEYING" article, herein.
9. Provide complete assemblies of controls, switches, power supplies, relays, and parts/material recommended and approved by manufacturer of automatic operator for each individual leaf. Actuators control both doors simultaneously at pairs. Sequence operation of exterior and vestibule doors with automatic operators to allow ingress or egress through both sets of openings as directed by Architect. Locate actuators, key switches, and other controls as directed by Architect.
10. Provide units with vestibule inputs that allow sequencing operation of two units, and SPDT relay for interfacing with latching or locking devices.

2.18 OVERHEAD STOPS AND OVERHEAD STOP/HOLDERS

A. Manufacturers:

1. Scheduled Manufacturers:

a. Glynn-Johnson

2. Acceptable Manufacturers:

a. Rixson

b. Sargent

B. Requirements:

1. Provide overhead stop at any door where conditions do not allow for a wall stop or floor stop presents tripping hazard.
2. Provide friction type at doors without closer and positive type at doors with closer.

2.19 DOOR STOPS AND HOLDERS

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Trimco
 - b. Burns
 - c. Rockwood

B. Provide door stops at each door leaf:

1. Provide wall stops wherever possible. Provide concave type where lockset has a push button or thumbturn.
2. Where a wall stop cannot be used, provide universal floor stops.
3. Where wall or floor stop cannot be used, provide overhead stop.
4. Provide roller bumper where doors open into each other and overhead stop cannot be used.

2.20 LATCH PROTECTORS

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Burns
 - b. Trimco
 - c. Rockwood

B. Provide stainless steel latch protectors of type required to function with specified lock.

2.21 THRESHOLDS, SEALS, DOOR SWEEPS, AUTOMATIC DOOR BOTTOMS, AND GASKETING

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Zero International
2. Acceptable Manufacturers:

- a. National Guard
- b. Legacy
- c. Pemko

B. Requirements:

1. Provide thresholds, weather-stripping, and gasketing systems as specified and per architectural details. Match finish of other items.
2. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
3. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.
4. Size thresholds 1/2 inch (13 mm) high by 5 inches (127 mm) wide by door width unless otherwise specified in the hardware sets or detailed in the drawings.

2.22 SILENCERS

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Burns
 - b. Rockwood
 - c. Trimco

B. Requirements:

1. Provide "push-in" type silencers for hollow metal or wood frames.
2. Provide one silencer per 30 inches (762 mm) of height on each single frame, and two for each pair frame.
3. Omit where gasketing is specified.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance. Verify doors, frames, and walls have been properly reinforced for hardware installation.
- B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

- C. Submit a list of deficiencies in writing and proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Mount door hardware units at heights to comply with the following, unless otherwise indicated or required to comply with governing regulations.
 - 1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
 - 2. Custom Steel Doors and Frames: HMMA 831.
 - 3. Interior Architectural Wood Flush Doors: ANSI/WDMA I.S. 1A
 - 4. Installation Guide for Doors and Hardware: DHI TDH-007-20
- B. Install door hardware in accordance with NFPA 80, NFPA 101 and provide post-install inspection, testing as specified in section 1.03.E unless otherwise required to comply with governing regulations.
- C. Install each hardware item in compliance with manufacturer's instructions and recommendations, using only fasteners provided by manufacturer.
- D. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.
- E. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.
- F. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- G. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.
- H. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated.
- I. Lock Cylinders:
 - 1. Install construction cores to secure building and areas during construction period.
 - 2. Replace construction cores with permanent cores as indicated in keying section.
- J. Wiring: Coordinate with Division 26, ELECTRICAL and Division 28 ELECTRONIC SAFETY AND SECURITY sections for:
 - 1. Conduit, junction boxes and wire pulls.
 - 2. Connections to and from power supplies to electrified hardware.
 - 3. Connections to fire/smoke alarm system and smoke evacuation system.
 - 4. Connection of wire to door position switches and wire runs to central room or area, as directed by Architect.
 - 5. Connections to panel interface modules, controllers, and gateways.
 - 6. Testing and labeling wires with Architect's opening number.
- K. Door Closers: Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Mount closers so they are not visible in corridors, lobbies and other public spaces unless approved by Architect.
- L. Closer/holders: Mount closer/holders on room side of corridor doors, inside of exterior doors, and stair side of stairway doors.

- M. Thresholds: Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."
- N. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.
- O. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
- P. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
- Q. Door Bottoms and Sweeps: Apply to bottom of door, forming seal with threshold when door is closed.

3.03 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
 - 1. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.
- B. Occupancy Adjustment: Approximately three to six months after date of Substantial Completion, examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors and door hardware.

3.04 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items per manufacturer's instructions to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

3.05 DOOR HARDWARE SCHEDULE

- A. The intent of the hardware specification is to specify the hardware for interior and exterior doors, and to establish a type, continuity, and standard of quality. However, it is the door hardware supplier's responsibility to thoroughly review existing conditions, schedules, specifications, drawings, and other Contract Documents to verify the suitability of the hardware specified.
- B. Discrepancies, conflicting hardware, and missing items are to be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application.
- C. Hardware items are referenced in the following hardware schedule. Refer to the above specifications for special features, options, cylinders/keying, and other requirements.

D. Hardware Sets:

Abbreviation	Name
ADA	Adams Rite Manufacturing Co
FAL	Falcon
GLY	Glynn-Johnson Corp
IVE	H.B. Ives
LOC	Locknetics Security Engineering
SCH	Schlage Lock Company
VON	Von Duprin
ZER	Zero International Inc

HARDWARE SET NO. 1

For use on mark/door #(s):

101

Each to have:

1	EA	CONT. HINGE	112HD EPT	628	IVE
1	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	PANIC HDWE W/RX	CD-RX-24-R-NL-OP-CON	626	FAL
1	EA	RIM CYLINDER	951	626	FAL
1	EA	MORTISE CYLINDER	985	626	FAL
1	EA	DOOR PULL	9264F 18" 12" O	630-	IVE
				316	
1	EA	OH STOP	100S	630	GLY
1	EA	AUTO OPERATOR	8242 MS 120 VAC	689	FAL
1	EA	THRESHOLD	65A-223	A	ZER
1	EA	WIRE HARNESS	CON-26P		SCH
1	EA	WIRE HARNESS	CON-6W		SCH
1	EA	NARROW ACTUATOR	PPH-50	630	LOC

PERIMETER WEATHER AND DOOR SWEEP SEALS PROVIDED BY ALUMINUM SECTION.
DOORS REQUIRE SPECIAL 3/8 INCH UNDERCUT FOR ADA TYPE THRESHOLD.

DESCRIPTION OF OPERATION;

PANIC HARDWARE IS MECHANICALLY DOGGED DURING OPEN HOURS FOR MANUAL PUSH/PULL OPERATION OR FOR OPENING BY ADA OPERATOR. RX SWITCH IN PANIC DEVICE MONITORS POSITION OF LATCH BOLT. WHEN LATCH BOLT IS RETRACTED, OPERATOR IS ON AND ACTUATORS ARE ACTIVE.

HARDWARE SET NO. 2

For use on mark/door #(s):

001 002 116

Each to have:

3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP	630	IVE
1	EA	CLASSROOM LOCK	T561P DAN	626	FAL
1	EA	LOCK GUARD	LG10	630	IVE
1	EA	SURFACE CLOSER	SC71A SS	689	FAL
1	EA	RAIN DRIP	142AA	AA	ZER
1	EA	GASKETING	429AA-S	AA	ZER
1	EA	THRESHOLD	65A-223	A	ZER

DOORS REQUIRE SPECIAL 3/8 INCH UNDERCUT FOR ADA TYPE THRESHOLD.

HARDWARE SET NO. 3

For use on mark/door #(s):

003 103 104 105 106 109
110 113 114

Each to have:

3	EA	HINGE	5PB1 3.5 X 3.5	652	IVE
1	EA	ENTRY / OFFICE LOCK	B511P DAN 57430 01-046	626	FAL
1	EA	FLOOR STOP	FS13 OR FS17 AS REQ'D	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE SET NO. 4

For use on mark/door #(s):

108 112

Each to have:

3	EA	HINGE	5PB1 3.5 X 3.5	652	IVE
1	EA	PRIVACY LOCK	B301S DAN 57630 01-046	626	FAL
1	EA	FLOOR STOP	FS13 OR FS17 AS REQ'D	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE SET NO. 5

For use on mark/door #(s):

004 107 111

Each to have:

3	EA	HINGE	5PB1 3.5 X 3.5	652	IVE
1	EA	STOREROOM LOCK	B581P DAN 57430 01-046	626	FAL
1	EA	FLOOR STOP	FS13 OR FS17 AS REQ'D	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE SET NO. 6

For use on mark/door #(s):

115

Each to have:

6	EA	HINGE	5PB1 3.5 X 3.5	652	IVE
2	EA	SURFACE BOLT	40 6" MOUNT INSIDE ON INACTIVE LEAF	626	IVE
1	EA	STOREROOM LOCK	B581P DAN 57430 01-046	626	FAL
2	EA	FLOOR STOP	FS13 OR FS17 AS REQ'D	626	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER
2	EA	DOOR SWEEP	154A MOUNTING SCREWS TO BE ON PUSH SIDE	A	ZER
1	EA	MEETING STILE	1840AA MOUNT INSIDE ON INACTIVE LEAF	AA	ZER

HARDWARE SET NO. 7

For use on mark/door #(s):

102

Each to have:

1	EA	CONT. HINGE	112HD EPT	628	IVE
1	EA	DEADLATCH LOCK	4900 AS REQ'D	628	ADA
1	EA	MORTISE CYLINDER	985	626	FAL
1	EA	HANDLE	4569 AS REQ'D	628	ADA
1	EA	DOOR PULL	9264F 18" 12" O	630- 316	IVE
1	EA	OH STOP	100S	630	GLY
1	EA	SURFACE CLOSER	SC71A TOP JAMB MOUNT	689	FAL
1	EA	MOUNTING PLATE	SC70A-18	689	FAL

END OF SECTION

SECTION 086800

GLASS AND GLAZING

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

- A. Definitions: Glass includes both primary and fabricated glass products as described in FGMA Glazing Manual. Glazing includes glass installation and materials used to install glass.
- B. Extent of glass and glazing work is indicated on the Drawings and schedules. Refer to the Drawings and other sections of the specifications to determine the full scope of the work called for under this heading.

1.2 SYSTEM PERFORMANCE

- A. Provide glass and glazing that has been produced, fabricated, and installed to withstand normal temperature changes, wind loading, impact loading, where applicable, without failure including loss or breakage of glass, failure of sealants or gaskets to remain watertight and airtight, deterioration of glass and glazing materials, and other defects in the work.

1.3 QUALITY ASSURANCE

- A. Glazing Standards: Glazing procedures and materials shall specifically comply with recommendations of Flat Glass Marketing Association (FGMA) Glazing Manual and Sealant Manual except where more stringent requirements are indicated. Refer to those publications for definitions of glass and glazing terms not otherwise defined in this section or other referenced standards.
- B. Safety Glazing Standard: Where safety glass is indicated or required by authorities having jurisdiction, provide type of products indicated which comply with ANSI Z97.1 and testing requirements of 16 CFR Part 1201 for Category II materials.
- C. Fire Resistance Rated Wire Glass: Provide wire glass products that are identical to those tested in accordance with ASTM E163 (UL 9) and are labeled and listed by UL or other testing and inspecting agency acceptable to authorities having jurisdiction.
- D. Single Source Responsibility: Provide materials obtained from one source for each type of glass and glazing product indicated.
- E. Preconstruction Sealant Substrate Tests: Submit glass and glazing substrate materials to manufacturer of glazing sealants for testing by method indicated or if not indicated, by method standard with manufacturer to determine the following qualities:
 - 1. If primers are required to ensure adhesion with substrates, ASTM C794.
 - 2. If sealant will withstand effects of ultra violet radiation exposure for 21 days, when in contact with glass and glazing substrates, without developing adhesion failure or sealant discoloration.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01300.

- B. **Product Data:** Submit manufacturer's technical data for each glazing material and fabricated glass product required, including installation and maintenance instructions.
- C. **Samples:** Submit, for verification purposes, 12 inch square samples of each type of glass indicated except for clear, single pane units, and 12 inch long samples of each color required for each type of sealant or gasket exposed to view. Install sealant or gasket sample between 2 strips of material representative of adjoining framing system in color.
- D. **Certificate:** Submit certificates from respective manufacturers attesting that glass and glazing materials furnished for project comply with requirements.
 - 1. Separate certification will not be required for glazing materials bearing manufacturer's permanent labels designating type and thickness of glass, provided labels represent a quality control program involving a recognized certification agency or independent testing laboratory acceptable to authorities having jurisdiction.
- E. **Test Reports:** Submit sealant substrate adhesion and sealant compatibility test reports, including glazing, sealant, manufacturer's findings, and recommendations.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle to site under provisions of Section 01600.
- B. Protect glass and glazing materials during delivery, storage, and handling to comply with the manufacturer's directions and as required to prevent edge damage to glass and damage to glass and glazing materials from effects of moisture, including condensation of temperature changes, of direct exposure to sun, and from other causes. Store glass off the ground and keep it dry according to the manufacturer's directions.
- C. Deliver glass with the manufacturer's labels intact. Supplies shall be in their original containers and labeled.

1.6 PROJECT CONDITIONS

- A. **Environmental Conditions:** Do not proceed with glazing when ambient and substrate temperature conditions are outside the limits permitted by glazing material manufacturer or when joint substrates are wet due to rain, frost, condensation, or other causes. Install glazing sealants only when temperatures are in middle third of manufacturer's recommended installation temperature range.

- 1.7 **PRODUCT WARRANTY PERIOD:** Manufacturer's standard, but not less than 5 years after date of substantial completion.

PART 2 PRODUCTS

- 2.1 **ACCEPTABLE MANUFACTURERS:** Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:

- A. AGC FlatGlass North America
- B. PPG Industries, Inc.

- C. Substitutions: No substitutions allowed. Manufacturers and models specified to conform to the Owner's Standardization Policy for a phased project.

2.2 GLASS PRODUCTS, GENERAL

- A. Sizes: Fabricate glass to sizes required for glazing openings indicated, with edge clearances and tolerances complying with recommendations of glass manufacturer. Provide thicknesses indicated or, if not otherwise indicated, as recommended by the glass manufacturer for application indicated.
- B. When specific manufacturer is indicated, equals will be acceptable with approval by the A/E.

2.3 INSULATING GLASS PRODUCTS

- A. Construction of insulating glass units consist of 2 lights of glass separated by a spacer. The air space is hermetically sealed using double seal organic sealants. The entrapped air is at atmospheric pressure and is kept dehydrated by a drying agent located in the spacer.
- B. When requested, provide certification that fabricated insulating glass units complying with requirements of either the Associated Laboratories, Inc. (ALI) or the Insulating Glass Certification Council (IGCC).
- C. Insulating Tempered Glass: 1/4 inch equal to PPG Solargray tempered exterior, 1/4 inch equal to PPG Solarban 60 (3) clear tempered interior, and 1/2 inch air space.

2.4 GLAZING SEALANTS

- A. General: Comply with recommendations of sealant and glass manufacturers for selection of glazing sealants which have performance characteristics suitable for applications indicated and conditions at time of installation.
- B. Compatibility: Select sealants with proven compatibility with surfaces contacted in the installation and under service conditions indicated, as demonstrated by testing and field experience.
- C. Colors: Provide color of exposed sealants indicated or, if not otherwise indicated, as selected by the A/E from the manufacturer's standard colors.
- D. Silicone Glazing Sealant: Single component elastomeric silicone sealant complying with FS TT-S-001543A, Class A, nonsag; and with ASTM C920, Type S, Grade NS, Class 25, Use G and, as applicable to use indicated, Uses A and O; and with the following requirements:
 - 1. High Modulus Silicone Glazing Sealant: Manufacturer's standard high modulus acid curing sealant
- E. Two Part Polysulfide Glazing Sealant: Polysulfide elastomeric sealant complying with FS TT-S-00227E, Class A, Type 2; and with ASTM C920, Type M, Grade NS, Class 25, Use G and, as applicable to use indicated, Uses A and O.
- F. Acrylic Glazing Sealant: Acrylic terpolymer or polypropenatate solvent based, thermoplastic one part sealant complying with FS TT-S-00230C, Class B, Type II; and with ASTM C920, Type S, Grade NS, Class 12-1/2, Use G, and as applicable, use indicated, Uses A and O.
- G. Preformed Butyl Polyisobutylene Glazing Tape: Blend of butyl polyisobutylene rubber with a solids content of 100 percent in extruded tape form, complying with

AAMA 807.1, packaged on rolls with a release paper on side, with or without continuous spacer rod as recommended by manufacturers of tapes and glass for application indicated.

H. Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

1. High Modulus Silicone Glazing Sealants
 - a. 863; Pecora Corporation
 - b. Proglaze; Tremco
2. Two Part Polysulfide Glazing Sealants
 - a. GC-5 Synthacalk; Pecora
 - b. Sonolastic 2 Part; Sonneborn Building Products Division, Rexnord Chemical Products, Inc.
3. Acrylic Glazing Sealants
 - a. 60+; Pecora Corporation
 - b. Mono; Tremco
4. Preformed Butyl Polyisobutylene Glazing Tape
 - a. Tremco 440 Tape; Tremco
 - b. Tremco Preshimed 440 Tape; Tremco
 - c. Pecora Shim-Seal Tape; Pecora
 - d. SST 800 Tape; Tremco

2.5 GLAZING GASKETS

- A. Lock Strip Gaskets: Neoprene extrusions of size and shape indicated, fabricated into frames with molded corner units and zipper lock strips, complying with ASTM C542; black
- B. Dense Elastomeric Compression Seal Gaskets: Molded or extruded neoprene or EPDM, gaskets of profile and hardness required to maintain watertight seal; complying with ASTM C864, Option 1.
- C. Cellular Elastomeric Preformed Gaskets: Extruded or molded closed cell, integral skinned neoprene of profile and hardness required to maintain watertight seal; complying with ASTM C509, Type II; black.

2.6 MISCELLANEOUS GLAZING MATERIALS

- A. Compatibility: Provide materials with proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers, and Sealers: Type recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Neoprene, EPDM, or silicone blocks as required for compatibility with glazing sealants, 80 to 90 Shore A durometer hardness
- D. Spacers: Neoprene, EPDM or silicone blocks, or continuous extrusions, as required for compatibility with glazing sealant, of size, shape, and hardness recommended by glass and sealant manufacturers for application indicated.
- E. Edge Blocks: Neoprene, EPDM, or silicone blocks as required for compatibility with glazing sealant of size and hardness required to limit lateral movement (side walking) of glass.

PART 3 EXECUTION

3.1 INSPECTION

- A. Glazier to inspect work of glass framing erector for compliance with manufacturing and installation tolerances, including those for size, squareness, offsets at corners; for presence and functioning of weep system; for existence of minimum required face or edge clearances; and for effective sealing of joinery. Obtain glaziers' written report listing conditions detrimental to performance of glazing work. Do not allow glazing work to proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean glazing channels and other framing members to receive glass, immediately before glazing. Remove coatings which are not firmly bonded to substrates. Remove lacquer from metal surfaces where elastomeric sealants are indicated for use.

3.3 GLAZING, GENERAL

- A. Comply with combined printed instructions for installation, including those concerning temperature requirements of glass manufacturers, of manufacturers of sealants, gaskets, and other glazing materials, except where more stringent requirements are indicated, including those of referenced glazing standards.
- B. Field measure for glass sizes, including the tolerances recommended by the manufacturer for particular glass.
- C. Glazing channel dimensions as indicated in details are intended to provide for necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by job conditions at time of installation.
- D. Protect glass from edge damage during handling and installation; use a rolling block in rotating glass units to prevent damage to glass corners. Do not impact glass with metal framing. Use suction cups to shift glass units within openings; do not raise or drift glass with a pry bar. Rotate glass with flares or bevels along one horizontal edge which would occur in the vicinity of setting blocks so that these are located at top of openings. Remove from project and dispose of glass units with edge damage or other imperfections of kind that, when installed, weakens glass and impairs performance and appearance.
- E. Apply primers to joint surfaces where required for adhesion of sealants as determined by preconstruction sealant substrate testing.
- F. Install tempered safety glass where indicated and in the locations required by the referenced standards.

3.4 GLAZING

- A. Install setting blocks of proper size in sill rabbet, located one quarter of glass width from each corner, but no closer than 6 inches, unless otherwise required. Set blocks in thin course of sealant which is acceptable for heel bead use.
- B. Provide spacers inside and out, of correct size and spacing to preserve required face clearances for glass sizes larger than 50 united inches, except where gaskets or glazing tapes with continuous spacer rods are used for glazing. Provide 1/8 inch minimum bite of spacers on glass and use thickness equal to sealant width, except

- with sealant tape use thickness slightly less than final compressed thickness of tape.
- C. Provide edge blocking to comply with requirements of referenced glazing standard, except where otherwise required by glass unit manufacturer.
 - D. Set units of glass in each series with uniformity of pattern, draw, bow, and similar characteristics.
 - E. Provide compressible filler rods or equivalent backup material, as recommended by sealant and glass manufacturers, to prevent sealant from extruding into glass channel weep systems and from adhering to joints back surface as well as to control depth of sealant for optimum performance, unless otherwise indicated.
 - F. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
 - G. Tool exposed surfaces of sealants to provide a substantial wash way from glass. Install pressurized tapes and gaskets to protrude slightly out of channel, so as to eliminate dirt and moisture pockets.
 - H. Where wedge shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage to ensure that gasket will not "walk" out when installation is subjected to movement.
 - I. Miter cut wedge shaped gaskets at corner and install gaskets in manner recommended by gasket manufacturer to prevent pull away at corners; seal corner joint and butt joints with sealant recommended by gasket manufacturer.

3.5 PROTECTION AND CLEANING

- A. Protect exterior glass from breakage immediately upon installation by use of crossed streamers attached to framing and held away from glass. Do not apply markers to surfaces of glass. Do not remove labels until the glass has been inspected.
- B. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove immediately by method recommended by glass manufacturer.
- C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less often than once a month, for buildup of dirt, scum, alkali deposits, or staining. When examination reveals presence of these forms of residue, remove by method recommended by glass manufacturer.
- D. Remove and replace glass which is broken, chipped, cracked, abraded, or damaged in other ways during construction period, including natural causes, accidents, and vandalism.
- E. Wash glass on both faces not more than 4 days prior to date scheduled for inspections intended to establish date of substantial completion in each area of project. Wash glass by method recommended by glass manufacturer.

END OF SECTION

DIVISION 9

FINISHES

SECTION 092250

GYPSUM DRYWALL SYSTEM

PART 1 GENERAL

1.1 GENERAL STANDARD: Gypsum Association Specification GA-216 (current edition) or the manufacturer's instructions, whichever is more stringent

1.2 DELIVERY AND STORAGE OF MATERIALS

A. 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.

1.3 ENVIRONMENTAL CONDITIONS: In cold weather and during gypsum panel application and joint finishing, maintain temperatures in the building within the range of 55 degrees to 70 degrees F. Provide adequate ventilation to carry off excess moisture.

PART 2 PRODUCTS

2.1 Provide materials manufactured by:

- A. United States Gypsum Company
- B. American Gypsum Company
- C. Georgia-Pacific Corporation
- D. National Gypsum Company

2.2 GYPSUM DRYWALL

A. General: All gypsum drywall boards shall conform to ASTM C36, or ASTM C630, or ASTM C79 when applicable. Board shall be taper edged and of the type and form specified below. Supply the gypsum drywall in 48 inch widths and in such lengths as will result in a minimum of joints.

B. Regular Drywall: 1/2 inch or 5/8 inch thick, for general partitions. See Drawings for thickness.

C. Moisture and Mold Resistant Drywall: 1/2 inch or 5/8 inch thick (See Drawings for thickness).

1. Use for bathrooms including at tub and shower walls receiving tub or shower surrounds, spaces other than bathrooms receiving ceramic wall tile, kitchens and similar spaces of high humidity. Use cementitious backing board at tubs receiving ceramic wall tile as designated in other sections of the Specifications.

2. Approved Products:

- a. United States Gypsum Company: Mold Tough® Panels
- b. American Gypsum Company: M-Bloc®, Gypsum Board
- c. Georgia-Pacific Corporation: Tough Rock®, Mold-Guard™
- d. National Gypsum Company: XP® Drywall

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- D. Fire Rated Drywall: 5/8 inch thick, Type X, Firecode "C" for fire rated partitions and ceilings as indicated on the Drawings. Each of the manufacturers listed provide fire-rated regular drywall as well as fire rated moisture and mold resistant drywall.

2.3 TRIM ACCESSORIES: Provide galvanized beaded type with face flanges for concealment in joint compound, except where semi-finishing or exposed accessories are indicated on the Drawings as follows.

- A. Dur-A-Bead No. 103 corner reinforcement
- B. Metal Casing Trim No. 200-A, U-shaped channel; No. 200-B, L-shaped angle edge trim. Use Type L for tight abutment at edges; otherwise use Type U.
- C. Metal Trim No. 801-A at window and door jambs, ceiling, angles, at intersections where panels abut other materials and at similar locations where shown on Drawings.
- D. Control Joint No. 93.

2.4 JOINT TREATMENT

- A. Gypsum Drywall:
 - 1. Provide Perf-A-Tape Joint System consisting of Perf-A-Tape Reinforcement Tape, Ready-Mixed Plus 3 Joint Compound, and Perf-A-Tape Topping Compound.
 - 2. At contractors option, Perf-A-Tape Ready-Mixed components may be used. Durabond One-Day Joint Compound with Durabond Topping Coat or Perf-A-Tape Ready-Mixed Compound may be used also at contractor's option.
 - 3. Make mixes in strict accordance with manufacturer's instructions.

2.5 DRYWALL FASTENERS

- A. Provide Type S bugle head screws of length recommended by manufacturer for specific types of fastening applications.
- B. Provide miscellaneous specialty and finishing screws recommended by the manufacturer for specific types of fastening applications.

2.6 MISCELLANEOUS

- A. Furnish USG Acoustical Sealant.
- B. Furnish Durabond 90 for sealing screw heads and cut edges of W/R wallboard.
- C. Furnish laminating adhesive recommended by drywall manufacturer for drywall board application to substrate which is to receive it.

PART 3 EXECUTION

- 3.1 All surfaces which are to receive drywall shall be examined for conditions that will impair drywall installation. Do not begin work until these conditions have been corrected.
- 3.2 All installation work shall be in accordance with USG Drywall Construction Handbook, latest edition, unless otherwise required by Codes or Governing Authority and/or specifications.

3.3 DRYWALL INSTALLATION - PARTITIONS AND/OR CEILINGS

- A. Install drywall boards in lengths with long dimensions parallel with vertical framing members that will keep the number of end joints to a minimum. Stagger end joints when they occur. Offset vertical joints on each side of partition so that joints occur on different framing members.
- B. Drywall construction tolerances shall not exceed 1/8 inch in 8 feet 0 inch variation from plumb or level in any exposed line or surface and shall not exceed 1/16 inch variation between planes of abutting edges or ends. Use shims as required to meet tolerances specified.
- C. Install drywall boards with the separate boards in moderate contact but not forced into place. Drywall shall be neatly cut and fitted around penetrations and caulked. Caulking required at perimeter of partition.
- D. Apply reinforcing tape and joint compound to all drywall at partitions extended above ceilings.
- E. When partitions are indicated on the Drawings or required by Codes of Governing Authorities to be tight to the deck, terminate and seal top of partitions airtight against structural deck with approved sealant or as detailed on the Drawings.

3.4 CEILINGS

- A. When single layer drywall ceiling is indicated on the Drawings, install drywall in accordance with manufacturer's recommendations for thickness of wall board and spacing of supports.
- B. When manufacturer's instructions allow drywall to be applied with long dimension of base sheets parallel to or at right angles to supports, apply in the direction which will minimize end joints.
- C. Locate edge joints over supports in parallel applications. Stagger end joints over supports in right angle applications.
- D. Install ceiling drywall with screws in accordance with manufacturer's instructions at 12 inches on center in field of base and along abutting edges.

3.5 WOOD FRAMING INSTALLATION

- A. Use boards of maximum practical lengths to minimize end joints. When end joints occur, stagger joints. Arrange joints on opposite sides of a partition so they occur on different studs.

- B. Apply drywall boards first to the ceiling and then to the walls. Fit ends and edges closely, but do not force boards into place. Cut drywall accurately to fit around pipes and fixtures.
- C. Follow manufacturer's instructions and recommendations for fastener type and installation. Drive fasteners at least 3/8 inch from edges and end of boards. On sidewalls, space screws 16 inches on center maximum for drywall, 12 inches on center maximum for gypsum base.
- D. Apply drywall to the sidewalls after ceilings are erected. Where perpendicular application is used on walls, apply top wall board first, butted against ceiling. When parallel application is used, span sidewall from ceiling to floor with a single length of board. Use parallel application where ceiling height is over 8 feet 1 inch or where this method reduces waste and joint treatment.

3.6 MISCELLANEOUS

- A. Install metal trim in accordance to USG Drywall Construction Handbook.
- B. Install Z-bar anchors for unlabeled metal door frames in drywall partitions. Three per jamb required. Anchor studs to labeled metal door frames in accordance with code requirements.

3.7 TRIM AND JOINT FINISHING

- A. Joints and Interior Angles: Embed tape in joint compound and apply three separate coats of joint compound over joints, angles, fastener heads, and accessories. Tool joint compound smooth and free of tool marks and rides.
 - 1. Center reinforcing tape over joint and coat into compound leaving approximately 1/64 inch to 1/32 inch under tape to provide proper bond.
 - 2. Follow with skim coat to embed tape, but not to function as second coat.
 - 3. Allow embedding coat to thoroughly dry prior to application of second coat.
 - 4. Allow second coat to thoroughly dry.
 - 5. Apply third coat evenly over and extending beyond second coat on joints, feathering to smooth uniform finish.
- B. Beads, Trim, Fastener and Joint Depressions:
 - 1. Cover with three coats of taping and joint compound. Apply in different directions making smooth transitions with adjacent surfaces.
 - 2. Allow sufficient drying time between coats.
 - 3. Leave depressions flush with surface plane.

3.8 TOLERANCES

- A. Shim panels as necessary to conform to tolerances.
- B. Between Board Faces: 1/16 inch offset.

3.9 ADJUSTING

- A. Remove and replace following gypsum board installations:
 - 1. Board in contact with water for over 18 hour time period.

2. Gypsum core exhibiting dampness or water intrusion.
3. Facing paper exhibiting delamination.
4. Facing or core exhibiting mold growth or turning black.
5. Board sagging or warped.
6. Board directly exposed to water determined to be contaminated.

3.10 CLEANING

- A. Clean beads, screeds, metal base, metal trim, mechanical and electrical items, and other work.
- B. Wipe clean, leaving work ready for finish specified under other Sections.
- C. As work is completed in each space, clean all rubbish, utensils, and surplus materials from the space. Leave floors broom-clean.

3.11 GYPSUM BOARD FINISH LEVELS

- A. Finish panels to levels indicated below, according to ASTM C840, for locations indicated:
 1. Level 1: Embed tape at joints in ceiling plenum areas, concealed areas, and where indicated, unless a higher level of finish is required for fire-resistance-rated assemblies and sound-rated assemblies.
 2. Level 2: Embed tape and apply separate first coat of joint compound to tape, fasteners, and trim flanges where panels are substrate for tile and where indicated.
 3. Level 4: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges at panel surfaces that will be exposed to view, unless otherwise noted.
 4. Level 5: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges, and apply skim coat of joint compound over entire surface where wallboard is indicated to receive wall coverings, semi-gloss and high gloss paints.

END OF SECTION

SECTION 093315

CERAMIC TILE FLOOR FINISH (12" x 24")

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Ceramic tile floor and base finish using the thinset application method.
- B. Thresholds at door openings
- C. Membrane waterproofing

1.2 SUBMITTALS

- A. Submit product data indicating material specifications, characteristics, and instructions for using adhesives and grouts.
- B. Submit manufacturer's master grade certificate bearing TCA Certification mark, and stating type and location of use, in accordance with manufacturer's directions.
- C. Submit samples as required by A/E.
- D. Submit manufacturer's installation instructions.
- E. Submit manufacturer's certificate that products meet or exceed specified requirements.
- F. Submit maintenance data.
- G. Include recommended cleaning and stain removal methods, cleaning materials.

1.3 QUALITY ASSURANCE

- A. Conform to ANSI/TCA A137.1
- B. Conform to TCA Handbook for Ceramic Tile Installation or ANSI/TCA A108.4.

1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in the manufacture of products specified in this Section with minimum 3 years documented experience.
- B. Installer: Company specializing in applying the work of this Section with minimum 2 years documented experience or approved by product manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in manufacturer's unopened cartons and check for compliance with material requirements, damage, and correct quantities.

- B. Store and protect products in accordance with manufacturer's recommendations.
- C. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Do not install adhesives in a closed, unventilated environment.
- B. Maintain 50 degrees F during installation of mortar materials.

PART 2 PRODUCTS

2.1 MANUFACTURERS - TILE AND TILE PRODUCTS

- A. Dal-Tile Corporation
- B. American Olean Tile Company
- C. Florida Tile Industries
- D. Compotite
- E. Substitutions: Approved equal

2.2 TILE MATERIAL

- A. Unglazed Ceramic Floor Tile:
 - 1. Size: 12 x 24 inch
 - 2. Edge: Cushioned
 - 3. Surface Finish: Unglazed
 - 4. Color: Selected by A/E
 - 5. Slip Resistance: Static coefficient of friction of 0.6 for accessible routes and 0.8 for ramps.

2.3 MANUFACTURERS - ADHESIVE

- A. North American Adhesives
- B. Miracle Adhesives Corporation
- C. Mapei
- D. Substitutions: Under provisions of Section 01600

2.4 ADHESIVE MATERIALS

- A. Organic Adhesive (Wood Subfloors Only): ANSI/TCA A136.1, Type 1 for showers, tub recesses, or other areas requiring prolonged water resistance, Type II elsewhere, unless otherwise indicated. Provide primer sealer where recommended by manufacturer; thinset bond type.

2.5 MANUFACTURERS - MORTAR AND GROUT

- A. Laticrete International, Inc.
- B. The Upco Company
- C. Mapei
- D. Substitutions: Approved equal

2.6 MORTAR MATERIALS

- A. Portland Cement Mortar - Thinset Application: Use dry-set Portland Cement mortar complying with ANSI/TCA A118.1, TCA 759 or 763, factory sanded with Laticrete 3701 additive.

2.7 GROUT MATERIALS

- A. Latex - Portland Cement Grout: Preblended compound of Portland Cement, selected and graded aggregates, color pigments and chemical additives gauged with Laticrete 3701 Additive. Additive to meet the requirements of ANSI/TCA A118.4. Color selected by A/E.

2.8 ACCESSORIES

- A. Waterproof Membrane:
 - 1. Compotite, 30 mil vinyl membrane. Joints welded with Weld-On 66, a PVC solvent cement.
 - 2. Locate membrane at toilets, janitor's closets, individual showers, gang showers, and similar wet area spaces at above grade floor slabs.
 - 3. Install membrane in accordance with manufacturer's instructions and recommendations.
- B. Thresholds:
 - 1. Material: Grade A white, honed Italian marble thresholds to adjust between tile and other floor finishes.
 - 2. Size: Equal to tile floor thickness, 2 inches wide
 - 3. Edges: Beveled
 - 4. Location: Under doors and cased openings at frames where floors receive ceramic tile.
- C. Tile Cleaner: Product specifically acceptable to manufacturer of tile and grout manufacturer for application indicated.

- D. Protective Cover: Heavy duty, nonstaining construction paper with compatible masking tape.

2.9 MORTAR MIX AND GROUT MIX

- A. Mix and proportion premix mortar and grout materials in accordance with manufacturer's instructions.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are ready to receive work.
- B. Beginning of installation means installer accepts condition of existing surfaces or substrate.

3.2 PREPARATION

- A. Protect surrounding work from damage or disfiguration.
- B. Vacuum clean existing surfaces or substrate and damp clean.
- C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.
 - 1. Fill cracks less than 1/8 inch in width with grout.
 - 2. Use recommended bridging membrane for cracks greater than 1/8 inch in width.

3.3 INSTALLATION - THINSET METHOD

- A. Install adhesive or thinset mortar, tile, threshold, and grout to TCA Handbook for Ceramic Tile Installation, Handbook Number scheduled in this Section.
- B. Place thresholds at exposed tile edges adjoining different floor finishes.
- C. Cut and fit tile tight to penetrations through tile. Form corners and bases neatly.
- D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make joints watertight, without voids, cracks, excess mortar, or excess grout.
- E. Sound tile after setting. Replace hollow sounding units.
- F. Allow tile to set for a minimum of 48 hours prior to grouting.
- G. Grout tile joints.
- H. Apply sealant to junction of tile and dissimilar materials and at junction of dissimilar planes.

3.4 FLOOR TILE INSTALLATION METHODS

- A. General: Install tile to comply with requirements indicated below for setting bed methods, TCA installation methods related to types of subfloor construction and grout types.
- B. Thinset Portland Cement Mortar: ANSI/TCA A108.5.
 - 1. Concrete Subfloors, Interior: TCA F113
 - 2. Grout: Latex-Portland Cement
- C. Organic Adhesive (Wood Substrate Application Only):
 - 1. Wood Subfloors, Interior (Only): TCA F142
 - 2. Grout: Latex-Portland Cement

3.5 SOLID SURFACE THRESHOLD INSTALLATION

- A. Install solid surface thresholds at all locations indicated. Set thresholds in thinset mortar.

3.6 REGROUTING

- A. Remove loose grout from existing floor tile. Repair loose tile.
- B. RegROUT floor tile to match existing in accordance with manufacturer's instructions.

3.7 CLEANING

- A. Upon completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter. Remove all grout haze, following the tile manufacturer's recommendations regarding the use of chemical cleaners for each particular type of tile.
- B. Finished Tile Work: Leave finished installation clean and free of cracked, chipped, broken, unbonded, or otherwise defective tile work.

3.8 PROTECTION

- A. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear.
- B. Prohibit foot traffic from using tiled floors for at least 7 days after grouting is completed.
- C. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces, and polish the tilework with a soft cloth.

END OF SECTION

SECTION 093317

CERAMIC TILE WALL FINISH

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Ceramic tile walls, wainscot, and base finish using the thinset application method.
- B. Cementitious backing board
- C. Ceramic tile accessories

1.2 SUBMITTALS

- A. Submit product data indicating material specifications, characteristics, and instructions for using adhesives and grouts.
- B. Submit manufacturer's Master Grade Certificate bearing TCA Certification Mark, and stating typing and location of use, in accordance with manufacturer's directions.
- C. Submit samples as required by the A/E.
- D. Submit manufacturer's installation instructions.
- E. Submit manufacturer's certificate that products meet or exceed specified requirements.
- F. Submit maintenance data.
- G. Include recommended cleaning and stain removal methods, and cleaning materials.

1.3 QUALITY ASSURANCE

- A. Conform to ANSI/TCA A137.1
- B. Conform to TCA Handbook for Ceramic Tile Installation or ANSI/TCA A108.4.

1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in the manufacture of products specified in this Section with minimum 3 years documented experience.
- B. Installer: Company specializing in applying the work of this Section with minimum 2 years documented experience or approved by product manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in manufacturer's unopened carton and check for compliance with material requirements, damage and correct quantities.

- B. Store and protect products in accordance with manufacturer's recommendations.
- C. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Do not install adhesives in a closed, unventilated environment.
- B. Maintain 50 degrees F during installation of mortar materials.

PART 2 PRODUCTS

2.1 MANUFACTURERS - TILE AND TILE PRODUCTS

- A. Dal-Tile Corporation
- B. American Olean
- C. Florida Tile Industries
- D. Substitutions: Approved equal

2.2 TILE MATERIAL (INTERIOR)

- A. Ceramic Glazed Wall Tile: (Contractor's Option -NongROUTED Factory Mounted or Unmounted)
 - 1. Size: 3 inches x 6 inches unless noted otherwise
 - 2. Edges: Cushioned
 - 3. Surface Finish: Bright or matte glazed
 - 4. Color: Selected by A/E.
- B. Bases and Trim Shapes
 - 1. Type/Finish: Same as wall tile
 - 2. Base: Cove construction for thinset installation
 - 3. Size: 4 inches high x 6 inches long, nominal
 - 4. Trim: Caps, stops, returns, trimmers, and other shapes for complete installation
 - 5. Color: Selected by A/E

2.3 MANUFACTURERS - ADHESIVE

- A. North American Adhesive Company
- B. Miracle Adhesive Corporation
- C. Mapei
- D. Substitutions: Approved equal

2.4 ADHESIVE MATERIALS

- A. Organic Adhesive (Gypsum and Backing Board Application Only): ANSI/TCA A136.1 Type I for showers, tub recesses, or other areas requiring prolonged water resistance, Type II elsewhere, unless otherwise indicated. Provide primer sealer where recommended by manufacturer; thinset bond type.

2.5 MANUFACTURERS - MORTAR AND GROUT

- A. Laticrete International, Inc.
- B. The Upco Company
- C. Mapei
- D. Substitutions: Approved equal

2.6 MORTAR MATERIALS

- A. Latex-Portland Cement Mortar - Thinset Application: Use 1 component dry mix portland cement mortar field mixed with water, or 2 part, dry grout mix and liquid latex additive, field mixed, complying with ANSI A118.4.
 - 1. All components shall be premeasured and packaged.
 - 2. Dry Latex Additive: Polyvinyl acetate or ethylene vinyl acetate.
 - 3. Liquid Latex: Manufacturer's standard water emulsion.
 - 4. Mix in accordance with manufacturer's recommendations.

2.7 GROUT MATERIALS

- A. Latex-Portland Cement Grout: Preblended compound of Portland cement, selected and graded aggregates, color pigments and chemical additives gauged with Laticrete 3701 additive. Additive to meet the requirements of ANSI A118.4. Color selected by A/E.

2.8 ACCESSORIES

- A. Cementitious Backing Board:
 - 1. Material: High density, glass fiber reinforced; coated glass fiber tape for joints and corners; complying with ANSI A118.9.
 - 2. Manufacturers:
 - a. USG
 - b. Custom Building Products, Inc.
 - c. Georgia-Pacific
 - d. Substitutions: Approved equal

2.9 MORTAR MIX AND GROUT MIX

- A. Mix and proportion pre-mix mortar and grout materials in accordance with manufacturer's instructions.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are ready to receive work.
- B. Beginning of installation means installer accepts condition of existing surfaces or substrate.

3.2 PREPARATION

- A. Protect surrounding work from damage or disfiguration.
- B. Vacuum clean existing surfaces or substrate and damp clean.
- C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.
 - 1. Fill cracks less than 1/8 inch in width with grout.
 - 2. Use recommended bridging membrane for cracks greater than 1/8 inch in width.
- D. When the specified TCA W-series application does not call for cleavage membrane apply sealer or conditioner to surfaces as recommended by adhesive manufacturer.

3.3 INSTALLATION CEMENTITIOUS BACKING BOARD

- A. Install in accordance with ANSI A108.11.
- B. Verify substrate:
 - 1. Demolish all unsound material and replace with new.
 - 2. Stud spacing should not exceed 16 inches on center.
- C. Field verify dimensions and mark size on board.
 - 1. Score both sides to cut through mesh, and snap panel into 2 pieces.
 - 2. Smooth cut edges with a wood rasp.
 - 3. To make cutouts in cement board for faucets and fixtures, use the above procedure or use a carbide blade sabre saw.
 - 4. Use wood rasp to make size adjustments in cutouts and to smooth rough edges.
- D. Cement Board Application:
 - 1. Install cement board with rough side out for mortar applications.
 - 2. Install cement board with smooth side out for mastic applications.
 - 3. Place a 1/4 inch spacer strip or shim around lip of tub.
 - a. Attach cement board to studs with 1-1/4 or 1-5/8 inch screws with a high-low thread pattern specifically for cement board. Space screws at 8 inches on center.
 - b. Attach cement board to concrete block and plaster partitions in a similar fashion, also use construction adhesive applied with a notched tooth trowel.

4. Prefill joints with tile-setting mortar.
 - a. Immediately apply 2 inch wide fiberglass tape over joints and corners.
 - b. Embed tape and level joints.

3.4 INSTALLATION - THINSET METHOD

- A. Install adhesive or thinset mortar, tile, and grout to TCA Handbook for Ceramic Tile Installation, Handbook Number scheduled in this Section.
- B. Install cementitious backing board over substrate in accordance with manufacturer's instructions. Tape joints and corners; cover with skim coat of dry-set mortar to a feather edge.
- C. Cut and fit tile tight to penetrations through tile. Form corners and bases neatly.
- D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make joints watertight, without voids, cracks, excess mortar or excess grout.
- E. Form internal angles square and external angles bullnosed.
- F. Sound tile and ceramic accessories (when specified) after setting. Replace hollow sounding units.
- G. Allow tile to set for a minimum of 48 hours prior to grouting.
- H. Grout tile joints.
- I. Apply sealant to junction of tile and dissimilar materials and at junction of dissimilar planes.

3.5 WALL TILE INSTALLATION METHODS

- A. General: Install types of tile designated for wall application to comply with requirements indicated below for setting bed methods, TCA installation methods related to subsurface wall conditions, and grout types.
- B. Thinset Dry-Set Mortar: ANSI/TCA A108.5
 1. Masonry, Interior: TCA W213
 2. Wood Studs and Gypsum Board, Interior: TCA W243
 3. Bathtub Walls, Gypsum Board or Cementitious Board: TCA B413
 4. Grout: Latex-Portland cement
 5. Grout: Elastomeric for pregrouted sheets

3.6 CLEANING

- A. Clean work under provisions of Division 1.
- B. Upon completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter. Remove all grout haze, following the tile manufacturer's recommendations regarding the use of chemical cleaners for each particular type of tile.

- C. **Finished Tile Work:** Leave finished installation clean and free of cracked, chipped, broken, unbonded, or otherwise defective tile work.

3.7 PROTECTION

- A. **Protect finished installation under provisions of Division 1.**
- B. **When recommended by tile manufacturer, apply a protective coat of neutral protective cleaner, mixed one part cleaner to one part water, to completed tile walls. Rinse tilework thoroughly with clean water before and after using chemical cleaners. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear.**
- C. **Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces, and polish the tilework with a soft cloth.**

END OF SECTION

SECTION 093652

RESILIENT FLOORING (PLANK VINYL)

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Resilient plank vinyl no-wax flooring.
- B. Resilient base if required on drawings.

1.2 SUBMITTALS

- A. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns and colors available.
- B. Samples:
 - 1. Submit 1 sample of each color available, 3 by 3 inch in size, illustrating color and pattern for each floor material specified.
 - 2. Submit 1 sample of each color available, 2 inches long, illustrating color and pattern of base material specified.
- C. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.

1.3 QUALITY ASSURANCE

- A. All materials used in this section shall contain no asbestos fibers.

1.4 REGULATORY REQUIREMENTS

- A. Conform to applicable local code for flame/smoke rating requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Transport and store materials in accordance with manufacturers' recommendations.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Store materials for 3 days prior to installation in area of installation to achieve temperature stability.
- B. Maintain ambient temperature required by adhesive manufacturer 3 days prior to, during, and 24 hours after installation of materials.

1.7 MAINTENANCE DATA

- A. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping and re-waxing.

PART 2 PRODUCTS

2.1 MATERIALS - PLANK FLOORING

- A. Vinyl Plank with Backing: Conforming to latest international standards and quality assurance base on the ISO 14001, ISO 9001 and ISO 9002:
1. Backing: Stone polymer with attached Polyethylene pad
 2. Wear Layer: 12 mil (0.3 mm)
 3. Gauge: 5.0 mm (0.197 inches)
 4. Manufacturers:
 - a. Heartland SPC by United Surface solutions, Stars Collection (Color to be selected by Owner).
1996 GA-225
Chatsworth, GA 30705
Phone: 706.686.3799
Fax: 203.750.8754
Unitedsurfaces.com
 - b. Substitutions: Approved equal (must be approved by A/E at least 7 days prior to the bid opening).

2.2 MATERIALS - BASE (IF REQUIRED ON DRAWINGS)

- A. Base: Type I rubber; top set coved; pre-molded external corners:
1. Height: 6 inch
 2. Thickness: 1/8 inch
 3. Length: 4 foot sections and 120 foot rolls
 4. Manufacturers:
 - a. Flexco Company
 - b. Johnsonite
 - c. R.C. Musson
 - d. Substitutions: Approved equal.

2.3 ACCESSORIES

- A. Subfloor Filler: White premix cement based latex; type recommended by adhesive material manufacturer.
- B. Edge Strips: Rubber reducer, 1 inch wide

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify concrete floors are dry to a maximum moisture content of 7 percent, and exhibit negative alkalinity, carbonization, or dusting.
- B. Verify floor and lower wall surfaces are free of substances that may impair adhesion of new adhesive and finish materials.
- C. Verify that existing floor tile is adhered to substrate.
- D. Verify that surfaces are smooth and flat with a maximum variation of 1/8 inch in 10 feet, and are ready to receive work.
- E. Beginning of installation means acceptance of existing substrate and site conditions.

3.2 PREPARATION

- A. Remove sub-floor ridges and bumps. Fill minor or low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface.
- B. Secure loose tiles with waterproof adhesive.
- C. Prohibit traffic until filler is cured.
- D. Vacuum clean substrate.

3.3 INSTALLATION - PLANK VINYL FLOORING

- A. Install in accordance with manufacturers' instructions.
- B. Set flooring in place, press to attain full click connection.
- C. Lay flooring with tight joints.
- D. Install plank flooring parallel to width of room.
- E. Terminate flooring at centerline of door openings where adjacent floor finish is dissimilar.
- F. Install edge strips at unprotected or exposed edges, and where flooring terminates. Secure resilient strips by adhesive.
- G. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

3.4 INSTALLATION - BASE

- A. Fit joints tight and vertical. Maintain minimum measurement of 18 inches between joints.

- B. Miter internal corners. At external corners, "V" cut back of base strip to 2/3 of its thickness and fold. At exposed ends, use pre-molded units.
- C. Install base on solid backing. Bond tight to wall and floor surfaces.
- D. Scribe and fit to door frames and other interruptions.

3.5 CLEANING

- A. Clean plank vinyl flooring in accordance with manufacturer's recommendations.

3.6 PROTECTION OF FINISHED WORK

- A. Protect finished work under provisions of Section 01500.
- B. Prohibit traffic on floor finish for 24 hours after installation.

END OF SECTION

RESILIENT BASE (MILLWORK)

PART 1 GENERAL

1.1 SECTION INCLUDES

Work includes the following items as indicated on the Drawings:

- A. Resilient base (Millwork)
- B. Resilient quarter round (Millwork)

1.2 QUALITY ASSURANCE

- A. All materials used in this Section shall contain no asbestos fibers.

1.3 SUBMITTALS

- A. Provide product data on specified products, describing physical and performance characteristics, sizes, patterns and colors available.
 - 1. Submit data on adhesive for approval prior to ordering materials.
- B. Submit two inch long samples of base material for each color specified.

1.4 OPERATION AND MAINTENANCE DATA

- A. Submit maintenance procedures.

1.5 ENVIRONMENTAL REQUIREMENTS

- A. Wall base and adhesives must be site conditioned at room temperature for a minimum of 48 hours prior to, during and after installation. Room temperature must be maintained between 65° and 85° F with HVAC system operating. A minimum temperature of 55° F must be maintained afterwards. The ambient relative humidity should be between 40% and 60%.

PART 2 PRODUCTS

2.1 MANUFACTURERS - BASE MATERIALS

- A. Johnsonite / Tarkett
- B. Burke Industries, Inc.
- C. R. C. Musson Rubber Company
- D. Flexco Company
- E. Substitutions: Approved equal.

2.2 BASE MATERIALS

- A. Millwork Base:
 - 1. Inflection Profile MW-XX-G, Thermoplastic rubber, 3/8" thick by 5-1/4" height, 6 per carton, 8 ft. lengths.
- B. Millwork Base to be designed to meet the performance and dimensional requirements of ASTM F-1861 Standard Specifications for Resilient Wall Base, Type TP, and Group 1.

2.3 ACCESSORIES

- A. Quarter Round:
 - 1. Profile QTR-XX-A, Thermoplastic rubber, 1/2" thick by 1/2" height, 6 per carton, 8 ft. lengths.
 - 2. Profile QTR-XX-D, Thermoplastic rubber, 3/4" thick by 3/4" height, 6 per carton, 8 ft. lengths.

PART 3 EXECUTION

3.1 EXAMINATION & PREPARATION

- A. All walls must be clean, smooth, flat and dry. The surface must be free of all dust, loose particles, solvents, paint, grease, oil, wax, alkali, sealing/curing compounds, old adhesive, and any other foreign material, which could affect installation.
- B. Remove existing adhesive and any other contaminants mechanically (do not use chemical adhesive removers or solvents). Fill all depressions, cracks, and other surface irregularities with a good quality patching compound.

3.2 INSTALLATION - MILLWORK MATERIAL

- A. Fit joints tight and vertical. Maintain minimum measurement of 18 inches between joints.
- B. Miter corners.
- C. Install base on solid backing. Bond tight to wall using Johnsonite 946 Premium Contact adhesive (or approved equal) following the manufacturers instructions.
- D. Scribe and fit to door frames and other interruptions.
- E. Contamination of the substrate can cause damage to the wall base material. Permanent and non-permanent marker, pens, crayons, paint, etc., must not be used to write on the back of the wall base material or used to mark the substrate as they could bleed through and stain the wall base material.

3.3 CLEANING

- A. Clean surface of new resilient base with a damp cloth with mild detergent (do not use chemical adhesive removers or solvents).

END OF SECTION

SECTION 094661

RESILIENT BASE (VINYL)

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Resilient base.

1.2 SUBMITTALS

- A. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns and colors available.
- B. Samples:
 - 1. Submit 1 sample of each color available, 2 inches long, illustrating color and pattern of base material specified.
- C. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.

1.3 QUALITY ASSURANCE

- A. All materials used in this section shall contain no asbestos fibers.

1.4 REGULATORY REQUIREMENTS

- A. Conform to applicable local code for flame/smoke rating requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect roll materials from damage.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Store materials for 3 days prior to installation in area of installation to achieve temperature stability.
- B. Maintain ambient temperature required by adhesive manufacturer 3 days prior to, during, and 24 hours after installation of materials.

1.7 MAINTENANCE DATA

- A. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping and re-waxing.

PART 2 PRODUCTS

2.1 MATERIALS - BASE (IF REQUIRED ON DRAWINGS)

- A. Base: Type I rubber; top set coved; premolded external corners:
 - 1. Height: 4 inch
 - 2. Thickness: 1/8 inch
 - 3. Length: 4 foot sections and 120 foot rolls
 - 4. Manufacturers:
 - a. Flexco Company
 - b. Johnsonite
 - c. R.C. Musson
 - d. Substitutions: Approved equal.
- B. Resilient Millwork Base & Base Shoe: See Specification Section 09660.
- C. Tub Cove Molding: Type I rubber; self-sticking:
 - 1. Height: 1.5 inch
 - 2. Thickness: 1/16 inch
 - 3. Length: 5 foot sections
 - 4. Manufacturers:
 - a. M-D Building Products
 - b. Burke Flooring Products
 - c. Johnsonite
 - d. Roppe

2.2 ACCESSORIES

- A. Primers and Adhesives: Waterproof; types recommended by flooring manufacturer.
- B. Preformed outside corners

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify lower wall surfaces is free of substances that may impair adhesion of new adhesive and finish materials.
- B. Beginning of installation means acceptance of existing substrate and site conditions.
- D. Verify that surfaces are smooth and flat with a maximum variation of 1/8 inch in 10 feet, and are ready to receive work.

3.2 PREPARATION

- A. Fill minor cracks, joints, holes, and other defects with joint compound, then sand and paint to achieve smooth, flat, hard surface.

3.3 INSTALLATION – VINYL COVE BASE

- A. Fit joints tight and vertical. Maintain minimum measurement of 18 inches between joints.
- B. Miter internal corners. At external corners, “V” cut back of base strip to 2/3 of its thickness and fold. At exposed ends, use premolded units.
- C. Install base on solid backing. Bond tight to wall and floor surfaces.
- D. Scribe and fit to door frames and other interruptions.

3.4 CLEANING

- A. Clean work in accordance with manufacturer's recommendations.
- B. Remove excess adhesive from floor, base and wall surfaces without damage. Use a neutral cleaner recommended by the manufacturer for the type of floor covering material installed.

3.5 PROTECTION OF FINISHED WORK

- A. Protect finished work under provisions of Section 01500.

END OF SECTION

SECTION 094682

CARPETING

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

- A. The extent of carpeting is indicated on the Drawings and specifications and is defined to include carpet and accessories.

1.2 QUALITY ASSURANCE

- A. Installer: A firm with not less than 2 years of carpeting experience similar to the work of this section
- B. Manufacturer: A firm (carpet mill) with not less than 5 years of production experience with carpet similar to the types specified in this section and whose published product literature clearly indicates general compliance of products with the requirements of this section
- C. General Standard: Use the Carpet Specifier's Handbook by the Carpet and Rug Institute for definitions of terminology not otherwise defined herein and for general recommendations and information.

1.3 SUBMITTALS

- A. Samples: Submit 18 inch by 18 inch samples of each carpet required and 6 inch lengths of exposed edge stripping.
- B. Maintenance Manual: Submit the manufacturer's maintenance instructions containing detailed lists of specific products and equipment along with local sources and detailed maintenance and care procedures.
- C. Shop Drawings: Submit Drawings that show the direction of lay, glue patterns, and other items necessary for the installation that are not specifically shown on the Drawings.
- D. Product Data: In addition to complete data on each carpet and carpeting material, provide the manufacturer's certification or certified test laboratory reports for required compliances with specified tests, and provide written instructions for each type of installation required.

1.4 PRODUCT DELIVERY AND STORAGE

- A. Deliver carpeting materials in protective wrapping, and store inside, protected from weather, moisture, and soiling.

1.5 WARRANTY

- A. Provide the following manufacturer's guarantee:
- B. Wear Guarantee: 10 year
- C. Antistatic: lifetime

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURER, Basis of Design

- A. Shawmark Carpet Tile. Available through Ohio Valley Distributors
Contact: Tom Hewett. Ph: 502-693-1183. Email: Tom.Hewett@ovf.com
- B. Substitutions: Approved equal

2.2 CARPET

- A. Manufacturer: One of the following may be used for carpeting.
- B. Shawmark

1. Style/Pattern: Journal Style Number 0A244
Color: 44480 Account
2. Weave: Multi-Level Pattern Loop
3. Fiber: 100% Eco*Solution Q Sd Nylon
4. Surface Texture: Loop Pile
5. Gauge: 1/10 in
6. Density 4091 oz/yd³
7. Finished Pile Thickness 0.132 in
8. Backing Construction:
 - a. Primary Backing: Synthetic
 - b. Secondary Backing: Ecoworx
9. Tufts: 8 per in
10. Size: 24 in w x 24 in
- 11: Environmental CRI Certification (GLP9968)

2.3 PERFORMANCE CRITERIA

- A. Carpet shall meet the following:
- B. Carpet Flammability:
 1. Pill Test: Provide carpet that passes the flammability test of ASTM D2859 (DOC FF-1-70).
 2. Radiant Panel Test: In corridors and spaces of project other than individual rooms or suites, provide carpet that has been tested (with cushions in place as appropriate) by the Flooring Radiant Panel Test (FRPT), NBS IR 75-950, with ratings not lower than 0.22.
 3. Tunnel Test: In spaces where required by code, provide carpet that has been tested (with cushions in place as appropriate) by the Steiner Tunnel

Test (ASTM E84) to have a tested rating of no worse than 75 for flame spread and 200 for smoke density.

4. Federal Standards: Where federal standards are applicable, carpet may be rated by the following tests and minimum ratings as an alternate to the tunnel test:
 - a. Test and Rating: Flame propagation index less than 4.0 when tested according to UL 992.
 - b. Test and Rating: Smoke developed rating of 450 when tested according to the National Bureau of Standards Smoke Chamber Test.
- C. Static Resistance: Provide yarn or yarn blend as indicated under Carpet Construction and include provisions to comply with the static resistance ratings indicated either by selection of yarns known to be effective or by inclusion of small percentages of special antistatic yarn known to be effective in achieving indicated static resistance. Where rating is not otherwise indicated, provide 1.5 KV resistance for 20 percent RH at 70 degrees F, AATCC 134.

2.4 CARPET ACCESSORIES

- A. Carpet Edge Guard, Metallic: Extruded or molded aluminum carpet edge guard of the size and profile indicated. Colors shall be selected by the A/E from among standard colors available within the industry (any manufacturer).
- B. Installation Adhesive: Water resistant type that is as recommended by the carpet manufacturer and that complies with flammability requirements for installed carpet.
- C. Miscellaneous Materials: As recommended by the manufacturers of carpet, and other carpeting products and as selected by the installer to meet project circumstance and requirements.

PART 3 EXECUTION

3.1 PREINSTALLATION REQUIREMENTS

- A. The installer must examine substrates for moisture content and other conditions under which carpeting is to be installed and notify the Contractor in writing of conditions detrimental to proper completion of the work. Do not proceed until unsatisfactory conditions have been corrected.
- B. Clear away debris and scrape up cementitious deposits from surfaces to receive carpeting. Vacuum clean immediately before installation. Check concrete surfaces to ensure no dusting through installed carpet. Apply sealer where required to prevent dusting.
- C. Sequence carpeting with other work so as to minimize the possibility of damage and soiling of carpet during the remainder of the construction period.
- D. Sequence carpeting with installation of moveable building elements.

3.2 INSTALLATION

A. General

1. Comply with the manufacturer's instructions and recommendations for seam locations and direction of carpet. Maintain uniformity of direction and lay of pile.
2. Extend carpet under open-bottomed obstructions and under removable flanges and furnishings and into alcoves and closets of each space. Extend carpet continuously under remountable partition runners.
3. Provide cutouts where required and bind cut edges properly where not concealed by protective edge guards or overlapping flanges.
4. Install carpet edge guard where the edge of carpet is exposed. Anchor guards to substrate.

3.3 CLEANING AND PROTECTION

- A. Remove debris, sorting pieces to be saved from scraps to be disposed of.
- B. Vacuum carpet using commercial machine with face beater element. Remove spots and replace carpet where spots cannot be removed.
- C. The installer shall advise the Contractor of protection methods and materials needed to ensure that carpeting is without deterioration or damage at time of substantial completion.

END OF SECTION

SECTION 095903

PAINTING

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Surface preparation and field application of paints and coatings.
- B. Surface finish schedule

1.2 DESCRIPTION OF WORK

- A. Extent of painting work is indicated on the Drawings and described in this section, but generally will include:
 - 1. Painting and finishing of exposed exterior items and surfaces.
 - 2. Painting and finishing of new exposed interior items and surfaces.
 - 3. Painting and preparation of existing items and surfaces.

Refer to Drawings for specific scope of painting work required for this project.

- B. Surface preparation, priming and coats of paint specified are in addition to shop priming and surface treatment specified under other sections of work.
- C. Paint, as used herein, means all coating systems materials, including primers, emulsions, enamels, stains, sealers and fillers, and other applied materials whether used as prime, intermediate, or finish coats.
- D. The following categories of work are not included as part of this section:
 - 1. Factory finishes of manufactured products.
 - 2. Painting of concealed surfaces unless otherwise indicated.
 - 3. Prefinished Metal Surfaces unless otherwise indicated.
 - 4. Moving parts of equipment unless otherwise indicated.
- E. Do not paint over any code required labels, such as UL and FM, or any equipment identification, performance rating, name, or nomenclature plates.

1.3 REFERENCES

- A. ASTM D16 - Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products.
- B. ASTM D2016 - Test Method for Moisture Content of Wood.
- C. SSPC (Steel Structures Painting Council) - Steel Structures Painting Manual.

1.4 DEFINITIONS

- A. Conform to ASTM D16 for interpretation of terms used in this Section.

1.5 SUBMITTALS

- A. Submit under provisions of Division 1.
- B. Product Data: Provide manufacturer's technical data on all finishing products, including paint label analysis and application instructions for each material proposed for use.
- C. Samples: Prior to beginning work, the A/E shall furnish selected color number to Contractor for surfaces to be painted. Use representative colors when preparing samples for review. Submit samples on actual material surfaces for the A/E's review of color and textures only. Provide a listing of material and application for each coat of each finish sample.
- D. Submit method of surface preparation for each type of existing painted surface receiving new paint coating.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing quality paint and finish products with 3 years experience.
- B. Applicator: Company specializing in performing commercial painting and finishing work of this section with 2 years documented experience.
- C. Single Source Responsibility: Provide primers and other undercoat paint produced by same manufacturer as finish coats. Use only thinners approved by paint manufacturer and use only within recommended limits.
- D. Coordination of Work: Review other sections of these specifications in which prime paints are to be provided to ensure compatibility of total coatings system for various substrates. Upon request from other trades, furnish information or characteristics of finish materials provided for use to ensure compatible prime coats are used.
- E. Include on label of containers, the following information:
 1. Manufacturer's Name
 2. Type of Paint
 3. Manufacturer's Stock Numbers
 4. Fed Spec Number, if applicable
 5. Date of Manufacturing
 6. Color Name and Number
- F. All latex based paints specified for the project are prohibited to containing mercury. The Painting Contractor shall furnish a letter certifying that the latex based paints used are free of mercury.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle products to site under provisions of Division 1.
- B. Deliver products to site in original, new, sealed and labeled containers; inspect to verify acceptance.

- C. Store paint materials at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in well ventilated area, unless required otherwise by manufacturer's instructions.
- D. Store materials not in actual use in tightly covered containers. Maintain containers used in storage of paint in a clean condition, free of foreign materials and residue.
- E. Protect from freezing where necessary. Keep storage area neat and orderly. Remove oily rags and waste daily. Take all precautions to ensure that workmen and work areas are adequately protected from fire hazards, spontaneous combustion, and health hazards resulting from handling, mixing, and application of paints.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply materials when surface and ambient temperature are outside the temperature ranges required by the paint product manufacturer.
- B. Provide continuous ventilation and heating facilities to maintain surface and ambient temperatures above 45 degrees F for 24 hours before, during, and 48 hours after application of finishes, unless required otherwise by manufacturer's instructions.
- C. Minimum Application Temperatures for Latex Paints: 50 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.
- D. Minimum Application Temperature for Solvent Thinned Paints: Only when temperature of surfaces and surrounding air and temperatures are between 45 degrees F and 95 degrees F, unless otherwise permitted by manufacturer's instructions.
- E. Minimum Application Temperature for Varnish Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.
- F. Do not apply exterior coatings during rain, snow, fog or mist, or when relative humidity is above 85 percent, or to damp or wet surfaces, unless otherwise permitted by paint manufacturer's printed instructions.
 - 1. The Contractor is prohibited from making final surface preparation to steel and iron surfaces when the relative humidity is above 85 percent or when the relative humidity is expected to exceed 85 percent before the prime coat of paint is applied. The Contractor shall, at his own expense, rework the steel and iron surfaces in the event the 85 percent maximum relative humidity is exceeded.
 - 2. The Contractor is prohibited from making final surface preparation to pipe, equipment, and other steel and iron surfaces when the relative humidity is within 5 percent of forming condensation on that surface.
 - 3. Under no circumstances shall the steel be allowed to rust before painting, regardless of time elapsed. In the event rusting is allowed to take place, the Contractor, at his own expense, shall reblast the surface.
 - 4. Painting may be continued during inclement weather if areas and surfaces to be painted are enclosed and heated within temperature limits specified by paint manufacturer during application and drying periods and prior approval obtained from the A/E.

- G. Provide lighting level of 80 footcandles measured mid- height at substrate surface.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS - PAINT

- A. Duron
- B. Imperial Chemical Industries (ICI)
- C. Porter Paint Company
- D. Sherwin-Williams
- E. Materials selected for coating systems for each type surface shall be the product of a single manufacturer, unless otherwise noted.
- F. Substitutions: Approved equal.
- G. Comply with coatings of quality specified when proposing substitutions.
- H. Submit substitute paint schedule listing all surfaces and proposed products for the A/E's approval.

2.2 MATERIALS

- A. Coatings: Ready mixed, except field catalyzed coatings. Process pigments to a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating; good flow and brushing properties; capable of drying or curing free of streaks or sags.
- B. Accessory Materials List:
 - 1. Refer to the painting schedule for basic material types for painting work specified and scheduled.
 - 2. Miscellaneous Materials:
 - a. Knot Sealer:
 - (1) Duron: Alcohol Based Primer/Sealer
 - (2) ICI: Ultra-Hide Gripper 3210
 - (3) Porter: Enamelac
 - (4) Sherwin-Williams: Parks Sealer
 - b. Spackling Patching Compound:
 - (1) Duron: One Pass Spackle No. 73114
 - (2) ICI: No-Shrink Spackle No. 20814
 - (3) Porter: Red Devil One Time Spackle
 - (4) Sherwin-Williams: Spackling Paste
 - c. Plastic Wood Patching Compound: Color to match.
 - (1) Duron: Color Putty
 - (2) ICI: Plastic Wood No. 30428
 - (3) Porter: Fix Wood Patch
 - (4) Sherwin-Williams: Carpenter's Wood Filler

- d. Putty:
 - (1) Duron: DAP Painter's Putty
 - (2) ICI: Putty No. 30276
 - (3) Porter: DAP Painter's Putty
 - (4) Sherwin-Williams: DAP Painter's Putty
- e. Thinners:
 - (1) Duron: Paint Thinner No. 7000413
 - (2) ICI: Crown Thinner No. 31037
 - (3) Porter: No. 5132
 - (4) Sherwin-Williams: EZ Painter's Thinner
- 3. Linseed oil, turpentine, and other materials not specifically indicated but required to achieve the finishes specified, of commercial quality.

2.3 FINISHES

- A. Refer to schedule at end of this section for surface finish schedule.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify site conditions under provisions of Division 1.
- B. Verify that surfaces or substrate conditions are ready to receive work as instructed by the product manufacturer.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report and notify Contractor in writing any condition that may potentially affect proper application and timely completion of the work. Do not proceed with work until satisfactory conditions have been corrected in a manner acceptable to the applicator.
- D. Test shop applied primer for compatibility with subsequent cover materials.
- E. Beginning of installation means applicator's acceptance of surfaces or substrate and conditions within any particular area.
- F. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, contact paper, wallpaper, or conditions otherwise detrimental to formation of a durable paint film. Areas where painting is to be started must be broom clean and dust free.

3.2 SURFACE PREPARATION

- A. General: Perform preparation and cleaning procedures in accordance with paint manufacturer's instructions and as herein specified, for each particular substrate condition.
 - 1. Provide barrier coats over incompatible primers or remove and reprime as required. Notify the A/E in writing of any anticipated problems in using the specified coating systems with substrates primed by others.
 - 2. Remove hardware, hardware accessories, machined surfaces, plates, lighting fixtures, escutcheons, fittings, and similar items in place and not to be finish painted, or provide surface applied protection prior to surface

preparation and painting operations. Remove, if necessary, for complete painting of items and adjacent surfaces. Following completion of painting of each space or area, reinstall removed items.

3. Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease prior to mechanical cleaning. Program cleaning and painting so that contaminants from cleaning process will not fall into wet, newly painted surfaces.

B. Wood:

1. Clean soiled surfaces with alcohol wash.
2. Sand to smooth and even surface, then vacuum off, except where rough exterior surface is specified.
3. Apply shellac to all knots, pitch and resinous sapwood before priming coat is applied.
4. Fill nail holes, cracks, open joints, and other defects with wood filler after priming coat has dried. Color shall match finish color.

C. Wood Doors:

1. Seal undercutted or trimmed top and bottom of wood doors prior to installation.
2. Use sealing finish recommended by door manufacturer.

D. Gypsum Wallboard and Plaster:

1. Fill narrow, shallow cracks, and smaller holes with spackling compound.
2. Rake deep, wide cracks, and deep holes.
 - a. Dampen with clear water.
 - b. Gypsum Wallboard: Fill with thin layers of drywall joint cement.
 - c. Plaster: Fill with thin layers of patching plaster.
3. Allow to dry.
4. Sand smooth. Do not raise nap of paper wallboard.

E. Masonry:

1. Fill cracks and irregularities with Portland cement grout to provide uniform surface texture.
2. Etch with 5 percent solution, by weight, of muriatic acid. Do not allow solution to come in contact with metal trim.
3. Fill concrete masonry unit surfaces with block filler.

F. Ferrous Metal Surfaces:

1. Prepare surface in accordance with recommendations of directions of manufacturer of rust inhibitive primer.
2. Feather edges of sound paint by grinding, if necessary.

G. Galvanized Metal:

1. Clean surface with solvent to remove oily residue.
2. Dry with clean cloth.

H. Aluminum:

1. Clean surface with mineral spirits.

3.3 PROTECTION

- A. Protect elements surrounding the work of this section from damage or disfiguration.
- B. Repair damage to other surfaces caused by work of this Section.
- C. Furnish drop cloths, shields, and protective methods to prevent droppings from disfiguring other surfaces.
- D. Remove empty paint containers from site.

3.4 APPLICATION

A. General Requirements:

1. Do not apply initial coating until moisture content of surface is within limitations recommended by the paint manufacturer. Test with moisture meter.
2. Do not paint over applied sealants until cured.
3. Apply paint enamel, stain, and varnishes with suitable brushes and rollers.
Application of paint by spraying will not be permitted.
 - a. Keep brushes and rollers clean, dry, free from contaminants, and suitable for the finish required.
 - b. Apply stain by brush.
4. Comply with recommendations of product manufacturer for drying time between succeeding coats.
5. Apply each coat of paint slightly darker than preceding coat unless otherwise approved.
6. Sand and dust between each coat to remove defects visible from a distance of 5 feet.
7. Finish coats shall be smooth and uniform finish, free of brush marks, streaks, laps, or pile up of paints, and skipped or missed areas.
8. Inspection
 - a. Do not apply additional coats until completed coat has been inspected by the A/E.
 - b. Only inspected coats of paint will be considered in determining the number of coats applied.
9. Leave all parts of moldings and ornaments clean and true to details with no undue amount of paint in corners and depressions.
10. Make edges of paint adjoining other materials or colors clean and sharp with no overlapping.
11. Apply primer on all work before glazing.
12. Change colors at door where colors differ between adjoining spaces or rooms and where door frames match wall colors.
13. Refinish whole wall where portion of finish has been damaged or is not acceptable.
14. Allow applied coat to dry before next coat is applied.

- B. Apply products in accordance with manufacturer's instructions.

C. Painted Work:

1. Prime back surfaces of interior and exterior woodwork with primer paint.
2. Runs on face not permitted.

D. Stained and Natural Finish:

1. Prime back surfaces of interior woodwork scheduled to receive stain or varnish finish with gloss varnish reduced 25 percent with mineral spirits.
2. Where clear finishes are required, tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.

3.5 FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT

- A. Paint shop primed equipment.
- B. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- C. Replace identification markings on mechanical or electrical equipment when painted accidentally.
- D. Paint exposed conduit and electrical equipment occurring in finished areas.
- E. Reinstall electrical plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.6 CLEANING

- A. Clean work under provisions of Division 1.
- B. As Work proceeds, promptly remove paint where spilled, splashed, or spattered. Touch up and restore finish where damaged.
- C. During progress of Work maintain premises free of unnecessary accumulation of tools, equipment, surplus materials, and debris.
- D. Collect waste materials which may constitute a fire hazard, place in closed metal containers and remove daily from site.
- E. Do not mar surface finish of item being cleaned.

3.7 PAINTING SCHEDULE, GENERAL:

- A. Paint all new and existing surfaces unless otherwise noted.

3.8 SCHEDULE

A. Exterior Wood:

1. First Coat:

- a. Duron: Bond-N-Seal Exterior Acrylic House Paint Primer, 08-124
 - b. ICI: Ultra-Hide Durus Primer 2010
 - c. Porter Acrylic Bonding Primer 515
 - d. Sherwin-Williams: A-100 Alkyd Exterior Wood Primer No. Y24W20
2. Second and Third Coat: Gloss Latex
- a. Duron: Weathershield Exterior Acrylic Semi- Gloss House Paint, Series No. 03
 - b. ICI: Ultra-Hide Int./Ext. Gloss 3038
 - c. Porter: 549 Series Acrylic Gloss House Paint
 - d. Sherwin-Williams: A-100 Latex House and Paint Trim No. A8 Series Gloss

B. Exterior Ferrous Metals:

- 1. Touch up shop coated ferrous metals with a primer compatible with shop coat
- 2. First Coat: Acrylic Metal Primer
 - a. Duron: Dura Clad Universal Phenolic Alkyd Fast Dry Metal Primer; White 33-025, Red 33- 026
 - b. ICI: Devflex D.T.M. No. 4020
 - c. Porter: Rust-Screen Fast Drying No. 215 Acrylic Metal Primer
 - d. Sherwin-Williams: D.T.M. Acrylic Primer/ Finish B66W1
- 3. Second and Third Coats: Gloss Exterior Acrylic
 - a. Duron: Deluxe Exterior Vinyl Acrylic Semi- Gloss House Paint, Series No. 07
 - b. ICI: Ultra-Hide Durus Int./Ext. Gloss 3038
 - c. Porter: Enamel Acrylic Exterior Paint No. 519
 - d. Sherwin-Williams: A-100 Latex House and Trim Paint No. A-8 Series
- 4. Dry Film Thickness: 5 mils minimum

C. Exterior Galvanized Metal:

- 1. First Coat: Alkyd Galvanized Metal Primer
 - a. Duron: Dura Clad Acrylic Galvanized Metal Primer No. 33-100
 - b. ICI: Devguard Multi-Purpose Tank and Structural Primer, No. 4160
 - c. Porter: No. 297 Zinc Dust Metal Primer
 - d. Sherwin-Williams: D.T.M. Acrylic Primer/ Finish B66W1
- 2. Second and Third Coats: Gloss Exterior Acrylic
 - a. Duron: Dura Clad Exterior Vinyl Acrylic Semi- Gloss House Paint, Series No. 07
 - b. ICI: Ultra-Hide Durus Gloss Finish 3038
 - c. Porter: Acrylic Exterior Paint No. 519
 - d. Sherwin-Williams: A-100 Latex House and Trim Paint No. A-8 Series
- 3. Dry Film Thickness: 5 mils minimum

D. Interior Wood-Painted (Woodwork Trim and Doors):

- 1. First Coat: Latex Undercoater
 - a. Duron: Acrylic Enamel Undercoater, No. 04-123
 - b. ICI: Ultra-Hide Acrylic Undercoater 1020
 - c. Porter: Acrylic Enamel Undercoat No. 1029
 - d. Sherwin-Williams: PrepRite Classic Interior Latex Primer B28W101
- 2. Second and Third Coats: Semi-Gloss Latex

- a. Duron: Ultra Deluxe Interior Vinyl Acrylic Semi-Gloss Enamel, Series No. 35
 - b. ICI: Ultra-Hide Interior Acrylic Semi-Gloss 1416
 - c. Porter: Latex Semi-Gloss Enamel No. 109
 - d. Sherwin-Williams: ProMar 200 Interior Latex Semi-Gloss Enamel No. B31W200 Series
3. For doors sand with 180 grit paper prior to prime coat and sand with 220 grit paper prior to finish coats.

E. Interior Wood-Stained (Woodwork Trim and Doors):

- 1. Sand thoroughly.
- 2. Apply wood filler if necessary.
- 3. Stain:
 - a. Duron: Interior Penetrating Oil Wood Stain, Clear Base, No. 28-100
 - b. ICI: Woodpride Transparent stain 1700
 - c. Porter: Wood Stain No. 832
 - d. Sherwin-Williams: Oil Stain No. A48 Series
- 4. Sealer:
 - a. Duron: Permathane Gloss Finish, No. 15-010
 - b. ICI: Woodpride Polyurethane Gloss 1908 thinned 50/50
 - c. Porter: Marine Urethane Gloss Varnish No. 858
 - d. Sherwin-Williams: Polyurethane Gloss Varnish No. A67V1
- 5. Steel Wool
- 6. Finish: 2 coats, steel wool lightly between coats.
 - a. Duron: Permathane Satin Finish, No. 15-011
 - b. ICI: Woodpride Polyurethane Satin 1901
 - c. Porter: Urethane Satin Varnish No. 857
 - d. Sherwin-Williams: Polyurethane Satin Varnish No. A67F1

F. Interior Concrete Masonry Units:

- 1. First Coat: Latex Filler
 - a. Duron: Block Kote Latex Block Filler, No. 08- 126
 - b. ICI: Ultra-hide Acrylic Block Fill, No. 3010
 - c. Porter: Acri-Fil Block Filler No. 767
 - d. Sherwin-Williams: PrepRite Block Filler Interior/Exterior B25W25
- 2. Second and Third Coats: Semi-Gloss Latex
 - a. Duron: Ultra Deluxe Interior Vinyl Acrylic Semi-Gloss Enamel, Series No. 35
 - b. ICI: Ultra-Hide Interior Acrylic Semi-Gloss, No. 1416
 - c. Porter: Latex Semi-Gloss Enamel No. 109
 - d. Sherwin-Williams: ProMar Interior Latex Semi- Gloss Enamel No. B31W200 Series

G. Interior Gypsum Wallboard (Walls and Ceilings):

1. First Coat: Latex Primer/Sealer
 - a. Duron: Drywall Vinyl Primer Sealer, No. 18-004
 - b. ICI: Ultra-Hide Latex Primer-Sealer 1030
 - c. Porter: Acrylic Enamel Undercoat No. 1029
 - d. Sherwin-Williams: PrepRite 200 Interior Latex Primer B28W200
2. Second and Third Coats: Semi-Gloss Latex
 - a. Duron: Ultra Deluxe Interior Vinyl Acrylic Semi-Gloss Enamel Series No. 35
 - b. ICI: Ultra-Hide Interior Acrylic Semi-Gloss No. 1416
 - c. Porter: Latex Semi-Gloss Enamel No. 109
 - d. Sherwin-Williams: ProMar 200 Interior Latex Semi-Gloss Enamel No. B31W200 Series

G. Interior Plaster (Walls and Ceilings):

1. First Coat: Latex Primer Sealer
 - a. Duron: Ultra Deluxe Interior Drywall Primer Sealer No. 04-126
 - b. ICI: Ultra-Hide Latex Primer-Sealer No. 1030
 - c. Porter: Drywall Sealer No. 426
 - d. Sherwin-Williams: PrepRite Classic Interior Latex Primer B28W101
2. Second and Third Coats: Semi-Gloss Latex
 - a. Duron: Ultra Deluxe Interior Vinyl Acrylic Semi-Gloss Enamel, Series No. 35
 - b. ICI: Ultra-Hide Interior Acrylic Semi-Gloss No. 1416
 - c. Porter: Latex Semi-Gloss Enamel No. 109
 - d. Sherwin-Williams: ProMar Interior Latex Semi-Gloss Enamel No. B31W200 Series

H. Interior Ferrous Metals:

1. Touch up shop primed metals with primer compatible with shop coat.
2. First Coat: Acrylic Primer
 - a. Duron: Dura Clad Universal Acrylic Metal Primer, No. 33-105
 - b. ICI: Devflex D.T.M. Flat Interior/Exterior Waterborne Primer No. 4020
 - c. Porter: Rust - Screen Fast Drying No. 215 Acrylic Metal Primer
 - d. Sherwin-Williams: D.T.M. Acrylic Primer/ Finish B66W1
3. Second and Third Coats: Semi-Gloss Latex Enamel
 - a. Duron: Ultra Deluxe Interior Vinyl Acrylic Semi-Gloss Enamel, Series No. 35
 - b. ICI: Ultra-Hide Interior Acrylic Semi-Gloss No. 1416
 - c. Porter: Latex Semi-Gloss Enamel No. 109
 - d. Sherwin-Williams: ProMar 200 Interior Latex Semi-Gloss Enamel No. B31W200 Series

I. Interior Nonferrous Metals:

1. First Coat: Alkyd Primer
 - a. Duron: Dura Clad Alkyd White Metal Primer, No. 33-010

- b. ICI: Devflex D.T.M. Flat Interior/Exterior Waterborne Primer No. 4020
- c. Sherwin-Williams: Galvite HS B50WZ30
- 2. Second and Third Coats: Semi-Gloss Latex
 - a. Duron: Ultra Deluxe Interior Vinyl Acrylic Semi-Gloss Enamel, Series No. 35
 - b. ICI: Ultra-Hide Interior Acrylic Semi-Gloss No. 4020
 - c. Porter: Latex Semi-Gloss Enamel, No. 109
 - d. Sherwin-Williams: ProMar 200 Interior Latex Semi-Gloss Enamel No. B31W200 Series

J. Stair Treads and Risers:

- 1. First and Second Coats: Clear polyurethane
 - a. Duron: Permathane Satin Finish, No. 15-011
 - b. ICI: Woodpride Polyurethane Satin No. 1901
 - c. Porter: Satin Urethane Varnish No. 857
 - d. Sherwin-Williams: Polyurethane Satin Varnish No. A67F1
- 2. Primer required when recommended by manufacturer.

K. Previously Painted Surfaces:

- 1. Follow manufacturer's surface preparation for each specified type of finish under each surface heading listed in the painting schedule. Paint all previously painted surfaces indicated or scheduled to be painted. Sand and stain all previously stained surfaces.

END OF SECTION

DIVISION 10

SPECIALITIES

SECTION 104426

SIGNAGE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Interior, surface mounted, pre-finished, signage.

1.2 SUBMITTALS

- A. Product Data: Provide component dimensions, configurations, and finishes.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Deliver to site, store and protect products at site under provisions of Section 01600.

PART 2 PRODUCTS

2.1 MANUFACTURER/PRODUCT

- A. Approved Manufacturers:
 - 1. Interior Signage:
 - a. Best Sign Systems, Inc.
(800) 235-2378
www.bestsigns.com
 - b. Approved Equal.
 - 2. Exterior Signage:
 - a. Coldspring USA
(800) 328-5040
www.coldspringusa.com
 - b. Approved Equal.
- B. Provide signs at the following locations:
 - 1. Model HC300A:
 - a. Right side of Door 103, Text: "FINANCE OFFICE"
 - b. Right side of Door 104, Text: "STAFF ONLY"
 - c. Right side of Door 105, Text: "INTERVIEW A"
 - d. Left side of Door 106, Text: "INTERVIEW B"
 - e. Right side of Door 108, Text: "TOILET" with international symbol for Unisex toilet.
 - f. Right side of Door 109, Text: "EXIT"
 - g. Right side of Door 110, Text: "RECEPTION"
 - h. Right side of Door 111, Text: "FILE STORAGE"
 - i. Right side of Door 112, Text: "TOILET" with international symbol for Unisex toilet.
 - j. Right side of Door 113, Text: "FINANCE OFFICE"
 - k. Right side of Door 114, Text: "EXECUTIVE DIRECTOR"

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are ready to receive work.
- B. Report any irregularities that will affect signage installation to the General Contractor for correction prior to beginning work.

3.2 INSTALLATION

- A. Install signage level and plumb in accordance with manufacturer's instructions.

3.3 PROTECTION

- A. Protect finished work under provisions of Division 1.

END OF SECTION

SECTION 105800

TOILET AND BATH ACCESSORIES

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

- A. The location and extent of toilet and bath accessories and attachment hardware are indicated on the Drawings. This section includes all possible accessories to be used. Refer to the Drawings for the specific scope of items required for this Project.

1.2 SUBMITTALS

- A. Provide product data on accessories describing size, finish, details of function, attachment methods.
- B. Submit samples if requested by A/E.
- C. Submit manufacturer's installation instructions.

1.3 REGULATORY REQUIREMENTS

- A. Conform to applicable code for installing work in conformance with UFAS Code.

1.4 SEQUENCING AND SCHEDULING

- A. Coordinate the work of this Section with the placement of internal wall reinforcement and reinforcement of toilet partitions to receive anchor attachments.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. American Specialties, Inc.
- B. Bobrick Washroom Equipment, Inc.
- C. Bradley Corporation
- D. Georgia Pacific
- E. Substitutions: Approved equal.

2.2 MATERIALS

- A. Sheet Steel: ANSI/ASTM A366.
- B. Stainless Steel Sheet: ASTM A167, Type 304.

- C. Tubing: ASTM A269, stainless steel.
- D. Adhesive: Two component epoxy type or contact type, waterproof.
- E. Fasteners, Screws, and Bolts: Hot dip galvanized, tamperproof.
- F. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

2.3 FABRICATION

- A. Weld and grind smooth joints of fabricated components.
- B. Form exposed surfaces from single sheet of stock, free of joints.
- C. Form surfaces flat without distortion. Maintain flat surfaces without scratches or dents.
- D. Back paint components where contact is made with building finishes to prevent electrolysis.
- E. Shop assemble components and package complete with anchors and fittings.
- F. Provide steel anchor plates, adapters, and anchor components for installation.
- G. Hot dip galvanize exposed and painted ferrous metal and fastening devices.

2.4 FACTORY FINISHING

- A. Galvanizing: ANSI/ASTM A123 or A386 to 1.25 oz/sq yd.
- B. Shop Primed Ferrous Metals: Pretreat and clean, spray apply one coat primer and bake.
- C. Enamel: Pretreat to clean condition, apply one coat primer and minimum two coats epoxy or electrostatic baked enamel.
- D. Chrome/Nickel Plating: ANSI/ASTM B456, Type SC 2 satin or polished finish.
- E. Stainless Steel: No. 4 satin luster finish.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that site conditions are ready to receive work and dimensions are as indicated on shop drawings.
- B. Beginning of installation means acceptance of existing conditions and substrate.

3.2 PREPARATION

- A. Deliver inserts and rough-in frames to site at appropriate time for building-in.
- B. Provide templates and rough-in measurements as required.
- C. Verify exact location of accessories for installation.

3.3 INSTALLATION

- A. Install fixtures, accessories and items in accordance with manufacturer's instructions.
- B. Install plumb and level, securely and rigidly anchored to substrate.

3.4 SCHEDULE: BATH ACCESSORIES (where applicable, refer to drawings)

A. Automatic Towel Dispenser:

- 1. Georgia Pacific, Pacific Blue Ultra, No. 59590, with 6 rolls of towels (26490)
- 2. Approved Equal

B. Automatic Soap Dispenser:

- 1. Georgia Pacific, Pacific Blue Ultra, No. 53590, with 3 refills (43822)
- 2. Approved Equal

C. Toilet Paper Holder - Surface Mounted (Heavy Duty with Exposed Screws):

- 1. American Specialties, No. 0263
- 2. Bobrick, No. B-273
- 3. Bradley, No. 5071

D. Grab Bars: 1-1/2 Inch Diameter with Safety Grip, Concealed Mounting in Lengths Shown on Drawings:

- 1. American Specialties, No. 3200K - Type 01
- 2. Approved Equal by Bobrick, Bradley or Seachrome:

3.5 SCHEDULE: MIRRORS

A. Mirrors:

- 1. American specialties: No. 0620-B 18x36

END OF SECTION

DIVISION 12

FURNISHINGS

CASEWORK WITH RECESSED FLAT PANEL DOORS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Cabinets and countertops.
- B. Casework hardware.

1.2 SYSTEM DESCRIPTION

A. Performance Requirements

1. Test Requirements

- a. ANSI/KCMA A161.1 - "Recommended Performance and Construction Standards for Kitchens and Vanity Cabinets" Test for Finish (Section 9.0) will be required for all cabinets. The "Severe Use" cabinets also must comply with finish requirements of Section 2.1.10.

2. Performance Specifications

- a. Cabinets qualifying for bid must meet or exceed all applicable requirements for ANSI/KCMA A161.1 - "Recommended Performance and Construction Standards for Kitchen and Vanity Cabinets."
- b. All tests must be performed on standard 30-inch wall and base cabinets.
- c. Drawers and drawer hardware of the "Severe Use" cabinets shall be subjected to a hardware load test as described herein. At the conclusion of the test, there shall be no failure in any part of the drawer assembly or operating system. The drawer shall remain operable with no mechanical interference with any other part of the cabinet assembly.
 - (1) Drawer hardware load test: A 75 lb. point load shall be applied to the exterior edge of the drawer for a period of 15 minutes. The drawer shall be subjected to this load extended 6 inches from its closed position.

3. Material Specifications: Kitchen cabinets shall contain materials that comply with the following:

- a. Pressure treated lumber shall comply with AWPB Standard LP-2
- b. Plywood shall comply with ANSI/HPMA HP 1938 and PSI 1-83
- c. Kitchen counter tops shall comply with ANSI A161.2
- d. Decorative laminate shall comply with NEMA LD-3

4. Cabinet Hardware: Cabinet hardware shall comply with the finishing requirements of ANSI/BHMA A156.9.

1.3 SUBMITTALS

A. Shop Drawings

- 1. Indicate casework locations, large scale plans, large scale section of base and wall cabinet construction, elevations, rough-in and anchor placement dimensions and tolerances, clearances required and detailed features.

2. General Contractor shall verify all kitchen dimensions prior to submittal of shop drawings. Shop drawings shall reflect contractor field verified dimensions. Dimensions for open spaces shall not be modified without the A/E's approval.
- B. Product Data: Provide component dimensions, configurations, construction details, joint details, and certification.
- C. Samples: Submit 2 samples, minimum size 3 by 6 inches of each color of finish.

1.4 QUALITY ASSURANCE

- A. Submit necessary reports to the A/E to show compliance with specifications requirements.
- B. Cabinets must be tested, certified, and bear the label or seal of the Kitchen Cabinet Manufacturer's Association (KCMA) or the Southern California Association of Cabinet Manufacturers Association in accordance with 24 CFR 200.935.
 1. One label should indicate that product meets the HUD CSP "Severe Use" specifications. The other label should indicate that the product meets the KCMA CSP specifications for "Normal/Elderly Use."

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum 3 years documented experience.

1.6 FIELD MEASUREMENTS

- A. Verify that field measurements are coordinated on shop drawings.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Evans Cabinet Corporation, (478) 272-2530
www.evanscabinet.com
- B. Master Built Cabinets, Inc. (270) 325-3578
- C. Blue River Cabinetry, Windy Creek Series (802) 883-6894
- D. Substitutions: Approved equal

2.2 MATERIAL

- A. The use of particle board, flakeboard, fiberboard, or hardboard in the construction of "severe use" kitchen cabinets and counter tops will not be accepted in this solicitation.

2.3 WALL AND BASE CABINETS

- A. Wall and base cabinets shall be of the same construction, outside appearance must be the same and must have face frames. Cabinets and counter tops must be constructed of solid lumber or exterior grade plywood with wood veneer core. All parts touching floor must be of pressure treated solid lumber. Brace cabinets as necessary to produce sturdy and rigid construction. Provide an integral toe space of at least 3 inches by 3 inches. Only first quality methods, materials and workmanship will be used.
1. Face Frames: 3/4 inches net thickness of kiln dried solid birch hardwood, free of knots and selected for light uniform color suitable for natural finish. Frames to be mortised and tenoned, dovetailed or doweled, glued and stapled under pressure and filled and sanded. Vertical end members (stiles) to be 1-1/2 inches wide. Vertical center members between doors and drawers (mulls) to be minimum 2 inches wide. Horizontal members (rails) to be 1-3/4 inches wide. Stiles and top and bottom rails to be dadoed to receive ends, bottoms and tops.
 2. End Panels: Exposed ends shall be minimum A-2 grade, 1/2 inch thick 5-ply birch hardwood plywood, selected for light uniform color. Ends not exposed can be 1/2 inch exterior softwood plywood, grade A-D, with "A" side to inside of cabinet. Ends shall be dadoed a minimum of 1/4 inch deep to receive shelves, bottoms and tops. Ends must be let into dadoe in face frame. Base cabinet end panels shall stop 3-1/2 inches above the floor and be supported by 2X on DTL by 3-1/2 inch pressure treated solid lumber member.
 3. Backs: Required on all cabinets (excluding removable fronts at Accessible Units). Minimum 1/4 inch thick 2-2 grade exterior hardwood plywood or A-D grade exterior softwood plywood. Backs shall be securely glued and stapled to ends, 3-1/2 inch cleats and shelves of cabinet. Backs may be let into dado of ends and cleats, or may be applied flush with ends and cleats.
 4. Installation Cleats: Minimum of 3/4 inch by 3-1/2 inch S4S, "C" grade, kiln dried solid lumber, dadoes to receive bottoms and tops. Two horizontal members running full length of cabinet at top and bottom required.
 5. Shelves and Wall Cabinet Bottoms: 3/4 inch thick A-2 grade exterior hardwood plywood or A-B grade exterior softwood plywood with wood banded front edge or 3/4 inch thick solid lumber. Shelves to be let into dadoes of end panels and braced behind mulls. Bottoms to be let into dadoes in ends, cleats and front frames. Both shall be glued and stapled.
 6. Doors: Three-fourth inch thick. Evans Cabinet Corporation, Lancaster – Recessed panel or equal by approval (solid birch recessed panel).
 7. Base Bottoms: 3/4 inch thick 2-2 grade exterior hardwood plywood or A-C grade exterior softwood plywood. Bottoms shall be let into end panels, front rails and installation cleats. Bottom shall be supported by 3/4 inch thick pressure treated solid lumber braces, 24 inches on center running front to rear of cabinet and resting on floor.
 8. Toe Kicks: Three-fourth inch thick pressure treated solid lumber. Ends of toe kick to be trimmed on cabinets with exposed ends to that base and base shoe may be wrapped neatly around corner.
 9. Drawers:
 - a. Drawer fronts shall be the same specification as the doors (Paragraph 1.2.A.6). Sides and backs shall be a minimum of 1 1/16 inch thick, "C" grade, solid lumber with sides dovetailed or mortised and tenoned into fronts. Backs shall be dadoed into sides. Drawer

- bottoms shall be a minimum of 1/4 inch softwood or hardwood exterior plywood let into front, sides and back. All drawer parts shall be glued and nailed or stapled together. Mount drawers on pair of 75 lb. capacity, side mounted metal guides. Base cabinet with drawers must have 3/4 inch solid lumber or plywood drawer bracket(s) side mounted to receive guide rails. Mount brackets at rear to 3/4 inch solid lumber hanging rail and face frame by use of metal rear mounted brackets or by the continuous wraparound method.
- b. File Drawer: Same basic construction, construct paper size for letter sized files. Provide with metal tracts sized for hanging folder (manufactured by Outwater Plastics). Modify toe kick to allow for two letter sized file drawers to be stacked in each cabinet. Also, vinyl base must be installed along face of all cabinets.
10. Finish: Exposed surfaces and interior of cabinet shall be factory finished, consisting of stain, sealer and polyurethane coats or an equivalent coating system, lightly sanded between applications. Sealer and top coats must be oven dried. The exterior finish shall meet the performance requirements of Article 1.4.A.1. Color shall be selected by the A/E from manufacturer's standard colors. 1/2 inch thick continuous toe kick trim shall be provided to match cabinet finish.
 11. Hardware: Provide corrosion resisting hardware.
 - a. Hinges: Hinges shall be manufacturer's standard heavy duty with self closing feature, and shall be the semi-concealed type.
 - b. Drawer Rails: Cabinet drawers shall be mounted on metal side rails with 75 lb. loading capacity
 - (1) Washington Manufacturing Model B2310
 - (2) Knap and Vogt Manufacturing Model KY 1300
 - (3) Grant Manufacturing Model 336.
 - c. File Drawers shall be mounted on metal drawer slides with 100 lb loading capacity. Knap & Vogt 8400
 - d. File Drawer Locks: Side loaded gang lock for multiple drawers – Timberline Lock, Ltd., System 150
 - e. Pulls: Pulls shall be provided on all cabinet doors and drawer. All pulls shall be tublar ("wire") style, 4" long (minimum) with satin finish
 - (1) Sugatsune American, Inc.
211 East Selandia Lane
Carson, CA 90746
(800.562.5267)
 - (2) Aerock Corporation
400 Auburn Street
P. O. Box 7018
Rockford, IL 61125-7018
800.435.6959
 - (3) Lavi Industries
17810 Avenue Hopkins
Valencia, CA 91355
(877.275.5284)
 - f. Grommets: provide (6) 2" grommets installed in countertops of office casework (verify locations and colors).
 12. Counter Tops: See Specification Section 12372 or 12373 (as applicable).
 13. Fillers and Moulding: Scribe mould and fillers shall be utilized to assure accurate job fit. Contractor shall supply cabinet manufacturer with adequate field dimensions.

14. Removable Sections: Provide at handicapped unit removable slide-in sections of base cabinets. Refer to Drawings for locations and sizing. Furnish each removable cabinet section with 4 Teenut fasteners, 1/4 inch diameter by 2 inch long bolt by 3/4 inch diameter mounted nut. Mount nut with prongs pointing to bolt head.
15. Valance: Provide (when detailed) valance of same wood species as cabinet in shape and size indicated.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions prior to ordering cabinets.
- B. Verify adequacy of support framing.

3.2 INSTALLATION

- A. Install casework, components and accessories in accordance with manufacturer's instructions.
- B. Use anchoring devices to suit conditions and substrate materials encountered.
- C. Set casework items plumb and square, securely anchored to building structure.
- D. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Use filler strips not additional overlay trim for this purpose.
- E. Close ends of units, back splashes, shelves and bases.
- F. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.
- G. Install bead of sealant at back splash edge and wall intersection horizontally and vertically.

3.3 ADJUSTING

- A. Adjust doors, drawers, hardware, fixtures, and other moving or operating parts to function smoothly.

3.4 CLEANING

- A. Clean casework, counters, shelves and hardware.

3.5 PROTECTION OF FINISHED WORK

- A. Do not permit finished casework to be exposed to continued construction activity.

END OF SECTION

SECTION 122371

BATH VANITIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Bath Vanities
- B. Vanity Tops (specified elsewhere)
- C. Casework hardware.

1.2 SYSTEM DESCRIPTION

A. Performance Requirements

1. Test Requirements

- a. ANSI/KCMA A161.1 - "Recommended Performance and Construction Standards for Kitchens and Vanity Cabinets" Test for Finish (Section 9.0) will be required for all cabinets. The "Severe Use" cabinets also must comply with finish requirements of Section 2.1.10.

2. Performance Specifications

- a. Cabinets qualifying for bid must meet or exceed all applicable requirements for ANSI/KCMA A161.1 - "Recommended Performance and Construction Standards for Kitchen and Vanity Cabinets."
- b. All tests must be performed on standard 30-inch wall and base cabinets.
- c. Drawers and drawer hardware of the "Severe Use" cabinets shall be subjected to a hardware load test as described herein. At the conclusion of the test, there shall be no failure in any part of the drawer assembly or operating system. The drawer shall remain operable with no mechanical interference with any other part of the cabinet assembly.
 - (1) Drawer hardware load test: A 75 lb. point load shall be applied to the exterior edge of the drawer for a period of 15 minutes. The drawer shall be subjected to this load extended 6 inches from its closed position.

3. Material Specifications: Vanities shall contain materials that comply with the following:

- a. Pressure treated lumber shall comply with AWPB Standard LP-2
- b. Plywood shall comply with ANSI/HPMA HP 1938 and PSI 1-83
- c. Vanity tops shall comply with NEMA LD3-3.03

4. Cabinet Hardware: Cabinet hardware shall comply with the finishing requirements of ANSI/BHMA A156.9.

1.3 SUBMITTALS

A. Shop Drawings

1. Indicate vanity locations, large scale plans, large scale section of base and wall cabinet construction, elevations, rough-in and anchor placement dimensions and tolerances, clearances required and detailed features.
2. General Contractor shall verify all dimensions prior to submittal of shop drawings. Shop drawings shall reflect contractor field verified dimensions. Dimensions for open spaces shall not be modified without the A/E's approval.

B. Product Data: Provide component dimensions, configurations, construction details, joint details, and certification.

C. Samples: Submit 2 samples, minimum size 3 by 6 inches of each color of finish.

1.4 QUALITY ASSURANCE

A. Submit necessary reports to the A/E to show compliance with specifications requirements.

B. Cabinets must be tested, certified, and bear the label or seal of the Kitchen Cabinet Manufacturer's Association (KCMA) or the Southern California Association of Cabinet Manufacturers Association in accordance with 24 CFR 200.935.

1. One label should indicate that product meets the HUD CSP "Severe Use" specifications. The other label should indicate that the product meets the KCMA CSP specifications for "Normal/Elderly Use."

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum 3 years documented experience.

1.6 FIELD MEASUREMENTS

A. Verify that field measurements are coordinated on shop drawings.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Evans Cabinet Corporation, Heritage Series (478) 272-2530
www.evanscabinet.com

B. Master Built Cabinets, Inc. (270) 325-3578

C. Blue River Cabinetry, Windy Creek Series (802) 883-6894

D. Substitutions: Approved equal

2.2 MATERIAL

- A. The use of particle board, flake board, fiberboard, or hardboard in the construction of "severe use" kitchen cabinets and countertops will not be accepted in this solicitation.

2.3 VANITIES

- A. Vanities shall be of the same construction, outside appearance must be the same and must have face frames. Vanities must be constructed of solid lumber or exterior grade plywood with wood veneer core. All parts touching floor must be of pressure treated solid lumber. Brace vanities as necessary to produce sturdy and rigid construction. Provide an integral toe space of at least 3 inches by 3 inches. Only first quality methods, materials and workmanship will be used.
 1. Face Frames: Three fourths inches net thickness of kiln dried solid birch or maple hardwood, free of knots and selected for light uniform color suitable for natural finish. Frames to be mortised and tenoned, dovetailed or doweled, glued and stapled under pressure and filled and sanded. Vertical end members (stiles) to be 1-1/2 inches wide. Vertical center members between doors and drawers (mulls) to be minimum 2 inches wide. Horizontal members (rails) to be 1-3/4 inches wide. Stiles and top and bottom rails to be dadoed to receive ends, bottoms and tops.
 2. End Panels: Exposed ends shall be minimum A-2 grade, 1/2 inch thick 5-ply exterior hardwood plywood, selected for light uniform color. Ends not exposed can be 1/2 inch exterior softwood plywood, grade A-D, with "A" side to inside of cabinet. Ends shall be dadoed a minimum of 1/4 inch deep to receive shelves, bottoms and tops. Ends must be let into dadoe in face frame. Base cabinet end panels shall stop 3-1/2 inches above the floor and be supported by 2X on DTL by 3-1/2 inch pressure treated solid lumber member.
 3. Backs: Required on all cabinets (optional on sink bases depending on job conditions). Minimum 1/4 inch thick 2-2 grade exterior hardwood plywood or A-D grade exterior softwood plywood. Backs shall be securely glued and stapled to ends, 3-1/2 inch cleats and shelves of cabinet. Backs may be let into dado of ends and cleats, or may be applied flush with ends and cleats.
 4. Installation Cleats: Minimum of 3/4 inch by 3-1/2 inch S4S, "C" grade, kiln dried solid lumber, dadoes to receive bottoms and tops. Two horizontal members running full length of cabinet at top and bottom required.
 5. Shelves and Wall Cabinet Bottoms: One-half inch thick A-2 grade exterior hardwood plywood or A-B grade exterior softwood plywood with wood banded front edge or 3/4 inch thick solid lumber. Shelves to be let into dadoes of end panels and braced behind mulls. Bottoms to be let into dadoes in ends, cleats and front frames. Both shall be glued and stapled.
 6. Doors: Three-fourth inch thick (solid birch recessed panel)
 7. Base Bottoms: One-half inch thick 2-2 grade exterior hardwood plywood or A-C grade exterior softwood plywood. Bottoms shall be let into end panels, front rails and installation cleats. Bottom shall be supported by 3/4 inch thick pressure treated solid lumber braces, 24 inches on center running front to rear of cabinet and resting on floor.
 8. Toe Kicks: Three-fourth inch thick pressure treated solid lumber. Faces with finished 1/2" plywood or vinyl base installed along face of all cabinets.

9. **Drawers:**

a. Drawer fronts shall be the same specification as the doors (Paragraph 1.2.A.6). Sides and backs shall be a minimum of 1 1/16 inch thick, "C" grade, solid lumber with sides dovetailed or mortised and tenoned into fronts. Backs shall be dadoed into sides. Drawer bottoms shall be a minimum of 1/4 inch softwood or hardwood exterior plywood let into front, sides and back. All drawer parts shall be glued and nailed or stapled together. Mount drawers on pair of 75 lb. capacity, side mounted metal guides. Base cabinet with drawers must have 3/4 inch solid lumber or plywood drawer bracket(s) side mounted to receive guide rails. Mount brackets at rear to 3/4 inch solid lumber hanging rail and face frame by use of metal rear mounted brackets or by the continuous wraparound method.

10. **Finish:** Exposed surfaces and interior of cabinet shall be factory finished, consisting of stain, sealer and polyurethane coats or an equivalent coating system, lightly sanded between applications. Sealer and top coats must be oven dried. The exterior finish shall meet the performance requirements of Article 1.4.A.1. Color shall be selected by the A/E from manufacturer's standard colors. Toe kick shall be painted with color selected by A/E.

11. **Hardware:** Provide corrosion resisting hardware.

a. **Hinges:** Hinges shall be manufacturer's standard heavy duty with self closing feature, and shall be the semi-concealed type.

b. **Pulls:** Pulls shall be provided on all cabinet doors and drawer. All pulls shall be tubular ("wire") style, 4" long (minimum) with satin finish

(1) Sugatsune American, Inc.
211 East Selandia Lane
Carson, CA 90746
(800.562.5267)

(2) Aerock Corporation
400 Auburn Street
P. O. Box 7018
Rockford, IL 61125-7018
800.435.6959

(3) Lavi Industries
17810 Avenue Hopkins
Valencia, CA 91355
(877.275.5284)

12. **Bath Vanity tops:** Provide a solid polymer fabricated material in compliance with Specification Section 12374.

13. **Fillers and Moulding:** Scribe mould and fillers shall be utilized to assure accurate job fit. Contractor shall supply cabinet manufacturer with adequate field dimensions.

14. **Valance:** Provide (when detailed) valance of same wood species as cabinet in shape and size indicated.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions prior to ordering cabinets.
- B. Verify adequacy of support framing.

3.2 INSTALLATION

- A. Install vanities, components and accessories in accordance with manufacturer's instructions.
- B. Use anchoring devices to suit conditions and substrate materials encountered.
- C. Set vanities plumb and square, securely anchored to building structure.
- D. Carefully scribe vanities abutting other components, with maximum gaps of 1/32 inch. Use filler strips not additional overlay trim for this purpose.
- E. Close ends of units, shelves and bases.
- F. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.
- G. Install bead of sealant at back splash edge and wall intersection horizontally and vertically.

3.3 ADJUSTING

- A. Adjust doors, drawers, hardware, fixtures, and other moving or operating parts to function smoothly.

3.4 CLEANING

- A. Clean vanities, vanity tops, shelves and hardware.

3.5 PROTECTION OF FINISHED WORK

- A. Do not permit finished casework to be exposed to continued construction activity.

END OF SECTION

SECTION 122372

COUNTERTOPS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Counter tops.

1.2 SYSTEM DESCRIPTION

- A. Material Specifications: Kitchen and Office countertops shall contain materials that comply with the following:
 1. Countertops laminate shall comply with ANSI A161
 2. Decorative laminate shall comply with NEMA LD-3

1.3 SUBMITTALS

- A. Shop Drawings
 1. Indicate countertop locations, large scale plans, rough-in and anchor placement dimensions and tolerances, clearances required and detailed features.
 2. General Contractor shall verify all kitchen dimensions prior to submittal of shop drawings. Shop drawings shall reflect contractor field verified dimensions. Dimensions for open spaces shall not be modified without the PHA's approval.
- B. Product Data: Provide component dimensions, configurations, construction details, joint details, and certification.
- C. Samples: Submit 2 samples, minimum size 3 by 6 inches of each color of finish.

1.4 QUALITY ASSURANCE

- A. Submit necessary reports to the PHA to show compliance with specifications requirements.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum 3 years documented experience.

1.6 FIELD MEASUREMENTS

- A. Verify that field measurements are coordinated on shop drawings.

PART 2 PRODUCTS

2.1 MATERIAL

- A. The use of particle board, flakeboard, fiberboard, or hardboard in the construction of "severe use" kitchen counter tops will not be accepted in this solicitation.

2.1 CONSTRUCTION STANDARDS

- A. **Kitchen Countertops:** Countertops shall be fully post-formed type of high pressure plastic laminated to 3/4 inch thick exterior plywood with a minimum 4 inch back splash (refer to drawings for width of backsplash. Provide end splashes and ends of cabinet that terminate at walls and at any offsets in elevation of countertops. The bottom front edge and ends of countertops shall have a solid wood mold. The perimeter of the bottom front edge of countertops and sink cut outs shall be sealed with polyurethane. Kitchen countertops shall include a post-formed drip edge.
- B. **Office Countertops:** Countertops shall be fully post-formed type of high pressure plastic laminated to 3/4 inch thick exterior plywood (1 or 2 layers as specified on drawings). The bottom front edge and ends of countertops shall have a solid wood mold substrate for laminate. Office countertops shall include a square face edge.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions prior to ordering countertops.
- B. Verify adequacy of support framing.

3.2 INSTALLATION

- A. Install countertops, components and accessories in accordance with manufacturer's instructions.
- B. Use anchoring devices to suit conditions and substrate materials encountered.
- C. Set countertop items plumb and square, securely anchored to cabinets.
- D. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.
- E. Install bead of sealant at back splash edge and wall intersection horizontally and vertically.

3.3 CLEANING

- A. Clean countertops, cabinets, shelves and hardware.

3.4 PROTECTION OF FINISHED WORK

- A. Do not permit finished countertops to be exposed to continued construction activity.

END OF SECTION

SECTION 123513

HORIZONTAL LOUVER BLINDS (FAUX WOOD)

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. 2" Horizontal slat, faux wood, louver blinds.
- B. Operating hardware.

1.2 SYSTEM DESCRIPTION

- A. Horizontal PVC slat louver blinds installed at window openings, manual control of raising and lowering by cord; blade angle adjustable by control wand.

1.3 SUBMITTALS

- A. Submit shop drawings indicating opening sizes, tolerances required, installation of blind at window opening, method of attachment, clearances, and operation.
- B. Submit product data indicating physical and dimensional characteristics and operating features.
- C. Submit samples as required by A/E.
- D. Submit 2 samples 6 inches long illustrating slat materials and finish, color, cord type and color.
- E. Submit manufacturer's installation instructions.

1.4 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing the products specified in this section with 3 years documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver blinds wrapped and crated in a manner to prevent damage to components or marring of surfaces.
- B. Store in a clean, dry area, laid flat and blocked off ground to prevent sagging, twisting, or warping.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Levolor Corporation
- B. Kirsch Company
- C. Hunter-Douglas, Inc.
- D. Graber
- E. Substitutions: Approved equal

2.2 MATERIALS

- A. Louver Slats: Two inch wide; 0.125 inch thick PVC composite horizontal slats. Slats must be coated with a co-extended polymer coating to resist warping, cracking and high humidity conditions.
- B. Slat Support: Ladder configuration.
- C. Head Rail Housing: 1-1/2" high x 2-1/4" wide, internally fitted with hardware, pulleys and bearings for blind operation.
- D. Cord: Braided polyester, continuous loop, free end.
- E. Control Wand: PVC polymer with a 0.38" diameter.
- F. Head Support Bracket: Overhead head rail housing attachment, installed in accordance with manufacturer's recommendations.
- G. Accessory Hardware: Type recommended by blind manufacturer.
- H. Warranty: Minimum one year

2.3 FACTORY FINISHING

- A. Blind Slat and Head Rail Housing: Color selected by Owner.
- B. Cord and Control Wand: Color selected by Owner.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces and openings are ready to receive the work.
- B. Do not commence fabrication until field measurements are confirmed.

- C. Ensure structural supports are correctly placed.
- D. Beginning of installation means installer accepts existing surfaces.

3.2 INSTALLATION

- A. Install blinds in accordance with manufacturer's instructions.
- B. Secure in place with flush countersunk fasteners.

3.3 TOLERANCES

- A. Maximum Variation of Gap at Window Opening Perimeter: 1/4 inch.
- B. Maximum Offset From Level: 1/8 inch.

3.4 ADJUSTING

- A. Adjust blinds for smooth operation.

3.5 CLEANING

- A. Clean work as recommended by manufacturer.

END OF SECTION

DIVISION 22

PLUMBING

SECTION 220523.12

BALL VALVES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Brass ball valves.
2. Bronze ball valves.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of valve.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Standards:

1. Domestic water valves intended to convey or dispense water for human consumption must comply with the SDWA, requirements of authorities having jurisdiction, and NSF 61 and NSF 372, or must be certified to be in compliance with NSF 61 and NSF 372 (by an ANSI-accredited third-party certification body) that the weighted average lead content at wetted surfaces is less than or equal to 0.25 percent.

B. ASME Compliance:

1. ASME B1.20.1 for threads for threaded end valves.
2. ASME B16.1 for flanges on iron valves.
3. ASME B16.5 for flanges on steel valves.
4. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
5. ASME B16.18 for cast copper solder-joint connections.
6. ASME B16.22 for wrought copper and copper alloy solder-joint connections.
7. ASME B16.34 for flanged and threaded end connections
8. ASME B31.9 for building services piping valves.

- C. Provide bronze valves made with dezincification-resistant materials. Bronze valves made with copper alloy (brass) containing more than 15 percent zinc are not permitted.

- D. Valve Pressure-Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- E. Valve Sizes: Same as upstream piping unless otherwise indicated.
- F. Valve Actuator Type:
 - 1. Hand Lever: For quarter-turn valves smaller than NPS 4.
- G. Valves in Insulated Piping:
 - 1. Provide 2-inch extended neck stems.
 - 2. Extended operating handles with nonthermal-conductive covering material and protective sleeves that allow operation of valves without breaking vapor seals or disturbing insulation.
 - 3. Memory stops that are fully adjustable after insulation is applied.

2.2 BRASS BALL VALVES

- A. Brass Ball Valves, Two Piece with Full Port and Brass Trim, Threaded or Soldered Ends:
 - 1. Standard: MSS SP-110; MSS SP-145.
 - 2. CWP Rating: 600 psig.
 - 3. Body Design: Two piece.
 - 4. Body Material: Forged brass.
 - 5. Ends: Threaded or soldered.
 - 6. Seats: PTFE.
 - 7. Stem: Brass.
 - 8. Ball: Chrome-plated brass.
 - 9. Port: Full.

2.3 BRONZE BALL VALVES

- A. Bronze Ball Valves, Two Piece with Full Port, and Bronze or Brass Trim, Threaded or Soldered Ends:
 - 1. Standard: MSS SP-110; MSS SP-145.
 - 2. CWP Rating: 600 psig.
 - 3. Body Design: Two piece.
 - 4. Body Material: Bronze.
 - 5. Ends: Threaded or soldered.
 - 6. Seats: PTFE.
 - 7. Stem: Bronze or brass.
 - 8. Ball: Chrome-plated brass.
 - 9. Port: Full.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
- B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
- C. Examine threads on valve and mating pipe for form and cleanliness.
- D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.
- E. Do not attempt to repair defective valves; replace with new valves. Remove defective valves from site.

3.2 INSTALLATION OF VALVES

- A. Install valves with unions or flanges at each piece of equipment arranged to allow space for service, maintenance, and equipment removal without system shutdown.
- B. Provide support to piping adjacent to valves such that no force is imposed upon valves.
- C. Locate valves for easy access.
- D. For valves in horizontal piping, install valves with stem at or above center of pipe.
- E. Install valves in position to allow full valve actuation movement.
- F. Valve Tags: Comply with requirements in Section 220553 "Identification for Plumbing Piping and Equipment" for valve tags and schedules.
- G. Adhere to manufacturer's written installation instructions. When soldering or brazing valves, do not heat valves above maximum permitted temperature. Do not use solder with melting point temperature above valve manufacturer's recommended maximum.
- H. Adjust or replace valve packing after piping systems have been tested and put into service, but before final adjusting and balancing. Replace valves exhibiting leakage.

3.3 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

- A. If valves with specified CWP ratings are unavailable, provide the same types of valves with higher CWP ratings.
- B. Select valves with the following end connections:

1. For Copper Tubing, NPS 2 and Smaller: Threaded ends except where solder-joint valve-end option or press-end option is indicated in valve schedules below.

3.4 DOMESTIC HOT- AND COLD-WATER VALVE SCHEDULE

A. Pipe NPS 2 and Smaller:

1. Brass ball valves, two piece with full port, and brass stainless steel trim. Provide with threaded or solder-joint ends.
2. Bronze ball valves, two piece with full port, and bronze or brass stainless steel trim. Provide with threaded or solder-joint ends.

END OF SECTION 220523.12

SECTION 220719

PLUMBING PIPING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes insulating the following plumbing piping services:
 - 1. Domestic cold-water piping.
 - 2. Domestic hot-water piping.
 - 3. Domestic recirculating hot-water piping.
- B. Related Sections:
 - 1. Section 220716 "Plumbing Equipment Insulation" for equipment insulation.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

1.4 QUALITY ASSURANCE

- A. Comply with the following applicable standards and other requirements specified for miscellaneous components:
 - 1. Supply and Drain Protective Shielding Guards: ICC A117.1.

1.5 COORDINATION

- A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."
- B. Coordinate clearance requirements with piping Installer for piping insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.
- C. Coordinate installation and testing of heat tracing.

1.6 SCHEDULING

- A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products in accordance with ASTM E84, by a testing agency acceptable to authorities having jurisdiction. Factory label insulation, jacket materials, adhesive, mastic, tapes, and cement material containers with appropriate markings of applicable testing agency.
 - 1. All Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.

2.2 INSULATION MATERIALS

- A. Comply with requirements in "Piping Insulation Schedule, General," "Indoor Piping Insulation Schedule," "Outdoor, Aboveground Piping Insulation Schedule," and "Outdoor, Underground Piping Insulation Schedule" articles for where insulating materials shall be applied.
- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Products that come into contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested in accordance with ASTM C871.
- D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable in accordance with ASTM C795.
- E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.
- F. Flexible Elastomeric: Closed-cell or expanded-rubber materials; suitable for maximum use temperature between minus 70 deg F and 220 deg F. Comply with ASTM C534/C534M, Type I for tubular materials.
- G. Mineral Wool, Preformed Pipe: Mandrel-wound mineral wool fibers bonded with a thermosetting resin, unfaced; suitable for maximum use temperature up to 1200 deg F in accordance with ASTM C447. Comply with ASTM C547.
 - 1. Preformed Pipe Insulation: Type II, Grade A with factory-applied ASJ .
 - 2. Fabricated shapes in accordance with ASTM C450 and ASTM C585.

2.3 ADHESIVES

- A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.
- B. Flexible Elastomeric and Polyolefin Adhesive: Solvent-based adhesive.
 - 1. Flame-spread index shall be 25 or less and smoke-developed index shall be 50 or less as tested in accordance with ASTM E84.
 - 2. Wet Flash Point: Below 0 deg F.
 - 3. Service Temperature Range: 40 to 200 deg F.
 - 4. Color: Black.
- C. Glass-Fiber and Mineral Wool Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
- D. ASJ Adhesive and FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A, for bonding insulation jacket lap seams and joints.

2.4 SEALANTS

- A. Materials shall be as recommended by the insulation manufacturer and shall be compatible with insulation materials, jackets, and substrates.
- B. Joint Sealants:
 - 1. Permanently flexible, elastomeric sealant.
 - 2. Service Temperature Range: Minus 58 to plus 176 deg F.
 - 3. Color: White or gray.

2.5 PROTECTIVE SHIELDING GUARDS

- A. Protective Shielding Pipe Covers, :
 - 1. Description: Manufactured plastic wraps for covering plumbing fixture hot- and cold-water supplies and trap and drain piping. Comply with Americans with Disabilities Act (ADA) requirements.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.
- B. Clean and prepare surfaces to be insulated. Before insulating, apply a corrosion coating to insulated surfaces as follows:

1. **Stainless Steel:** Coat 300 series stainless steel with an epoxy primer 5 mils thick and an epoxy finish 5 mils thick if operating in a temperature range of between 140 and 300 deg F. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.
 2. **Carbon Steel:** Coat carbon steel operating at a service temperature of between 32 and 300 deg F with an epoxy coating. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.
- C. Coordinate insulation installation with the tradesman installing heat tracing. Comply with requirements for heat tracing that apply to insulation.
- D. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless steel surfaces, use demineralized water.

3.2 GENERAL INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping, including fittings, valves, and specialties.
- B. Install insulation materials, forms, vapor barriers or retarders, jackets, and of thicknesses required for each item of pipe system, as specified in insulation system schedules.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, compress, or otherwise damage insulation or jacket.
- D. Install insulation with longitudinal seams at top and bottom (12 o'clock and 6 o'clock positions) of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- G. Keep insulation materials dry during storage, application, and finishing. Replace insulation materials that get wet during storage or in the installation process before being properly covered and sealed in accordance with the contract documents, unless otherwise approved by the engineer-of-record.
- H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- I. Install insulation with least number of joints practical.
- J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.

1. Install insulation continuously through hangers and around anchor attachments.
 2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends attached to structure with vapor-barrier mastic.
 3. Install insert materials and insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
 4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.
- K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- L. Install insulation with factory-applied jackets as follows:
1. Draw jacket tight and smooth, but not to the extent of creating wrinkles or areas of compression in the insulation.
 2. Cover circumferential joints with 3-inch-wide strips, of same material as insulation jacket. Secure strips with adhesive and outward-clinching staples along both edges of strip, spaced 4 inches o.c.
 3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward-clinching staples along edge at 4 inches o.c.
 - a. For below-ambient services, apply vapor-barrier mastic over staples.
 4. Cover joints and seams with tape, in accordance with insulation material manufacturer's written instructions, to maintain vapor seal.
 5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.
- M. Cut insulation in a manner to avoid compressing insulation.
- N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches in similar fashion to butt joints.
- P. For above-ambient services, do not install insulation to the following:
1. Vibration-control devices.
 2. Testing agency labels and stamps.
 3. Nameplates and data plates.
 4. Cleanouts.

3.3 PENETRATIONS

- A. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

3.4 GENERAL PIPE INSULATION INSTALLATION

- A. Requirements in this article generally apply to all insulation materials, except where more specific requirements are specified in various pipe insulation material installation articles below.
- B. Insulation Installation on Fittings, Valves, Strainers, Flanges, Mechanical Couplings, and Unions:
 - 1. Install insulation over fittings, valves, strainers, flanges, mechanical couplings, unions, and other specialties with continuous thermal and vapor-retarder integrity unless otherwise indicated.
 - 2. Insulate pipe elbows using preformed fitting insulation made from same material and density as that of adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
 - 3. Insulate tee fittings with preformed fitting insulation of same material and thickness as that used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
 - 4. Insulate valves using preformed fitting insulation of same material, density, and thickness as that used for adjacent pipe. Overlap adjoining pipe insulation by not less than 2 times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
 - 5. Insulate strainers using preformed fitting insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than 2 times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers, so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below-ambient services, provide a design that maintains vapor barrier.
 - 6. Insulate flanges, mechanical couplings, and unions, using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than 2 times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Stencil or label the outside insulation jacket of each union with the word "union" matching size and color of pipe labels.
 - 7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below-ambient services and a breather mastic for above-ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.

8. For services not specified to receive a field-applied jacket, except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing, using PVC tape.
- C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.
 - D. Install removable insulation covers at locations indicated. Installation shall conform to the following:
 1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as that of adjoining pipe insulation.
 2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union at least 2 times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover in place with stainless steel or aluminum bands. Select band material compatible with insulation and jacket.
 3. Construct removable valve insulation covers in same manner as for flanges, except divide the two-part section on the vertical center line of valve body.
 4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.
 5. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.

3.5 INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION

- A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- B. Insulation Installation on Pipe Flanges:
 1. Install pipe insulation to outer diameter of pipe flange.
 2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
 3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as that of pipe insulation.
 4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install sections of pipe insulation and miter if required in accordance with manufacturer's written instructions.
2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install prefabricated valve covers manufactured of same material as that of pipe insulation when available.
2. When prefabricated valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.
4. Secure insulation to valves and specialties, and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.6 INSTALLATION OF GLASS-FIBER AND MINERAL WOOL INSULATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of preformed pipe insulation to pipe with wire or bands, and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with jackets on above-ambient surfaces, secure laps with outward-clinched staples at 6 inches o.c.
4. For insulation with jackets on below-ambient surfaces, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive, as recommended by insulation material manufacturer, and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install prefabricated pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with glass-fiber or mineral-wool blanket insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install prefabricated sections of same material as that of straight segments of pipe insulation when available.

2. When prefabricated insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.
- D. Insulation Installation on Valves and Pipe Specialties:
1. Install prefabricated sections of same material as that of straight segments of pipe insulation when available.
 2. When prefabricated sections are not available, install fabricated sections of pipe insulation to valve body.
 3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
 4. Install insulation to flanges as specified for flange insulation application.

3.7 FINISHES

- A. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.
- B. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.
- C. Do not field paint aluminum or stainless steel jackets.

3.8 PIPING INSULATION SCHEDULE, GENERAL

- A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.
- B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:
 1. Drainage piping located in crawl spaces.
 2. Underground piping.
 3. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

3.9 INDOOR PIPING INSULATION SCHEDULE

- A. Domestic Cold Water:
 1. NPS 1 and Smaller: Insulation shall be one of the following:
 - a. Flexible Elastomeric: 1/2 inch thick.
 - b. Mineral Wool, Preformed Pipe Insulation, Type II: 1/2 inch thick.
 2. NPS 1-1/4 and Larger: Insulation shall be one of the following:
 - a. Flexible Elastomeric: 1 inch thick.
 - b. Mineral Wool, Preformed Pipe Insulation, Type II: 1 inch thick.
- B. Domestic Hot and Recirculated Hot Water:

1. NPS 1-1/4 and Smaller: Insulation shall be one of the following:
 - a. Flexible Elastomeric: 1inch thick.
 - b. Mineral Wool, Preformed Pipe Insulation, Type II: 1 inch thick.
2. NPS 1-1/2 and Larger: Insulation shall be one of the following:
 - a. Flexible Elastomeric: 1-1/2inch thick.
 - b. Mineral Wool, Preformed Pipe Insulation, Type II: 1-1/2 inch thick.

END OF SECTION 220719

SECTION 221116

DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Copper tube and fittings - domestic water.
2. PEX tube and fittings - domestic water.
3. Piping joining materials - domestic water.
4. Dielectric fittings - domestic water.

B. Related Requirements:

1. Section 331415 "Site Water Distribution Piping" for water-service piping outside the building from source to the point where water-service piping enters the building.

1.2 ACTION SUBMITTALS

A. Product data.

1.3 INFORMATIONAL SUBMITTALS

1.4 QUALITY ASSURANCE

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Domestic water piping, tubing, fittings, joints, and appurtenances intended to convey or dispense water for human consumption are to comply with the U.S. Safe Drinking Water Act, with requirements of authorities having jurisdiction, and with NSF 61 and NSF 372, or be certified in compliance with NSF 61 and NSF 372 by an ANSI-accredited third-party certification body, in that the weighted average lead content at wetted surfaces is less than or equal to 0.25 percent.

2.2 PIPING MATERIALS

- A. Potable-water piping and components are to comply with NSF 14, NSF 61, and NSF 372. Include marking "NSF-pw" on piping.

2.3 COPPER TUBE AND FITTINGS - DOMESTIC WATER

- A. Drawn-Temper Copper Tube: ASTM B88, Type L .
- B. Cast-Copper, Solder-Joint Fittings: ASME B16.18, pressure fittings. Do not use solder joints on pipe sizes greater than NPS 4.
- C. Wrought-Copper, Solder-Joint Fittings: ASME B16.22, pressure fittings. Do not use solder joints on pipe sizes greater than NPS 4.

2.4 PEX TUBE AND FITTINGS - DOMESTIC WATER

- A. PEX Tube - Domestic Water:
 - 1. Tube Material: PEX plastic in accordance with ASTM F876 and ASTM F877.
- B. PEX Tube Fittings - Domestic Water:
 - 1. Fittings: ASTM F1807, metal insert and copper crimp rings.
 - 2. Push-Fit Fittings: ASSE 1061, push-fit fittings.

2.5 PIPING JOINING MATERIALS - DOMESTIC WATER

- A. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.
- B. Solder Filler Metals: ASTM B32, lead-free alloys.
- C. Flux: ASTM B813, water flushable.
- D. Brazing Filler Metals: AWS A5.8M/A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.

2.6 DIELECTRIC FITTINGS - DOMESTIC WATER

- A. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.
- B. Dielectric Unions - Domestic Water:
 - 1. Standard: ASSE 1079.
 - 2. Pressure Rating: 125 psig minimum at 180 deg F.

3. End Connections: Solder-joint copper alloy and threaded ferrous.
- C. Dielectric Nipples - Domestic Water:
1. Standard: IAPMO PS 66.
 2. Electroplated steel nipple complying with ASTM F1545.
 3. Pressure Rating and Temperature: 300 psig at 225 deg F.
 4. End Connections: Male threaded or grooved.
 5. Lining: Inert and noncorrosive, propylene.

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS

- A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.
- B. Flanges and unions may be used for aboveground piping joints unless otherwise indicated.
- C. Fitting Option: Extruded-tee connections and brazed joints may be used on aboveground copper tubing.
- D. Aboveground domestic water piping, NPS 2 (DN 50) and smaller is to be the following:
 1. Drawn-temper copper tube, ASTM B88, Type L ; cast- or wrought-copper, solder-joint fittings; and soldered joints.
- E. Aboveground domestic water piping, NPS 2-1/2 to NPS 4 (DN 65 to DN 100) is to be the following:
 1. Drawn-temper copper tube, ASTM B88, Type L ; cast- or wrought-copper, solder-joint fittings; and brazed joints.
- F. Below ground domestic water piping is to be the following:
 1. Annealed-temper copper tube, ASTM B88, Type L; wrought-copper, solder-joint fittings; and brazed joints.

3.2 INSTALLATION OF PIPING

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.
- B. Install copper tubing under building slab in accordance with CDA's "Copper Tube Handbook."

- C. Install underground copper tube and ductile-iron pipe in PE encasement in accordance with ASTM A674 or AWWA C105/A21.5.
- D. Install valves in accordance with the following:
 - 1. Section 220523.12 "Ball Valves for Plumbing Piping."
 - 2. Section 220523.13 "Butterfly Valves for Plumbing Piping."
 - 3. Section 220523.14 "Check Valves for Plumbing Piping."
 - 4. Section 220523.15 "Gate Valves for Plumbing Piping."
- E. Install domestic water piping level and plumb.
- F. Rough-in domestic water piping for water-meter installation in accordance with utility company's requirements.
- G. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.
- H. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- I. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.
- J. Install piping to permit valve servicing.
- K. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than the system pressure rating used in applications below unless otherwise indicated.
- L. Install piping free of sags and bends.
- M. Install fittings for changes in direction and branch connections.
- N. Install PEX tube with loop at each change of direction of more than 90 degrees.
- O. Install unions in copper tubing at final connection to each piece of equipment, machine, and specialty.
- P. Install escutcheons for piping penetrations of walls, ceilings, and floors.

3.3 JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.

- C. Threaded Joints: Thread pipe with tapered pipe threads in accordance with ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.
- D. Brazed Joints for Copper Tubing: Comply with CDA's "Copper Tube Handbook," "Braze Joints" chapter.
- E. Soldered Joints for Copper Tubing: Apply ASTM B813, water-flushable flux to end of tube. Join copper tube and fittings in accordance with ASTM B828 or CDA's "Copper Tube Handbook."
- F. Joints for PEX Tubing, ASTM: Join in accordance with ASTM F1807 for metal insert and copper crimp ring fittings and ASTM F1960 for cold expansion fittings and reinforcing rings.
- G. Joints for Dissimilar-Material Piping: Make joints using adapters compatible with materials of both piping systems.

3.4 INSTALLATION OF DIELECTRIC FITTINGS

- A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
- B. Dielectric Fittings for NPS 2 (DN 50) and Smaller: Use dielectric couplings or nipples unions.
- C. Dielectric Fittings for NPS 2-1/2 to NPS 4 (DN 65 to DN 100): Use dielectric nipples.
- D. Dielectric Fittings for NPS 5 (DN 125) and Larger: Use dielectric flange kits.

3.5 INSTALLATION OF HANGERS AND SUPPORTS

- A. Comply with requirements for hangers, supports, and anchor devices in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."
- B. Install hangers for copper tube and pipe, with maximum horizontal spacing and minimum rod diameters, to comply with MSS SP-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
- C. Install vinyl-coated hangers for PEX tube, with maximum horizontal spacing and minimum rod diameters, to comply with manufacturer's written instructions, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
- D. Support horizontal piping within 12 inches of each fitting.

- E. Support vertical runs of copper tube and pipe to comply with MSS SP-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
- F. Support vertical runs of PEX tube to comply with manufacturer's written instructions, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

3.6 PIPING CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. When installing piping adjacent to equipment and machines, allow space for service and maintenance.
- C. Connect domestic water piping to exterior water-service piping. Use transition fitting to join dissimilar piping materials.
- D. Connect domestic water piping to water-service piping with shutoff valve; extend and connect to the following:
 - 1. Water Heaters: Cold-water inlet and hot-water outlet piping in sizes indicated, but not smaller than sizes of water heater connections.
 - 2. Plumbing Fixtures: Cold- and hot-water-supply piping in sizes indicated, but not smaller than that required by plumbing code.
 - 3. Equipment: Cold- and hot-water-supply piping as indicated, but not smaller than equipment connections. Provide shutoff valve and union for each connection. Use flanges instead of unions for NPS 2-1/2 and larger.

3.7 IDENTIFICATION

- A. Identify system components. Comply with requirements for identification materials and installation in Section 220553 "Identification for Plumbing Piping and Equipment."

3.8 CLEANING

- A. Clean and disinfect potable domestic water piping as follows:
 - 1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
 - 2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:
 - a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
 - b. Fill and isolate system in accordance with either of the following:
 - 1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours.

- 2) Fill system or part thereof with water/chlorine solution with at least 200 ppm of chlorine. Isolate and allow to stand for three hours.
 - c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
 - d. Repeat procedures if biological examination shows contamination.
 - e. Submit water samples in sterile bottles to authorities having jurisdiction.
- B. Clean non-potable domestic water piping as follows:
1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
 2. Use purging procedures prescribed by authorities having jurisdiction or; if methods are not prescribed, follow procedures described below:
 - a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
 - b. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedures if biological examination shows contamination.
- C. Prepare and submit reports of purging and disinfecting activities. Include copies of water-sample approvals from authorities having jurisdiction.
- D. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

3.9 ADJUSTING

- A. Perform the following adjustments before operation:
1. Close drain valves, hydrants, and hose bibbs.
 2. Open shutoff valves to fully open position.
 3. Open throttling valves to proper setting.
 4. Adjust balancing valves in hot-water-circulation return piping to provide adequate flow.
 - a. Manually adjust ball-type balancing valves in hot-water-circulation return piping to provide hot-water flow in each branch.
 - b. Adjust calibrated balancing valves to flows indicated.
 5. Remove plugs used during testing of piping and for temporary sealing of piping during installation.
 6. Remove and clean strainer screens. Close drain valves and replace drain plugs.
 7. Remove filter cartridges from housings and verify that cartridges are as specified for application where used and are clean and ready for use.
 8. Check plumbing specialties and verify proper settings, adjustments, and operation.

END OF SECTION 221116

SECTION 221119

DOMESTIC WATER PIPING SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Water-hammer arresters.

B. Related Requirements:

1. Section 221116 "Domestic Water Piping" for water meters.

1.2 ACTION SUBMITTALS

- ##### A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

1.4 CLOSEOUT SUBMITTALS

- ##### A. Operation and maintenance data.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR PIPING SPECIALTIES

- ##### A. Domestic water piping specialties intended to convey or dispense water for human consumption are to comply with the SDWA, requirements of authorities having jurisdiction, and NSF 61 and NSF 372, or to be certified in compliance with NSF 61 and NSF 372 by an American National Standards Institute (ANSI)-accredited third-party certification body that the weighted average lead content at wetted surfaces is less than or equal to 0.25 percent.

2.2 WATER-HAMMER ARRESTERS

A. Water-Hammer Arresters:

1. Standard: ASSE 1010 or PDI-WH 201.
2. Type: Piston.

3. Size: ASSE 1010, Sizes AA and A through F, or PDI-WH 201, Sizes A through F.

PART 3 - EXECUTION

3.1 INSTALLATION OF PIPING SPECIALTIES

- A. Water-Hammer Arresters: Install in water piping in accordance with PDI-WH 201.
- B. Supply-Type, Trap-Seal Primer Device: Install with outlet piping pitched down toward drain trap a minimum of 1 percent, and connect to floor-drain body, trap, or inlet fitting. Adjust valve for proper flow.
- C. Drainage-Type, Trap-Seal Primer Device: Install as lavatory trap with outlet piping pitched down toward drain trap a minimum of 1 percent, and connect to floor-drain body, trap, or inlet fitting.

3.2 PIPING CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. When installing piping specialties adjacent to equipment and machines, allow space for service and maintenance.

3.3 ELECTRICAL CONNECTIONS

- A. Connect wiring in accordance with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- B. Ground equipment in accordance with Section 260526 "Grounding and Bonding for Electrical Systems."
- C. Install electrical devices furnished by manufacturer, but not factory mounted, in accordance with NFPA 70 and NECA 1.

3.4 CONTROL CONNECTIONS

- A. Connect control wiring in accordance with Section 260523 "Control-Voltage Electrical Power Cables."

3.5 ADJUSTING

- A. Set field-adjustable pressure set points of water pressure-reducing valves.
- B. Set field-adjustable flow set points of balancing valves.

- C. Set field-adjustable temperature set points of temperature-actuated, water mixing valves.
- D. Adjust each reduced-pressure-principle backflow preventer in accordance with manufacturer's written instructions, authorities having jurisdiction and the device's reference standard.

3.6 FIELD QUALITY CONTROL

- A. Testing Agency: a qualified testing agency to perform tests and inspections.
- B. Perform the following tests and inspections.
 - 1. Test each reduced-pressure-principle backflow preventer according to authorities having jurisdiction and the device's reference standard.
 - 2. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
 - 3. Operational Test: After electrical circuitry has been energized, start units to confirm unit operation.
 - 4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- C. Domestic water piping specialties will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

END OF SECTION 221119

SECTION 221316

SANITARY WASTE AND VENT PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. PVC pipe and fittings.

1.2 ACTION SUBMITTALS

A. Product data.

1.3 INFORMATIONAL SUBMITTALS

1.4 WARRANTY

- A. Listed manufacturers to provide labeling and warranty of their respective products.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Components and installation are capable of withstanding the following minimum working pressure unless otherwise indicated:

1. Soil, Waste, and Vent Piping: 10 ft. head of water.

2.2 PIPING MATERIALS

- A. Piping materials to bear label, stamp, or other markings of specified testing agency.
- B. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

2.3 PVC PIPE AND FITTINGS

- A. Comply with NSF 14 for plastic piping components. Include "NSF-dwv" marking for plastic drain, waste, and vent piping and "NSF-sewer" marking for plastic sewer piping.
- B. Solid-Wall PVC Pipe: ASTM D2665 drain, waste, and vent.
- C. PVC Socket Fittings: ASTM D2665, made in accordance with ASTM D3311, drain, waste, and vent patterns and to fit Schedule 40 pipe.
- D. Adhesive Primer: ASTM F656.
- E. Solvent Cement: ASTM D2564.

2.4 SPECIALTY PIPE FITTINGS

A. Transition Couplings:

- 1. General Requirements: Fitting or device for joining piping with small differences in ODs or of different materials. Include end connections of same size as and compatible with pipes to be joined.
- 2. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.
- 3. Unshielded, Nonpressure Transition Couplings:
 - a. Standard: ASTM C1173.
 - b. Description: Elastomeric, sleeve-type, reducing or transition pattern. Include shear ring and corrosion-resistant-metal tension band and tightening mechanism on each end.
 - c. End Connections: Same size as and compatible with pipes to be joined.
 - d. Sleeve Materials:
 - 1) For Cast-Iron Soil Pipes: ASTM C564, rubber.
 - 2) For Plastic Pipes: ASTM F477, elastomeric seal or ASTM D5926 PVC.
 - 3) For Dissimilar Pipes: ASTM D5926 PVC or other material compatible with pipe materials being joined.
- 4. Shielded, Nonpressure Transition Couplings:
 - 1) Standard: ASTM C1460.
 - 2) Description: Elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.
 - 3) End Connections: Same size as and compatible with pipes to be joined.

PART 3 - EXECUTION

3.1 EARTH MOVING

- A. Comply with requirements for excavating, trenching, and backfilling specified in Section 312000 "Earth Moving."

3.2 INSTALLATION OF PIPING

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems.
 - 1. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations.
 - 2. Install piping as indicated unless deviations to layout are approved on coordination drawings.
- B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
- C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- E. Install piping to permit valve servicing.
- F. Install piping at indicated slopes.
- G. Install piping free of sags and bends.
- H. Install fittings for changes in direction and branch connections.
- I. Install piping to allow application of insulation.
- J. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends.
 - 1. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical.
 - 2. Use long-turn, double Y-branch, and 1/8-bend fittings if two fixtures are installed back to back or side by side with common drain pipe.
 - a. Straight tees, elbows, and crosses may be used on vent lines.
 - 3. Do not change direction of flow more than 90 degrees.
 - 4. Use proper size of standard increasers and reducers if pipes of different sizes are connected.
 - a. Reducing size of waste piping in direction of flow is prohibited.

- K. Lay buried building waste piping beginning at low point of each system.
1. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream.
 2. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.
 3. Maintain swab in piping and pull past each joint as completed.
- L. Install soil and waste and vent piping at the following minimum slopes unless otherwise indicated:
1. Building Sanitary Waste: Two percent downward in direction of flow for piping NPS 3 and smaller; 1/8 inch per foot downward in direction of flow for piping NPS 4 and larger.
 2. Horizontal Sanitary Waste Piping: 1/8 inch per foot downward in direction of flow.
 3. Vent Piping: One percent down toward vertical fixture vent or toward vent stack.
- M. Install aboveground PVC piping in accordance with ASTM D2665.
- N. Install underground PVC piping in accordance with ASTM D2321.
- O. Plumbing Specialties:
1. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers in sanitary waste gravity-flow piping.
 - a. Install cleanout fitting with closure plug inside the building in sanitary drainage force-main piping.
 - b. Comply with requirements for cleanouts specified in Section 221319 "Sanitary Waste Piping Specialties."
 2. Install drains in sanitary waste gravity-flow piping.
 - a. Comply with requirements for drains specified in Section 221319 "Sanitary Waste Piping Specialties."
- P. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.
- Q. Install escutcheons for piping penetrations of walls, ceilings, and floors.

3.3 JOINT CONSTRUCTION

- A. Plastic, Nonpressure-Piping, Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings in accordance with the following:
1. Comply with ASTM F402 for safe-handling practice of cleaners, primers, and solvent cements.
 2. PVC Piping: Join in accordance with ASTM D2855 and ASTM D2665 appendixes.

3.4 INSTALLATION OF SPECIALTY PIPE FITTING

A. Transition Couplings:

1. Install transition couplings at joints of piping with small differences in ODs.
2. Belowground Waste Drainage Piping: Unshielded, nonpressure transition couplings.
3. Aboveground Waste Drainage Piping: Shielded, nonpressure transition couplings.

3.5 INSTALLATION OF HANGERS AND SUPPORTS

A. Comply with requirements for pipe hanger and support devices and installation specified in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment".

1. Install carbon-steel pipe hangers for horizontal piping in noncorrosive environments.
 2. Install stainless steel pipe hangers for horizontal piping in corrosive environments.
 3. Install carbon-steel pipe support clamps for vertical piping in noncorrosive environments.
 4. Install stainless steel pipe support clamps for vertical piping in corrosive environments.
 5. Vertical Piping: MSS Type 8 or Type 42 clamps.
 6. Install individual, straight, horizontal piping runs:
 - a. 100 Ft. (30 m) and Less: MSS Type 1, adjustable, steel clevis hangers.
 - b. Longer Than 100 Ft. (30 m): MSS Type 43, adjustable roller hangers.
 - c. Longer Than 100 Ft. (30 m) if Indicated: MSS Type 49, spring cushion rolls.
 7. Multiple, Straight, Horizontal Piping Runs 100 Ft. (30 m) or Longer: MSS Type 44 pipe rolls. Support pipe rolls on trapeze.
 8. Base of Vertical Piping: MSS Type 52 spring hangers.
- B. Install hangers for cast-iron soil piping, with maximum horizontal spacing and minimum rod diameters, to comply with MSS SP-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
- C. Install hangers for PVC piping, with maximum horizontal spacing and minimum rod diameters, to comply with manufacturer's written instructions, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
- D. Support horizontal piping and tubing within 12 inches of each fitting and coupling.
- E. Support vertical runs of cast-iron soil piping to comply with MSS SP-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
- F. Support vertical runs of PVC piping to comply with manufacturer's written instructions, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

3.6 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.
- C. Connect waste and vent piping to the following:
 - 1. Plumbing Fixtures: Connect waste piping in sizes indicated, but not smaller than required by plumbing code.
 - 2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.
 - 3. Plumbing Specialties: Connect waste and vent piping in sizes indicated, but not smaller than required by plumbing code.
 - 4. Install test tees (wall cleanouts) in conductors near floor and floor cleanouts with cover flush with floor.
 - 5. Comply with requirements for cleanouts and drains specified in Section 221319 "Sanitary Waste Piping Specialties."
 - 6. Equipment: Connect waste piping as indicated.
 - a. Provide shutoff valve if indicated and union for each connection.
 - b. Use flanges instead of unions for connections NPS 2-1/2 and larger.
- D. Where installing piping adjacent to equipment, allow space for service and maintenance of equipment.
- E. Make connections in accordance with the following unless otherwise indicated:
 - 1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
 - 2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.

3.7 IDENTIFICATION

- A. Identify exposed sanitary waste and vent piping.
- B. Comply with requirements for identification specified in Section 220553 "Identification for Plumbing Piping and Equipment."

3.8 FIELD QUALITY CONTROL

- A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.
 - 1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.

2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
- B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.
 - C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
 - D. Test sanitary waste and vent piping in accordance with procedures of authorities having jurisdiction or, in absence of published procedures, as follows:
 1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired.
 - a. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
 2. Leave uncovered and unconcealed new, altered, extended, or replaced waste and vent piping until it has been tested and approved.
 - a. Expose work that was covered or concealed before it was tested.
 3. Roughing-in Plumbing Test Procedure: Test waste and vent piping except outside leaders on completion of roughing-in.
 - a. Close openings in piping system and fill with water to point of overflow, but not less than 10 ft. head of water.
 - b. From 15 minutes before inspection starts to completion of inspection, water level must not drop.
 - c. Inspect joints for leaks.
 4. Finished Plumbing Test Procedure: After plumbing fixtures have been set and traps filled with water, test connections and prove they are gastight and watertight.
 - a. Plug vent-stack openings on roof and building drains where they leave building. Introduce air into piping system equal to pressure of 1 inch wg.
 - b. Use U-tube or manometer inserted in trap of water closet to measure this pressure.
 - c. Air pressure must remain constant without introducing additional air throughout period of inspection.
 - d. Inspect plumbing fixture connections for gas and water leaks.
 5. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
 6. Prepare reports for tests and required corrective action.

3.9 PIPING SCHEDULE

- A. Flanges and unions may be used on aboveground pressure piping unless otherwise indicated.
- B. Aboveground, soil and waste piping NPS 6 and smaller are to be any of the following:
 1. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
- C. Aboveground, vent piping NPS 4 and smaller is to be any of the following:

1. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
- D. Underground, soil, waste, and vent piping NPS 4 and smaller are to be any of the following:
1. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
- E. Underground, soil and waste piping NPS 5 and larger are to be any of the following:
1. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.

END OF SECTION 221316

SECTION 221319

SANITARY WASTE PIPING SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cleanouts.
2. Miscellaneous sanitary drainage piping specialties.

B. Related Requirements:

1. Section 076200 "Sheet Metal Flashing and Trim" for metal roof flashing assemblies.
2. Section 077200 "Roof Accessories" for preformed flashings.
3. Section 078413 "Penetration Firestopping" for through-penetration firestop assemblies.

1.2 ACTION SUBMITTALS

- ###### A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

1.4 CLOSEOUT SUBMITTALS

PART 2 - PRODUCTS

2.1 ASSEMBLY DESCRIPTIONS

- ###### A. Sanitary waste piping specialties shall bear label, stamp, or other markings of specified testing agency.
- ###### B. Comply with NSF 14 for plastic sanitary waste piping specialty components.

2.2 CLEANOUTS

A. Cast-Iron Exposed Cleanouts:

1. Standard: ASME A112.36.2M.

2. Size: Same as connected drainage piping.
 3. Body Material: as required to match connected piping.
 4. Closure: Raised-head , brass plug.
 5. Closure Plug Size: Same as or not more than one size smaller than cleanout size.
- B. Cast-Iron Exposed Floor Cleanouts:
1. Standard: ASME A112.36.2M for adjustable housing heavy-duty, adjustable housing cleanout.
 2. Size: Same as connected branch.
 3. Type: Adjustable housing.
 4. Body or Ferrule: Cast iron.
 5. Clamping Device: Required.
 6. Outlet Connection: Inside calk.
 7. Closure: Brass plug with tapered threads.
 8. Adjustable Housing Material: Cast iron with setscrews or other device.
 9. Frame and Cover Material and Finish: Nickel-bronze, copper alloy.
 10. Frame and Cover Shape: Round.
 11. Top-Loading Classification: Medium Duty.
 12. Riser: ASTM A74, Service Class, cast-iron drainage pipe fitting and riser to cleanout.

2.3 MISCELLANEOUS SANITARY DRAINAGE PIPING SPECIALTIES

- A. Floor-Drain, Inline Trap Seal:
1. Description: Inline floor drain trap seal, forming a physical barrier to slow trap evaporation while not impeding flow from drain.
 2. Material: Polymer.
 3. Standard: Tested and certified in accordance with ASSE 1072.
 4. Listing: ICC-ES or IAPMO listed.
 5. Size: Same as floor drain outlet or strainer throat.
- B. Vent Caps:
1. Description: Cast-iron body with threaded or hub inlet and vandal-proof design. Include vented hood and setscrews to secure to vent pipe.
 2. Size: Same as connected stack vent or vent stack.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install cleanouts in aboveground piping and building drain piping according to the following, unless otherwise indicated:

1. Size same as drainage piping up to NPS 4. Use NPS 4 for larger drainage piping unless larger cleanout is indicated.
 2. Locate at each change in direction of piping greater than 45 degrees.
 3. Locate at minimum intervals of 50 feet for piping NPS 4 and smaller and 100 feet for larger piping.
 4. Locate at base of each vertical soil and waste stack.
- B. For floor cleanouts for piping below floors, install cleanout deck plates with top flush with finished floor.
- C. For cleanouts located in concealed piping, install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall.
- D. Install deep-seal traps on floor drains and other waste outlets, if indicated.
- E. Install floor-drain, trap-seal primer fittings on inlet to floor drains that require trap-seal primer connection.
1. Exception: Fitting may be omitted if trap has trap-seal primer connection.
 2. Size: Same as floor drain inlet.
- F. Install air-gap fittings on draining-type backflow preventers and on indirect-waste piping discharge into sanitary drainage system.
- G. Install sleeve and sleeve seals with each riser and stack passing through floors with waterproof membrane.
- H. Install vent caps on each vent pipe passing through roof.
- I. Install wood-blocking reinforcement for wall-mounting-type specialties.
- J. Install traps on plumbing specialty drain outlets. Omit traps on indirect wastes unless trap is indicated.

3.2 PIPING CONNECTIONS

- A. Comply with requirements in Section 221316 "Sanitary Waste and Vent Piping" for piping installation requirements. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to equipment, to allow service and maintenance.

3.3 PROTECTION

- A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.
- B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

END OF SECTION 221319

SECTION 221319.13

SANITARY DRAINS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Floor drains.

1.2 DEFINITIONS

- A. ABS: Acrylonitrile-butadiene styrene.
- B. FRP: Fiberglass-reinforced plastic.
- C. HDPE: High-density polyethylene.
- D. PE: Polyethylene.
- E. PP: Polypropylene.
- F. PVC: Polyvinyl chloride.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 DRAIN ASSEMBLIES

- A. Sanitary drains shall bear label, stamp, or other markings of specified testing agency.
- B. Comply with NSF 14 for plastic sanitary piping specialty components.

2.2 FLOOR DRAINS

- A. Refer to schedule on drawings.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install floor drains at low points of surface areas to be drained. Set grates of drains flush with finished floor, unless otherwise indicated.
 - 1. Position floor drains for easy access and maintenance.
 - 2. Set floor drains below elevation of surrounding finished floor to allow floor drainage.
 - 3. Set with grates depressed according to the following drainage area radii:
 - a. Radius, 30 Inches or Less: Equivalent to 1 percent slope, but not less than 1/4-inch total depression.
 - b. Radius, 30 to 60 Inches: Equivalent to 1 percent slope.
 - c. Radius, 60 Inches or Larger: Equivalent to 1 percent slope, but not greater than 1-inch total depression.
 - 4. Install floor-drain flashing collar or flange, so no leakage occurs between drain and adjoining flooring.
 - a. Maintain integrity of waterproof membranes where penetrated.
 - 5. Install individual traps for floor drains connected to sanitary building drain, unless otherwise indicated.

3.2 CONNECTIONS

- A. Comply with requirements in Section 221316 "Sanitary Waste and Vent Piping" for piping installation requirements. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Comply with requirements in Section 221319 "Sanitary Waste Piping Specialties" for backwater valves, air admittance devices and miscellaneous sanitary drainage piping specialties.
- C. Comply with requirements in Section 221323 "Sanitary Waste Interceptors" for grease interceptors, grease-removal devices, oil interceptors, sand interceptors, and solid interceptors.
- D. Install piping adjacent to equipment to allow service and maintenance.
- E. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."
- F. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

3.3 LABELING AND IDENTIFYING

- A. Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in

addition to identifying unit. Nameplates and signs are specified in Section 220553 "Identification for Plumbing Piping and Equipment."

3.4 PROTECTION

- A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.
- B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

END OF SECTION 221319.13

SECTION 224200

COMMERCIAL PLUMBING FIXTURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Commercial lavatories.
 - 2. Commercial sinks.
 - 3. Commercial water closets.
 - 4. Toilet seats.
 - 5. Fixture carriers.

1.2 ACTION SUBMITTALS

- A. Product data.

1.3 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Lavatory faucets, sink faucets, shower valves, and wash fountain spray heads and faucets intended to convey or dispense water for human consumption are to comply with the U.S. Safe Drinking Water Act (SDWA), with requirements of the Authority Having Jurisdiction (AHJ), and with NSF 61 and NSF 372, or be certified in compliance with NSF 61 and NSF 372 by an ANSI-accredited third-party certification body, in that the weighted average lead content at wetted surfaces is less than or equal to 0.25 percent.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 COMMERCIAL LAVATORIES

- A. Lavatories, Counter Mounted:
 - 1. Lavatories, Wall Mounted - Vitreous China, Self-Rimming, Oval or Round:

- a. Fixture:
 - 1) Standard: ASME A112.19.2/CSA B45.1.
 - 2) Type: Self-rimming for above-counter mounting.
 - 3) Nominal Size: See Drawings.
 - 4) Faucet-Hole Punching: Coordinate with faucet specified for each lavatory.
 - 5) Faucet-Hole Location: Top.
 - 6) Color: White.
 - 7) Mounting Material: Sealant.
- b. Faucet: See schedule on Drawings.

B. Lavatories, Wall Mounted:

- 1. Lavatories, Wall Mounted - Vitreous China, Rectangular, Wheelchair:
 - a. Fixture:
 - 1) Standard: ASME A112.19.2/CSA B45.1.
 - 2) Type: Wheelchair.
 - 3) Nominal Size: See Drawings.
 - 4) Faucet-Hole Punching: Coordinate with faucet specified for each lavatory.
 - 5) Faucet-Hole Location: Top.
 - 6) Color: White.
 - 7) Mounting: For concealed-arm carrier.
 - b. Faucet: See schedule on Drawings.
 - c. Support: Lavatory carrier, floor affixed with steel uprights, concealed-arm.
 - d. Lavatory Mounting Height: Accessible in accordance with ICC A117.1.

C. Lavatory Faucets, Manually Operated:

- 1. Delta or approved equal.
- 2. Standard: ASME A112.18.1/CSA B125.1.
- 3. Operation Type: Single control, mixing, Commercial.
- 4. General: Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture hole punchings; coordinate outlet with spout and fixture receptor.
- 5. Body Type: Centerset.
- 6. Body Material: Commercial, solid-brass, or die-cast housing with brazed copper and brass waterway.
- 7. Finish: Polished chrome plate.
- 8. Maximum Flow Rate: 0.5 gpm.
- 9. Mounting Type: Deck, concealed.
- 10. Valve Handle(s): Single lever.
- 11. Spout: Rigid type.
- 12. Spout Outlet: Aerator.
- 13. Operation: Compression, manual.
- 14. Drain: Not part of faucet.

D. Lavatory Supply Fittings:

1. NSF Standard: Comply with NSF 61 and NSF 372 for supply-fitting materials that will be in contact with potable water.
2. Standard: ASME A112.18.1/CSA B125.1.
3. Supply Piping: Chrome-plated-brass pipe or chrome-plated copper tube matching water-supply piping size. Include chrome-plated-brass or stainless steel wall flange.
4. Supply Stops: Chrome-plated-brass, one-quarter-turn, ball-type or compression valve with inlet connection matching supply piping.
5. Operation: Wheel handle.
6. Risers: See schedule on Drawings.

E. Lavatory Waste Fittings: See schedule on Drawings.

2.3 Urinals, Wall Hung:

A. Urinals, Wall Hung - Back Outlet, Siphon Jet:

B. American STD, ProFlo, Kohler, Zurn.

C. Fixture:

1. Standards:
 - a. ASME A112.19.2/CSA B45.1.
 - b. ASME A112.19.5/CSA B45.15.
2. Material: Vitreous china.
3. Type: Siphon jet.
4. Strainer or Trapway: Manufacturer's standard strainer with integral trap.
5. Water Consumption: 0.125 gpf.
6. Spud Size and Location: NPS 3/4; top.
7. Outlet Size and Location: NPS 2; back.
8. Color: White.

D. Flushometer Valve: Refer to schedule on Drawings.

E. Waste Fitting:

1. Standard: ASME A112.18.2/CSA B125.2 for coupling.
2. Size: NPS 2.

F. Support: Urinal carrier, floor affixed with steel uprights with fixture support plates and coupling with seal and fixture bolts and hardware matching fixture.

G. Urinal Mounting Height: Standard.

2.4 COMMERCIAL WATER CLOSETS

A. Water Closets, Floor Mounted – Closed-coupled flushometer tank:

1. Water Closets, Floor Mounted - Bottom Outlet, Top Spud:

- a. American STD, ProFlo, Kohler, Zurn.
- b. Source Limitations: Obtain water closets from single source from single manufacturer.
- c. Standard: ASME A112.19.2/CSA B45.1.
- d. Bowl:
 - 1) Material: Vitreous china.
 - 2) Type: Siphon jet.
 - 3) Style: Flushometer tank, pressure assisted.
 - 4) Height: Accessible in accordance with ICC A117.1.
 - 5) Rim Contour: Elongated.
 - 6) Water Consumption: 1.28 gal. per flush.
 - 7) Color: White.

2.5 TOILET SEATS

A. Toilet Seats:

1. Source Limitations: Obtain toilet seat from single source from single manufacturer.
2. Standard: IAPMO/ANSI Z124.5.
3. Material: Plastic.
4. Type: Commercial (Heavy duty).
5. Shape: Elongated rim, open front.
6. Hinge: Self-sustaining, check.
7. Hinge Material: Noncorroding metal.
8. Seat Cover: Not required.
9. Color: White.
10. Surface Treatment: Not required.

2.6 FIXTURE CARRIERS

A. Fixture Carriers - Lavatory:

1. Source Limitations: Obtain lavatory carriers from single source from single manufacturer.
2. Standards:
 - a. ASME A112.6.1M.
 - b. ASME A112.6.2.

B. Fixture Carriers - Urinal:

1. Source Limitations: Obtain urinal carriers from single source from single manufacturer.
2. Standard: ASME A112.6.1M.
3. Description: Waste-fitting assembly, as required to match drainage piping material and arrangement with faceplates, couplings, gaskets, and feet; bolts and hardware matching fixture.

PART 3 - EXECUTION

3.1 INSTALLATION OF COMMERCIAL PLUMBING FIXTURES

A. Lavatory Installation:

1. Install lavatories level and plumb in accordance with roughing-in drawings.
2. Install supports, affixed to building substrate, for wall-mounted lavatories.
3. Install accessible, wall-mounted lavatories at mounting height in accordance with ICC A117.1.
4. Install water-supply piping with stop on each supply to each lavatory faucet. Install stops in locations that are accessible for ease of operation.
5. Install trap and waste piping on each drain outlet of each lavatory to be connected to sanitary drainage system.
6. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Use deep-pattern escutcheons if required to conceal protruding fittings. Comply with escutcheon requirements specified in Section 220500 "Common Work Results for Plumbing."
7. Seal joints between lavatories, counters, and walls using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Comply with sealant requirements specified in Section 079200 "Joint Sealants."
8. Install protective shielding pipe covers and enclosures on exposed supplies and waste piping of accessible lavatories. Comply with requirements in Section 220719 "Plumbing Piping Insulation."

B. Sink Installation:

1. Install sinks level and plumb in accordance with roughing-in drawings.
2. Install supports, affixed to building substrate, for wall-mounted sinks.
3. Install accessible, wall-mounted sinks at mounting height in accordance with ICC A117.1.
4. Set floor-mounted sinks in leveling bed of cement grout.
5. Install water-supply piping with stop on each supply to each sink faucet.
 - a. Exception: Use ball or gate valves if supply stops are not specified with sink. Comply with valve requirements specified in Section 220523 "General Duty Valves for Plumbing Piping."
 - b. Install stops/valves in locations that are accessible for ease of operation.
6. Install trap and waste piping on each drain outlet of each sink to be connected to sanitary drainage system.
7. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Use deep-pattern escutcheons if required to conceal protruding fittings. Comply with escutcheon requirements specified in Section 220500 "Common Work Results for Plumbing."
8. Seal joints between sinks, counters, floors, and walls using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Comply with sealant requirements specified in Section 079200 "Joint Sealants."

9. Install protective shielding pipe covers and enclosures on exposed supplies and waste piping of accessible sinks. Comply with requirements in Section 220719 "Plumbing Piping Insulation."

C. Water Closet Installation:

1. Install water closets level and plumb in accordance with roughing-in drawings.
2. Install floor-mounted water closets on bowl-to-drain connecting fitting attachments to piping or building substrate.
3. Install accessible, wall-mounted water closets at mounting height in accordance with ICC A117.1.
4. Install supports, affixed to building substrate, for floor-mounted, back-outlet water closets.
5. Use carrier supports with waste-fitting assembly and seal.
6. Install floor-mounted, back-outlet water closets, attached to building floor substrate, onto waste-fitting seals; and attach to support.
7. Install wall-mounted, back-outlet water-closet supports with waste-fitting assembly and waste-fitting seals, and affix to building substrate.
8. Measure support height installation from finished floor, not structural floor.
9. Install water-supply fitting on each supply to each water closet.
10. Attach supply piping to supports or substrate within pipe spaces behind fixtures.
11. Install lever-handle for accessible water closets with handle mounted on open side of water closet.
12. Install actuators in locations easily reachable for people with disabilities.
13. Install new batteries in battery-powered, electronic-sensor mechanisms.
14. Install toilet seats on water closets.
15. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Install deep-pattern escutcheons if required to conceal protruding fittings. Comply with escutcheon requirements specified in Section 220500 "Common Work Results for Plumbing."
16. Seal joints between water closets, walls, and floors using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to water-closet color. Comply with sealant requirements specified in Section 079200 "Joint Sealants."

3.2 INSTALLATION OF PIPING CONNECTIONS

- A. Connect plumbing fixtures with water supplies and soil, waste, and vent piping. Use size fittings required to match plumbing fixtures.
- B. Comply with water piping requirements specified in Section 221116 "Domestic Water Piping."
- C. Comply with soil, waste, and vent piping requirements specified in Section 221316 "Sanitary Waste and Vent Piping."
- D. Install protective-shielding pipe covers and enclosures on exposed supplies and waste piping of accessible plumbing fixtures. Comply with requirements in Section 220719 "Plumbing Piping Insulation."

- E. Where installing piping adjacent to water closets and urinals, allow space for service and maintenance.

3.3 INSTALLATION OF ELECTRICAL CONNECTIONS

- A. Connect wiring in accordance with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- B. Ground equipment in accordance with Section 260526 "Grounding and Bonding for Electrical Systems."
- C. Install electrical devices furnished by manufacturer, but not factory mounted in accordance with NFPA 70 and NECA 1.
- D. Install nameplate for each electrical connection, indicating electrical equipment designation and circuit number feeding connection.
 - 1. Nameplate to be laminated acrylic or melamine plastic signs, as specified in Section 260553 "Identification for Electrical Systems."

3.4 INSTALLATION OF CONTROL CONNECTIONS

- A. Install control and electrical power wiring to field-mounted control devices.
- B. Connect control wiring in accordance with Section 260523 "Control-Voltage Electrical Power Cables."

3.5 CLEANING AND PROTECTION

- A. After completing installation of plumbing fixtures, inspect and repair damages finishes. Replace any fixtures unable to be repaired to the satisfaction of the Architect.
- B. Clean plumbing fixtures and associated faucets, valves, flushometer valves, and fittings with manufacturers' recommended cleaning methods and materials.
- C. Provide protective covering for installed plumbing fixtures and associated faucets, valves, flushometer valves, and fittings.
- D. Do not allow use of plumbing fixtures for temporary facilities unless approved in writing by Owner.

END OF SECTION 224200

SECTION 224713

DRINKING FOUNTAINS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Bottle filling stations.
2. Supports.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of drinking fountain and bottle filling station.

1.3 CLOSEOUT SUBMITTALS

- A. Maintenance data.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Standards:

1. Drinking fountains and bottle filling stations intended to convey or dispense water for human consumption are to comply with the U.S. Safe Drinking Water Act (SDWA), requirements of the Authority Having Jurisdiction (AHJ), and with NSF 61 or NSF 372, or be certified in compliance with NSF 61 or NSF 372 by an ANSI-accredited third-party certification body, that the weighted average lead content at wetted surfaces is less than or equal to 0.25 percent.
2. Comply with ASME A112.19.3/CSA B45.4 for stainless steel drinking fountains and bottle filling stations.
3. Comply with NSF 42 and NSF 53 for water filters for drinking fountains and bottle filling stations.
4. Comply with ICC A117.1 for accessible drinking fountains and bottle filling stations.

2.2 BOTTLE FILLING STATIONS

- A. Bottle Filling Station - Surface Wall-Mounted, ABS/Stainless Steel Combination: .

1. Type: Vandal resistant.
2. Cabinet: ABS/stainless steel combination.
3. Bottle Filler: Push-button activation. Fill rate 0.5 to 1.5 gpm.
4. Drain: Grid type with NPS 1-1/4 tailpiece.
5. Supply: NPS 3/8 with shutoff valve.
6. Waste Fitting: ASME A112.18.2/CSA B125.2, NPS 1-1/4 brass P-trap.
7. Filter: One or more water filters complying with NSF 42 and NSF 53 and with capacity sized for peak flow rate.
8. Support: Provide manufacturer's mounting plate and drinking fountain carrier.
9. Bottle Filling Station Mounting Height: Accessible in accordance with ICC A117.1.
10. Electrical Characteristics:
 - a. Volts: 120 V ac.
 - b. Phase: Single.
 - c. Hertz: 60 Hz.

2.3 SUPPORTS

A. Drinking Fountain Carrier:

1. Standard: ASME A112.6.1M.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install fixtures level and plumb according to roughing-in drawings. For fixtures indicated for children, install at height required by authorities having jurisdiction.
- B. Set pedestal drinking fountains and bottle filling stations on flat surface in accordance with manufacturer's written installation instructions.
- C. Install recessed, drinking fountains and bottle filling stations secured to wood blocking in wall construction.
- D. Install off-the-floor carrier supports, affixed to building substrate, for wall-mounted fixtures.
- E. Install water-supply piping with shutoff valve on supply to each fixture to be connected to domestic-water distribution piping. Use ball valve. Install valves in locations where they can be easily reached for operation. Valves are specified in Section 220523.12 "Ball Valves for Plumbing Piping"
- F. Install trap and waste piping on drain outlet of each fixture to be connected to sanitary drainage system.
- G. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Use deep-pattern escutcheons where required to conceal protruding fittings.

Comply with escutcheon requirements specified in Section 220500 "Common Work Results for Plumbing."

- H. Seal joints between fixtures and walls using sanitary-type, one-part, mildew-resistant, silicone sealant. Match sealant color to fixture color. Comply with sealant requirements specified in Section 079200 "Joint Sealants."

3.2 PIPING CONNECTIONS

- A. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.
- B. Comply with water piping requirements specified in Section 221116 "Domestic Water Piping."
- C. Install ball shutoff valve on water supply to each fixture. Install valve upstream from filter for drinking fountain. Comply with valve requirements specified in Section 220523.12 "Ball Valves for Plumbing Piping"
- D. Comply with soil and waste piping requirements specified in Section 221316 "Sanitary Waste and Vent Piping."

3.3 ELECTRICAL CONNECTIONS

- A. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."
- B. Install electrical devices furnished by manufacturer, but not factory mounted, according to NFPA 70 and NECA 1.
- C. Install nameplate for each electrical connection, indicating electrical equipment designation and circuit number feeding connection.
 - 1. Nameplates to be laminated acrylic or melamine plastic signs, as specified in Section 260553 "Identification for Electrical Systems."
 - 2. Nameplates to be laminated acrylic or melamine plastic signs with a black background and engraved white letters at least 1/2 inch high.

3.4 ADJUSTING

- A. Adjust fixture flow regulators for proper flow and stream height.

3.5 CLEANING

- A. After installing fixtures, inspect unit. Remove paint splatters and other spots, dirt, and debris. Repair damaged finish to match original finish.

- B. Clean fixtures, on completion of installation, according to manufacturer's written instructions.
- C. Provide protective covering for installed fixtures.
- D. Do not allow use of fixtures for temporary facilities unless approved in writing by Owner.

END OF SECTION 224713

DIVISION 23

HEATING, VENTILATION, AND AIR CONDITIONING (HVAC)

SECTION 230529

HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Metal pipe hangers and supports.
2. Thermal-hanger shield inserts.
3. Equipment supports.

B. Related Requirements:

1. Section 233113 "Metal Ducts" for duct hangers and supports.

1.2 ACTION SUBMITTALS

- ##### A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

1.4 QUALITY ASSURANCE

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

2.2 METAL PIPE HANGERS AND SUPPORTS

A. Copper Pipe and Tube Hangers:

1. Description: MSS SP-58, Types 1 through 58, copper-plated steel, factory-fabricated components.
2. Hanger Rods: Continuous-thread rod, nuts, and washer made of stainless steel.

2.3 THERMAL-HANGER SHIELD INSERTS

- ##### A. Insulation-Insert Material for Cold Piping: ASTM C552, Type II cellular glass with 100-psi minimum compressive strength and vapor barrier.

- B. Insulation-Insert Material for Hot Piping: ASTM C552, Type II cellular glass with 100-psi minimum compressive strength.
- C. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.
- D. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.
- E. Insert Length: Extend 2 inches beyond sheet metal shield for piping operating below ambient air temperature.

2.4 EQUIPMENT SUPPORTS

- A. Description: Welded, shop- or field-fabricated equipment support made from structural carbon-steel shapes.

2.5 MATERIALS

- A. Aluminum: ASTM B221.
- B. Carbon Steel: ASTM A1011/A1011M.
- C. Structural Steel: ASTM A36/A36M, carbon-steel plates, shapes, and bars; black and galvanized.
- D. Stainless Steel: ASTM A240/A240M.
- E. Grout: ASTM C1107/C1107M, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.
 - 1. Properties: Nonstaining, noncorrosive, and nongaseous.
 - 2. Design Mix: 5000-psi, 28-day compressive strength.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation for penetrations through fire-rated walls, ceilings, and assemblies.
- B. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

3.2 HANGER AND SUPPORT INSTALLATION

- A. Metal Pipe-Hanger Installation: Comply with MSS SP-58. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.
- B. Metal Framing System Installation: Arrange for grouping of parallel runs of piping, and support together on field-assembled strut systems.
- C. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.
- D. Pipe Stand Installation:
 - 1. Pipe Stand Types except Curb-Mounted Type: Assemble components and mount on smooth roof surface. Do not penetrate roof membrane.
 - 2. Curb-Mounted-Type Pipe Stands: Assemble components or fabricate pipe stand and mount on permanent, stationary roof curb. See Section 077200 "Roof Accessories" for curbs.
- E. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.
- F. Equipment Support Installation: Fabricate from welded-structural-steel shapes.
- G. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- H. Install lateral bracing with pipe hangers and supports to prevent swaying.
- I. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.
- J. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- K. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.
- L. Insulated Piping:
 - 1. Attach clamps and spacers to piping.
 - a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
 - b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
 - c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.

2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
 - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.
 - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
4. Shield Dimensions for Pipe: Not less than the following:
 - a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
 - b. NPS 4: 12 inches long and 0.06 inch thick.
 - c. NPS 5 and NPS 6: 18 inches long and 0.06 inch thick.
 - d. NPS 8 to NPS 14: 24 inches long and 0.075 inch thick.
 - e. NPS 16 to NPS 24: 24 inches long and 0.105 inch thick.
5. Pipes NPS 8 and Larger: Include wood or reinforced calcium-silicate-insulation inserts of length at least as long as protective shield.
6. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.3 EQUIPMENT SUPPORTS

- A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.
- B. Grouting: Place grout under supports for equipment and make bearing surface smooth.
- C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.4 METAL FABRICATIONS

- A. Cut, drill, and fit miscellaneous metal fabrications for equipment supports.
- B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.
- C. Field Welding: Comply with AWS D1.1/D1.1M procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work; and with the following:
 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. Finish welds at exposed connections so no roughness shows after finishing and so contours of welded surfaces match adjacent contours.

3.5 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

3.6 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 - 1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils.
- B. Touchup: Comply with requirements in Section 099113 "Exterior Painting" for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A780/A780M.

3.7 HANGER AND SUPPORT SCHEDULE

- A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.
- B. Comply with MSS SP-58 for pipe-hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finish.
- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- E. Use carbon-steel pipe hangers and supports and attachments for general service applications.
- F. Use stainless steel pipe hangers and stainless steel attachments for hostile environment applications.
- G. Use copper-plated pipe hangers and stainless steel attachments for copper piping and tubing.
- H. Use padded hangers for piping that is subject to scratching.
- I. Use thermal-hanger shield inserts for insulated piping and tubing.

- J. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30.
 2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of up to 1050 deg F, pipes NPS 4 to NPS 24, requiring up to 4 inches of insulation.
 3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes NPS 3/4 to NPS 36, requiring clamp flexibility and up to 4 inches of insulation.
- K. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24.
- L. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
 2. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
- M. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Thermal-Hanger Shield Inserts: For supporting insulated pipe.
- N. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Restraint-Control Devices (MSS Type 47): Where indicated to control piping movement.
 2. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches.
 3. Spring Sway Braces (MSS Type 50): To retard sway, shock, vibration, or thermal expansion in piping systems.
- O. Comply with MSS SP-58 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.

END OF SECTION 230529

SECTION 230593

TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Testing, Adjusting, and Balancing of Air Systems:
 - a. Constant-volume air systems.
2. Testing, adjusting, and balancing of equipment.

1.2 DEFINITIONS

- A. AABC: Associated Air Balance Council.
- B. NEBB: National Environmental Balancing Bureau.
- C. TAB: Testing, adjusting, and balancing.
- D. TABB: Testing, Adjusting, and Balancing Bureau.
- E. TAB Specialist: An independent entity meeting qualifications to perform TAB work.
- F. TDH: Total dynamic head.
- G. UFAD: Underfloor air distribution.

1.3 INFORMATIONAL SUBMITTALS

- A. Certified TAB reports.
- B. Instrument calibration reports, to include the following:
 1. Instrument type and make.
 2. Serial number.
 3. Application.
 4. Dates of use.
 5. Dates of calibration.

1.4 QUALITY ASSURANCE

- A. TAB Specialists Qualifications, Certified by AABC:

1. TAB Field Supervisor: Employee of the TAB specialist and certified by AABC.
 2. TAB Technician: Employee of the TAB specialist and certified by AABC.
- B. TAB Specialists Qualifications, Certified by NEBB:
1. TAB Field Supervisor: Employee of the TAB specialist and certified by NEBB.
 2. TAB Technician: Employee of the TAB specialist and certified by NEBB.
- C. Instrumentation Type, Quantity, Accuracy, and Calibration: Comply with requirements in ASHRAE 111, Section 4, "Instrumentation."
- D. ASHRAE/IES 90.1 Compliance: Applicable requirements in ASHRAE/IES 90.1, Section 6.7.2.3 - "System Balancing."
- E. Code and AHJ Compliance: TAB is required to comply with governing codes and requirements of authorities having jurisdiction.

1.5 FIELD CONDITIONS

- A. Full Owner Occupancy: Owner will occupy the site and existing building during entire TAB period. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.
- B. Partial Owner Occupancy: Owner may occupy completed areas of building before Substantial Completion. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems designs that may preclude proper TAB of systems and equipment.
- B. Examine installed systems for balancing devices, such as test ports, gauge cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers. Verify that locations of these balancing devices are applicable for intended purpose and are accessible.
- C. Examine the approved submittals for HVAC systems and equipment.
- D. Examine design data, including HVAC system descriptions, statements of design assumptions for environmental conditions and systems output, and statements of philosophies and assumptions about HVAC system and equipment controls.

- E. Examine ceiling plenums and underfloor air plenums used for HVAC to verify that they are properly separated from adjacent areas and sealed.
- F. Examine equipment performance data, including fan and pump curves.
 - 1. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
 - 2. Calculate system-effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from the conditions used to rate equipment performance. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," or in SMACNA's "HVAC Systems - Duct Design." Compare results with the design data and installed conditions.
- G. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.
- H. Examine test reports specified in individual system and equipment Sections.
- I. Examine HVAC equipment and verify that bearings are greased, belts are aligned and tight, filters are clean, and equipment with functioning controls is ready for operation.
- J. Examine control valves for proper installation for their intended function of isolating, throttling, diverting, or mixing fluid flows.
- K. Examine heat-transfer coils for correct piping connections and for clean and straight fins.
- L. Examine system pumps to ensure absence of entrained air in the suction piping.
- M. Examine operating safety interlocks and controls on HVAC equipment.
- N. Examine control dampers for proper installation for their intended function of isolating, throttling, diverting, or mixing air flows.
- O. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.2 PREPARATION

- A. Prepare a TAB plan that includes the following:
 - 1. Equipment and systems to be tested.
 - 2. Strategies and step-by-step procedures for balancing the systems.
 - 3. Instrumentation to be used.
 - 4. Sample forms with specific identification for all equipment.
- B. Perform system-readiness checks of HVAC systems and equipment to verify system readiness for TAB work. Include, at a minimum, the following:

1. Airside:
 - a. Verify that leakage and pressure tests on air distribution systems have been satisfactorily completed.
 - b. Duct systems are complete with terminals installed.
 - c. Volume, smoke, and fire dampers are open and functional.
 - d. Clean filters are installed.
 - e. Fans are operating, free of vibration, and rotating in correct direction.
 - f. Variable-frequency controllers' startup is complete and safeties are verified.
 - g. Automatic temperature-control systems are operational.
 - h. Ceilings are installed.
 - i. Windows and doors are installed.
 - j. Suitable access to balancing devices and equipment is provided.

3.3 GENERAL PROCEDURES FOR TESTING AND BALANCING

- A. Perform testing and balancing procedures on each system in accordance with the procedures contained in NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems" and in this Section.
- B. Cut insulation, ducts, pipes, and equipment casings for installation of test probes to the minimum extent necessary for TAB procedures.
 1. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts.
 2. After testing and balancing, install test ports and duct access doors that comply with requirements in Section 233300 "Air Duct Accessories."
 3. Where holes for probes are required in piping or hydronic equipment, install pressure and temperature test plugs to seal systems.
 4. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish in accordance with Section 230713 "Duct Insulation," Section 230716 "HVAC Equipment Insulation," and Section 230719 "HVAC Piping Insulation."
- C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.
- D. Take and report testing and balancing measurements in inch-pound (IP) units.

3.4 TESTING, ADJUSTING, AND BALANCING OF HVAC EQUIPMENT

- A. Test, adjust, and balance HVAC equipment indicated on Drawings, including, but not limited to, the following:
 1. Motors.
 2. Fans.

3.5 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

- A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.
- B. Prepare schematic diagrams of systems' Record drawings duct layouts.
- C. For variable-air-volume systems, develop a plan to simulate diversity.
- D. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.
- E. Check airflow patterns from the outdoor-air louvers and dampers and the return- and exhaust-air dampers through the supply-fan discharge and mixing dampers.
- F. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.
- G. Verify that motor starters are equipped with properly sized thermal protection.
- H. Check dampers for proper position to achieve desired airflow path.
- I. Check for airflow blockages.
- J. Check condensate drains for proper connections and functioning.
- K. Check for proper sealing of air-handling-unit components.

3.6 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

- A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.
 - 1. Measure total airflow.
 - a. Set outside-air, return-air, and relief-air dampers for proper position that simulates minimum outdoor-air conditions.
 - b. Where duct conditions allow, measure airflow by main Pitot-tube traverse. If necessary, perform multiple Pitot-tube traverses close to the fan and prior to any outlets, to obtain total airflow.
 - c. Where duct conditions are unsuitable for Pitot-tube traverse measurements, a coil traverse may be acceptable.
 - 2. Measure fan static pressures as follows:
 - a. Measure static pressure directly at the fan outlet or through the flexible connection.
 - b. Measure static pressure directly at the fan inlet or through the flexible connection.
 - c. Measure static pressure across each component that makes up the air-handling system.
 - d. Report artificial loading of filters at the time static pressures are measured.

3. Review Contractor-prepared shop drawings and Record drawings to determine variations in design static pressures versus actual static pressures. Calculate actual system-effect factors. Recommend adjustments to accommodate actual conditions.
 4. Obtain approval from Architect for adjustment of fan speed higher or lower than indicated speed. Comply with requirements in HVAC Sections for air-handling units for adjustment of fans, belts, and pulley sizes to achieve indicated air-handling-unit performance.
 5. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload occurs. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.
- B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows.
1. Measure airflow of submain and branch ducts.
 2. Adjust submain and branch duct volume dampers for specified airflow.
 3. Re-measure each submain and branch duct after all have been adjusted.
- C. Adjust air inlets and outlets for each space to indicated airflows.
1. Set airflow patterns of adjustable outlets for proper distribution without drafts.
 2. Measure inlets and outlets airflow.
 3. Adjust each inlet and outlet for specified airflow.
 4. Re-measure each inlet and outlet after they have been adjusted.
- D. Verify final system conditions.
1. Re-measure and confirm that minimum outdoor, return, and relief airflows are within design. Readjust to design if necessary.
 2. Re-measure and confirm that total airflow is within design.
 3. Re-measure all final fan operating data, speed, volts, amps, and static profile.
 4. Mark all final settings.
 5. Test system in economizer mode. Verify proper operation and adjust if necessary.
 6. Measure and record all operating data.
 7. Record final fan-performance data.

3.7 PROCEDURES FOR MOTORS

- A. Motors 1/2 HP and Larger: Test at final balanced conditions and record the following data:
1. Manufacturer's name, model number, and serial number.
 2. Motor horsepower rating.
 3. Motor rpm.
 4. Phase and hertz.
 5. Nameplate and measured voltage, each phase.

6. Nameplate and measured amperage, each phase.
 7. Starter size and thermal-protection-element rating.
 8. Service factor and frame size.
- B. Motors Driven by Variable-Frequency Controllers: Test manual bypass of controller to prove proper operation.
- 3.8 PROCEDURES FOR AIR-COOLED CONDENSING UNITS
- A. Verify proper rotation of fan(s).
 - B. Measure and record entering- and leaving-air temperatures.
 - C. Measure and record entering and leaving refrigerant pressures.
 - D. Measure and record operating data of compressor(s), fan(s), and motors.
- 3.9 TOLERANCES
- A. Set HVAC system's airflow rates and water flow rates within the following tolerances:
 1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus 10 percent. If design value is less than 100 cfm, within 10 cfm.
 2. Air Outlets and Inlets: Plus or minus 10 percent. If design value is less than 100 cfm, within 10 cfm.
 - B. Maintaining pressure relationships as designed shall have priority over the tolerances specified above.
- 3.10 PROGRESS REPORTING
- A. Initial Construction-Phase Report: Based on examination of the Contract Documents as specified in "Examination" Article, prepare a report on the adequacy of design for system-balancing devices. Recommend changes and additions to system-balancing devices, to facilitate proper performance measuring and balancing. Recommend changes and additions to HVAC systems and general construction to allow access for performance-measuring and -balancing devices.
 - B. Status Reports: Prepare biweekly progress reports to describe completed procedures, procedures in progress, and scheduled procedures. Include a list of deficiencies and problems found in systems being tested and balanced. Prepare a separate report for each system and each building floor for systems serving multiple floors.
- 3.11 FINAL REPORT
- A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.

1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
 2. Include a list of instruments used for procedures, along with proof of calibration.
 3. Certify validity and accuracy of field data.
- B. Final Report Contents: In addition to certified field-report data, include the following:
1. Pump curves.
 2. Fan curves.
 3. Manufacturers' test data.
 4. Field test reports prepared by system and equipment installers.
 5. Other information relative to equipment performance; do not include Shop Drawings and Product Data.
- C. General Report Data: In addition to form titles and entries, include the following data:
1. Title page.
 2. Name and address of the TAB specialist.
 3. Project name.
 4. Project location.
 5. Architect's name and address.
 6. Engineer's name and address.
 7. Contractor's name and address.
 8. Report date.
 9. Signature of TAB supervisor who certifies the report.
 10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
 11. Summary of contents, including the following:
 - a. Indicated versus final performance.
 - b. Notable characteristics of systems.
 - c. Description of system operation sequence if it varies from the Contract Documents.
 12. Nomenclature sheets for each item of equipment.
 13. Data for terminal units, including manufacturer's name, type, size, and fittings.
 14. Notes to explain why certain final data in the body of reports vary from indicated values.
 15. Test conditions for fans performance forms, including the following:
 - a. Settings for outdoor-, return-, and exhaust-air dampers.
 - b. Conditions of filters.
 - c. Cooling coil, wet- and dry-bulb conditions.
 - d. Heating coil, dry-bulb conditions.
 - e. Face and bypass damper settings at coils.
 - f. Fan drive settings, including settings and percentage of maximum pitch diameter.
 - g. Variable-frequency controller settings for variable-air-volume systems.
 - h. Settings for pressure controller(s).
 - i. Other system operating conditions that affect performance.
- D. System Diagrams: Include schematic layouts of air and hydronic distribution systems. Present each system with single-line diagram and include the following:

1. Quantities of outdoor, supply, return, and exhaust airflows.
2. Duct, outlet, and inlet sizes.
3. Balancing stations.
4. Position of balancing devices.

E. Air-Handling-Unit Test Reports: For air-handling units, include the following:

1. Unit Data:
 - a. Unit identification.
 - b. Location.
 - c. Make and type.
 - d. Model number and unit size.
 - e. Manufacturer's serial number.
 - f. Unit arrangement and class.
 - g. Discharge arrangement.
 - h. Sheave make, size in inches, and bore.
 - i. Center-to-center dimensions of sheave and amount of adjustments in inches.
 - j. Number, make, and size of belts.
 - k. Number, type, and size of filters.
2. Motor Data:
 - a. Motor make, and frame type and size.
 - b. Horsepower and speed.
 - c. Volts, phase, and hertz.
 - d. Full-load amperage and service factor.
 - e. Sheave make, size in inches, and bore.
 - f. Center-to-center dimensions of sheave and amount of adjustments in inches.
3. Test Data (Indicated and Actual Values):
 - a. Total airflow rate in cfm.
 - b. Total system static pressure in inches wg.
 - c. Fan speed.
 - d. Inlet and discharge static pressure in inches wg.
 - e. For each filter bank, filter static-pressure differential in inches wg.
 - f. Preheat-coil static-pressure differential in inches wg.
 - g. Cooling-coil static-pressure differential in inches wg.
 - h. Heating-coil static-pressure differential in inches wg.
 - i. List for each internal component with pressure-drop, static-pressure differential in inches wg.
 - j. Outdoor airflow in cfm.
 - k. Return airflow in cfm.
 - l. Outdoor-air damper position.
 - m. Return-air damper position.

F. Apparatus-Coil Test Reports:

1. Coil Data:
 - a. System identification.
 - b. Location.
 - c. Coil type.

- d. Number of rows.
 - e. Fin spacing in fins per inch o.c.
 - f. Make and model number.
 - g. Face area in sq. ft..
 - h. Tube size in NPS.
 - i. Tube and fin materials.
 - j. Circuiting arrangement.
2. Test Data (Indicated and Actual Values):
- a. Airflow rate in cfm.
 - b. Average face velocity in fpm.
 - c. Air pressure drop in inches wg.
 - d. Outdoor-air, wet- and dry-bulb temperatures in deg F.
 - e. Return-air, wet- and dry-bulb temperatures in deg F.
 - f. Entering-air, wet- and dry-bulb temperatures in deg F.
 - g. Leaving-air, wet- and dry-bulb temperatures in deg F.
 - h. Water flow rate in gpm.
 - i. Water pressure differential in feet of head or psig.
 - j. Entering-water temperature in deg F.
 - k. Leaving-water temperature in deg F.
 - l. Refrigerant expansion valve and refrigerant types.
 - m. Refrigerant suction pressure in psig.
 - n. Refrigerant suction temperature in deg F.
 - o. Inlet steam pressure in psig.

G. Gas- and Oil-Fired Heat Apparatus Test Reports: In addition to manufacturer's factory startup equipment reports, include the following:

1. Unit Data:
- a. System identification.
 - b. Location.
 - c. Make and type.
 - d. Model number and unit size.
 - e. Manufacturer's serial number.
 - f. Fuel type in input data.
 - g. Output capacity in Btu/h.
 - h. Ignition type.
 - i. Burner-control types.
 - j. Motor horsepower and speed.
 - k. Motor volts, phase, and hertz.
 - l. Motor full-load amperage and service factor.
 - m. Sheave make, size in inches, and bore.
 - n. Center-to-center dimensions of sheave and amount of adjustments in inches.
2. Test Data (Indicated and Actual Values):
- a. Total airflow rate in cfm.
 - b. Entering-air temperature in deg F.
 - c. Leaving-air temperature in deg F.
 - d. Air temperature differential in deg F.
 - e. Entering-air static pressure in inches wg.
 - f. Leaving-air static pressure in inches wg.
 - g. Air static-pressure differential in inches wg.

- h. Low-fire fuel input in Btu/h.
- i. High-fire fuel input in Btu/h.
- j. Manifold pressure in psig.
- k. High-temperature-limit setting in deg F.
- l. Operating set point in Btu/h.
- m. Motor voltage at each connection.
- n. Motor amperage for each phase.
- o. Heating value of fuel in Btu/h.

H. Fan Test Reports: For supply, return, and exhaust fans, include the following:

- 1. Fan Data:
 - a. System identification.
 - b. Location.
 - c. Make and type.
 - d. Model number and size.
 - e. Manufacturer's serial number.
 - f. Arrangement and class.
 - g. Sheave make, size in inches, and bore.
 - h. Center-to-center dimensions of sheave and amount of adjustments in inches.
- 2. Motor Data:
 - a. Motor make, and frame type and size.
 - b. Horsepower and speed.
 - c. Volts, phase, and hertz.
 - d. Full-load amperage and service factor.
 - e. Sheave make, size in inches, and bore.
 - f. Center-to-center dimensions of sheave and amount of adjustments in inches.
 - g. Number, make, and size of belts.
- 3. Test Data (Indicated and Actual Values):
 - a. Total airflow rate in cfm.
 - b. Total system static pressure in inches wg.
 - c. Fan speed.
 - d. Discharge static pressure in inches wg.
 - e. Suction static pressure in inches wg.

I. Round, Flat-Oval, and Rectangular Duct Traverse Reports: Include a diagram with a grid representing the duct cross-section and record the following:

- 1. Report Data:
 - a. System fan and air-handling-unit number.
 - b. Location and zone.
 - c. Traverse air temperature in deg F.
 - d. Duct static pressure in inches wg.
 - e. Duct size in inches.
 - f. Duct area in sq. ft..
 - g. Indicated airflow rate in cfm.
 - h. Indicated velocity in fpm.
 - i. Actual airflow rate in cfm.
 - j. Actual average velocity in fpm.

k. Barometric pressure in psig.

J. Air-Terminal-Device Reports:

1. Unit Data:

- a. System and air-handling unit identification.
- b. Location and zone.
- c. Apparatus used for test.
- d. Area served.
- e. Make.
- f. Number from system diagram.
- g. Type and model number.
- h. Size.
- i. Effective area in sq. ft..

2. Test Data (Indicated and Actual Values):

- a. Airflow rate in cfm.
- b. Air velocity in fpm.
- c. Preliminary airflow rate as needed in cfm.
- d. Preliminary velocity as needed in fpm.
- e. Final airflow rate in cfm.
- f. Final velocity in fpm.
- g. Space temperature in deg F.

K. Instrument Calibration Reports:

1. Report Data:

- a. Instrument type and make.
- b. Serial number.
- c. Application.
- d. Dates of use.
- e. Dates of calibration.

3.12 VERIFICATION OF TAB REPORT

- A. If the number of "FAILED" measurements is greater than 10 percent of the total measurements checked during the final inspection, the TAB shall be considered incomplete and shall be rejected.
- B. If recheck measurements find the number of failed measurements noncompliant with requirements indicated, proceed as follows:
 1. TAB specialists shall recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes; resubmit the final report and request a second final inspection. All changes shall be tracked to show changes made to previous report.
 2. If the second final inspection also fails, Owner may pursue others Contract options to complete TAB work.
- C. Prepare test and inspection reports.

END OF SECTION 230593

SECTION 230713

DUCT INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes insulating the following duct services:
 - 1. Indoor, concealed supply, return, and outdoor air.
 - 2. Indoor, exposed supply and outdoor air.
- B. Related Requirements:
 - 1. Section 230719 "HVAC Piping Insulation."
 - 2. Section 233113 "Metal Ducts" for duct liners.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

1.3 INFORMATIONAL SUBMITTALS

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products in accordance with ASTM E84, by a testing agency acceptable to authorities having jurisdiction. Factory label insulation, jacket materials, adhesive, mastic, tapes, and cement material containers with appropriate markings of applicable testing agency.
 - 1. All Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.

2.2 INSULATION MATERIALS

- A. Comply with requirements in "Duct Insulation Schedule, General," "Indoor Duct and Plenum Insulation Schedule," and "Aboveground, Outdoor Duct and Plenum Insulation Schedule" articles for where insulating materials are applied.
- B. Products do not contain asbestos, lead, mercury, or mercury compounds.

- C. Products that come in contact with stainless steel have a leachable chloride content of less than 50 ppm when tested in accordance with ASTM C871.
- D. Insulation materials for use on austenitic stainless steel are qualified as acceptable in accordance with ASTM C795.
- E. Foam insulation materials do not use CFC or HCFC blowing agents in the manufacturing process.
- F. Glass-Fiber Blanket: Glass fibers bonded with a thermosetting resin; suitable for maximum use temperature up to 450 deg F in accordance with ASTM C411. Comply with ASTM C553, Type II, and ASTM C1290, Type III with factory-applied FSK jacket . Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
- G. Mineral Wool Blanket: Basalt volcanic rock-derived fibers bonded with a thermosetting resin, unfaced; suitable for maximum use temperature up to 1200 deg F in accordance with ASTM C447. Comply with ASTM C553.

2.3 ADHESIVES

- A. Materials are compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.
- B. Glass-Fiber and Mineral Wool Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
- C. ASJ Adhesive, and FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.

2.4 FACTORY-APPLIED JACKETS

- A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:
 1. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C1136, Type II.

2.5 TAPES

- A. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C1136.
 1. Width: 3 inches.
 2. Thickness: 6.5 mils.
 3. Adhesion: 90 ounces force/inch in width.
 4. Elongation: 2 percent.
 5. Tensile Strength: 40 lbf/inch in width.
 6. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.

2.6 SECUREMENTS

- A. Aluminum Bands: ASTM B209, Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 1/2 inch wide with wing seal or closed seal.
- B. Insulation Pins and Hangers:
 - 1. Metal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
 - a. Baseplate: Perforated, galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
 - b. Spindle: Copper- or zinc-coated, low-carbon steel, fully annealed, 0.106-inch-diameter shank, length to suit depth of insulation indicated.
 - c. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.
 - 2. Nonmetal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate fastened to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
 - a. Baseplate: Perforated, nylon sheet, 0.030 inch thick by 1-1/2 inches in diameter.
 - b. Spindle: Nylon, 0.106-inch-diameter shank, length to suit depth of insulation indicated, up to 2-1/2 inches.
 - c. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.
 - 3. Self-Sticking-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
 - a. Baseplate: Galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
 - b. Spindle: Copper- or zinc-coated, low-carbon steel, fully annealed, 0.106-inch-diameter shank, length to suit depth of insulation indicated.
 - c. Adhesive-backed base with a peel-off protective cover.
 - 4. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick, galvanized-steel sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
 - a. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in exposed locations.
 - 5. Nonmetal Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick nylon sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

3.2 GENERAL INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of ducts and fittings.
- B. Install insulation materials, vapor barriers or retarders, jackets, and thicknesses required for each item of duct system as specified in insulation system schedules.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, compress, or otherwise damage insulation or jacket.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Keep insulation materials dry during application and finishing. Replace insulation materials that get wet during storage or in the installation process before being properly covered and sealed in accordance with the Contract Documents, unless otherwise approved by the engineer of record.
- G. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- H. Install insulation with least number of joints practical.
- I. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
 - 1. Install insulation continuously through hangers and around anchor attachments.
 - 2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
 - 3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
- J. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- K. Install insulation with factory-applied jackets as follows:

1. Draw jacket tight and smooth, but not to the extent of creating wrinkles or areas of compression in the insulation.
 2. Cover circumferential joints with 3-inch-wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
 3. Overlap jacket longitudinal seams at least 1-1/2 inches. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 4 inches o.c.
 - a. For below ambient services, apply vapor-barrier mastic over staples.
 4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
 5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to duct flanges and fittings.
- L. Cut insulation in a manner to avoid compressing insulation.
- M. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- N. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

3.3 PENETRATIONS

- A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.
1. Seal penetrations with flashing sealant.
 2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
 3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
 4. Seal jacket to roof flashing with flashing sealant.
- B. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

3.4 INSTALLATION OF GLASS-FIBER AND MINERAL-WOOL INSULATION

- A. Blanket Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.
- B. Comply with manufacturer's written installation instructions.
1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 100 percent coverage of duct and plenum surfaces.

2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:
 - a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.
 - b. On duct sides with dimensions larger than 18 inches, place pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
 - c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
 - d. Do not overcompress insulation during installation.
 - e. Impale insulation over pins and attach speed washers.
 - f. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.
4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-clinching staples, 1 inch o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.
 - a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
 - b. Install vapor stops for ductwork and plenums operating below 50 deg F at 18-foot intervals. Vapor stops consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to two times the insulation thickness, but not less than 3 inches.
5. Overlap unfaced blankets a minimum of 2 inches on longitudinal seams and end joints. At end joints, secure with steel bands spaced a maximum of 18 inches o.c.
6. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
7. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch-wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.

3.5 FIELD-APPLIED JACKET INSTALLATION

- A. Where FSK jackets are indicated, install as follows:
 1. Draw jacket material smooth and tight.
 2. Install lap or joint strips with same material as jacket.
 3. Secure jacket to insulation with manufacturer's recommended adhesive.
 4. Install jacket with 1-1/2-inch laps at longitudinal seams and 3-inch-wide joint strips at end joints.

5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-barrier mastic.
- B. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints; for horizontal applications, install with longitudinal seams along top and bottom of tanks and vessels. Seal with manufacturer's recommended adhesive.
 1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.
- C. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless steel bands 12 inches o.c. and at end joints.

3.6 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:
 1. Inspect ductwork, randomly selected by Architect, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection is limited to one location(s) for each duct system defined in the "Duct Insulation Schedule, General" Article.
- C. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

3.7 DUCT INSULATION SCHEDULE, GENERAL

- A. Plenums and Ducts Requiring Insulation:
 1. Indoor, concealed supply, return, and outdoor air.
 2. Indoor, exposed supply and outdoor air.
- B. Items Not Insulated:
 1. Factory-insulated flexible ducts.
 2. Factory-insulated plenums and casings.
 3. Flexible connectors.
 4. Factory-insulated access panels and doors.

3.8 INDOOR DUCT AND PLENUM INSULATION SCHEDULE

- A. Concealed, Return-Air, Outdoor-Air, and Supply-Air Duct and Plenum Insulation: Glass-fiber Mineral wool blanket, 2 inches thick and 1.5 lb/cu. ft. nominal density. The installed duct insulation shall have a minimum R-6 insulation resistance value where installed within the conditioned space. **The installed duct insulation shall have a**

minimum R-8 insulation resistance value where installed within the unconditioned attic space.

- B. Return air ductwork is not required to be insulated where installed within the conditioned space (below the attic in mechanical rooms, as an example). All return ductwork installed in the attic (unconditioned space) shall be insulated per the above requirement, in accordance with the current energy code.
- C. Exposed, Outdoor-Air and Supply-Air Duct and Plenum Insulation: Glass-fiber Mineral wool blanket , 2 inches thick and 1.5 lb/cu. ft. nominal density to achieve a minimum R-6 insulation resistance value.

END OF SECTION 230713

SECTION 230719

HVAC PIPING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes insulation for HVAC piping systems.
- B. Related Requirements:
 - 1. Section 230713 "Duct Insulation" for duct insulation.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Field quality-control reports.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or craft training program.

1.5 COORDINATION

- A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."
- B. Coordinate clearance requirements with piping Installer for piping insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

1.6 SCHEDULING

- A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products in accordance with ASTM E84, by a testing agency acceptable to authorities having jurisdiction. Factory label insulation, jacket materials, adhesive, mastic, tapes, and cement material containers with appropriate markings of applicable testing agency.
 - 1. All Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.

2.2 INSULATION MATERIALS

- A. Comply with requirements in "Piping Insulation Schedule, General," "Indoor Piping Insulation Schedule," "Outdoor, Aboveground Piping Insulation Schedule," and "Outdoor, Underground Piping Insulation Schedule" articles for where insulating materials shall be applied.
- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Products that come into contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested in accordance with ASTM C871.
- D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable in accordance with ASTM C795.
- E. Mineral Wool, Preformed Pipe: Mandrel-wound mineral wool fibers bonded with a thermosetting resin, unfaced; suitable for maximum use temperature up to 1200 deg F in accordance with ASTM C447. Comply with ASTM C547.
 - 1. Preformed Pipe Insulation: Type II, Grade A with factory-applied ASJ-SSL
 - 2. Fabricated shapes in accordance with ASTM C450 and ASTM C585.
 - 3. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

2.3 ADHESIVES

- A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.
- B. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
- C. ASJ Adhesive and FSK and PVDC Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A, for bonding insulation jacket lap seams and joints.

2.4 MASTICS AND COATINGS

- A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-PDF-19565C, Type 11.
- B. Vapor-Retarder Mastic, Water Based: Suitable for indoor use on below-ambient services.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. Foster Brand; H. B. Fuller Construction Products.
 - c. Knauf Insulation.
 - d. Vimasco Corporation.
 - 2. Water-Vapor Permeance: Comply with ASTM E96/E96M or ASTM F1249.
 - 3. Service Temperature Range: Minus 20 to plus 180 deg F.
 - 4. Comply with MIL-PRF-19565C, Type II, for permeance requirements.
 - 5. Color: White.

2.5 SEALANTS

- A. Materials shall be as recommended by the insulation manufacturer and shall be compatible with insulation materials, jackets, and substrates.
- B. Joint Sealants:
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. Foster Brand; H. B. Fuller Construction Products.
 - c. Mon-Eco Industries, Inc.
 - d. Pittsburgh Corning Corporation.
 - 2. Permanently flexible, elastomeric sealant.
 - a. Service Temperature Range: Minus 100 to plus 300 deg F.
 - b. Color: White or gray.
- C. FSK and Metal Jacket Flashing Sealants:
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. Foster Brand; H. B. Fuller Construction Products.

c. Mon-Eco Industries, Inc.

2. Fire- and water-resistant, flexible, elastomeric sealant.
3. Service Temperature Range: Minus 40 to plus 250 deg F.
4. Color: Aluminum.

D. ASJ Flashing Sealants and PVDC and PVC Jacket Flashing Sealants:

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

a. Childers Brand; H. B. Fuller Construction Products.

2. Fire- and water-resistant, flexible, elastomeric sealant.
3. Service Temperature Range: Minus 40 to plus 250 deg F.
4. Color: White.

2.6 FACTORY-APPLIED JACKETS

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:

1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C1136, Type I.
2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C1136, Type I.
3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C1136, Type II.

2.7 FIELD-APPLIED FABRIC-REINFORCING MESH

A. Woven Glass-Fiber Fabric: Approximately 2 oz./sq. yd. with a thread count of 10 strands by 10 strands/sq. in. for covering pipe and pipe fittings.

B. Woven Polyester Fabric: Approximately 1 oz./sq. yd. with a thread count of 10 strands by 10 strands/sq. in., in a Leno weave, for pipe.

2.8 FIELD-APPLIED JACKETS

A. Field-applied jackets shall comply with ASTM C1136, Type I, unless otherwise indicated.

B. Metal Jacket:

1. Aluminum Jacket: Comply with ASTM B209, Alloy 3003, 3005, 3105, or 5005, Temper H-14.
 - a. Sheet and roll stock ready for shop or field sizing.
 - b. Finish and thickness are indicated in field-applied jacket schedules.

- c. Moisture Barrier for Indoor Applications: 1-mil-thick, heat-bonded polyethylene and kraft paper.
- d. Moisture Barrier for Outdoor Applications: 3-mil-thick, heat-bonded polyethylene and kraft paper.
- e. Factory-Fabricated Fitting Covers:
 - 1) Same material, finish, and thickness as jacket.
 - 2) Preformed two-piece or gore, 45- and 90-degree, short- and long-radius elbows.
 - 3) Tee covers.
 - 4) Flange and union covers.
 - 5) End caps.
 - 6) Beveled collars.
 - 7) Valve covers.
 - 8) Field fabricate fitting covers only if factory-fabricated fitting covers are not available.

2.9 TAPES

A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C1136.

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

- a. 3M Industrial Adhesives and Tapes Division.
- b. Avery Dennison Corporation, Specialty Tapes Division.
- c. Ideal Tape Co., Inc., an American Biltrite Company.
- d. Knauf Insulation.

- 2. Width: 3 inches.
- 3. Thickness: 11.5 mils.
- 4. Adhesion: 90 ounces force/inch in width.
- 5. Elongation: 2 percent.
- 6. Tensile Strength: 40 lbf/inch in width.
- 7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.

B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C1136.

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

- a. 3M Industrial Adhesives and Tapes Division.
- b. Avery Dennison Corporation, Specialty Tapes Division.
- c. Ideal Tape Co., Inc., an American Biltrite Company.
- d. Knauf Insulation.

- 2. Width: 3 inches.

3. Thickness: 6.5 mils.
4. Adhesion: 90 ounces force/inch in width.
5. Elongation: 2 percent.
6. Tensile Strength: 40 lbf/inch in width.
7. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.

C. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. 3M Industrial Adhesives and Tapes Division.
 - b. Avery Dennison Corporation, Specialty Tapes Division.
 - c. Ideal Tape Co., Inc., an American Biltrite Company.
 - d. Knauf Insulation.
2. Width: 2 inches.
3. Thickness: 3.7 mils.
4. Adhesion: 100 ounces force/inch in width.
5. Elongation: 5 percent.
6. Tensile Strength: 34 lbf/inch in width.

2.10 SECUREMENTS

A. Bands:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. ITW Insulation Systems; Illinois Tool Works, Inc.
 - b. RPR Products, Inc.
2. Stainless Steel: ASTM A240/A240M, Type 304; 0.015 inch thick, 1/2 inch wide with closed seal.
3. Aluminum: ASTM B209, Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 3/4 inch wide with closed seal.
4. Springs: Twin spring set constructed of stainless steel, with ends flat and slotted to accept metal bands. Spring size is determined by manufacturer for application.

B. Staples: Outward-clinching insulation staples, nominal 3/4 inch wide, stainless steel or Monel.

C. Wire: 0.080-inch nickel-copper alloy.

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

- a. C & F Wire.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.
- B. Clean and prepare surfaces to be insulated. Before insulating, apply a corrosion coating to insulated surfaces as follows:
 - 1. Stainless Steel: Coat 300 series stainless steel with an epoxy primer 5 mils thick and an epoxy finish 5 mils thick if operating in a temperature range between 140 and 300 deg F. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.
 - 2. Carbon Steel: Coat carbon steel operating at a service temperature of between 32 and 300 deg F with an epoxy coating. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.
- C. Coordinate insulation installation with the tradesman installing heat tracing. Comply with requirements for heat tracing that apply to insulation.
- D. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless steel surfaces, use demineralized water.

3.2 GENERAL INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping, including fittings, valves, and specialties.
- B. Install insulation materials, forms, vapor barriers or retarders, jackets, and of thicknesses required for each item of pipe system, as specified in insulation system schedules.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, compress, or otherwise damage insulation or jacket.
- D. Install insulation with longitudinal seams at top and bottom (12 o'clock and 6 o'clock positions) of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.

- G. Keep insulation materials dry during storage, application, and finishing. Replace insulation materials that get wet during storage or in the installation process before being properly covered and sealed in accordance with the Contract Documents, unless otherwise approved by the engineer of record.
- H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- I. Install insulation with least number of joints practical.
- J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
 - 1. Install insulation continuously through hangers and around anchor attachments.
 - 2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends attached to structure with vapor-barrier mastic.
 - 3. Install insert materials and insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
 - 4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.
- K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- L. Install insulation with factory-applied jackets as follows:
 - 1. Draw jacket tight and smooth, but not to the extent of creating wrinkles or areas of compression in the insulation.
 - 2. Cover circumferential joints with 3-inch-wide strips, of same material as insulation jacket. Secure strips with adhesive and outward-clinching staples along both edges of strip, spaced 4 inches o.c.
 - 3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward-clinching staples along edge at 4 inches o.c.
 - 4. For below-ambient services, apply vapor-barrier mastic over staples.
 - 5. Cover joints and seams with tape, in accordance with insulation material manufacturer's written instructions, to maintain vapor seal.
 - 6. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.
- M. Cut insulation in a manner to avoid compressing insulation.
- N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

- O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches in similar fashion to butt joints.
- P. For above-ambient services, do not install insulation to the following:
 - 1. Vibration-control devices.
 - 2. Testing agency labels and stamps.
 - 3. Nameplates and data plates.

3.3 PENETRATIONS

- A. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

3.4 GENERAL PIPE INSULATION INSTALLATION

- A. Requirements in this article generally apply to all insulation materials, except where more specific requirements are specified in various pipe insulation material installation articles below.
- B. Insulation Installation on Fittings, Valves, Strainers, Flanges, Mechanical Couplings, and Unions:
 - 1. Install insulation over fittings, valves, strainers, flanges, mechanical couplings, unions, and other specialties with continuous thermal and vapor-retarder integrity unless otherwise indicated.
 - 2. Insulate pipe elbows using prefabricated fitting insulation made from same material and density as that of adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
 - 3. Insulate tee fittings with prefabricated fitting insulation of same material and thickness as that used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
 - 4. Insulate valves using prefabricated fitting insulation of same material, density, and thickness as that used for adjacent pipe. Overlap adjoining pipe insulation by not less than 2 times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
 - 5. Insulate strainers using prefabricated fitting insulation of same material, density, and thickness as that used for adjacent pipe. Overlap adjoining pipe insulation by not less than 2 times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers, so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a

removable reusable insulation cover. For below-ambient services, provide a design that maintains vapor barrier.

6. Insulate flanges, mechanical couplings, and unions using a section of oversized preformed pipe insulation to fit. Overlap adjoining pipe insulation by not less than 2 times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Stencil or label the outside insulation jacket of each union with the word "union" matching size and color of pipe labels.
 7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below-ambient services and a breather mastic for above-ambient services. Reinforce the mastic with reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
 8. For services not specified to receive a field-applied jacket, except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing, using PVC tape.
- C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.
- D. Install removable insulation covers at locations indicated. Installation shall conform to the following:
1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as that of adjoining pipe insulation.
 2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union at least 2 times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover in place with stainless steel or aluminum bands. Select band material compatible with insulation and jacket.
 3. Construct removable valve insulation covers in same manner as for flanges, except divide the two-part section on the vertical center line of valve body.
 4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.
 5. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.

3.5 INSTALLATION OF MINERAL-FIBER INSULATION

- A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of preformed pipe insulation to pipe with wire or bands, and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above-ambient surfaces, secure laps with outward-clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets on below-ambient surfaces, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive, as recommended by insulation material manufacturer, and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as that of straight segments of pipe insulation when available.
2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of same material as that of straight segments of pipe insulation when available.
2. When preformed sections are not available, install mitered sections of pipe insulation to valve body.
3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
4. Install insulation to flanges as specified for flange insulation application.

3.6 INSTALLATION OF GLASS-FIBER AND MINERAL WOOL INSULATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of preformed pipe insulation to pipe with wire or bands, and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with jackets on above-ambient surfaces, secure laps with outward-clinched staples at 6 inches o.c.

4. For insulation with jackets on below-ambient surfaces, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive, as recommended by insulation material manufacturer, and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install prefabricated pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with glass-fiber or mineral-wool blanket insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install prefabricated sections of same material as that of straight segments of pipe insulation when available.
2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install prefabricated sections of same material as that of straight segments of pipe insulation when available.
2. When prefabricated sections are not available, install fabricated sections of pipe insulation to valve body.
3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
4. Install insulation to flanges as specified for flange insulation application.

3.7 INSTALLATION OF FIELD-APPLIED JACKETS

A. Where glass-cloth jackets are indicated, install directly over bare insulation or insulation with factory-applied jackets.

1. Draw jacket smooth and tight to surface with 2-inch overlap at seams and joints.
2. Embed glass cloth between two 0.062-inch-thick coats of lagging adhesive.
3. Completely encapsulate insulation with coating, leaving no exposed insulation.

B. Where FSK jackets are indicated, install as follows:

1. Draw jacket material smooth and tight.
2. Install lap or joint strips with same material as jacket.
3. Secure jacket to insulation with manufacturer's recommended adhesive.
4. Install jacket with 1-1/2-inch laps at longitudinal seams and 3-inch-wide joint strips at end joints.

5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-barrier mastic.
- C. Where PVC jackets are indicated and for horizontal applications, install with 1-inch overlap at longitudinal seams and end joints. Seal with manufacturer's recommended adhesive.
1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.
- D. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless steel bands 12 inches o.c. and at end joints.
- E. Where PVDC jackets are indicated, install as follows:
1. Apply three separate wraps of filament tape per insulation section to secure pipe insulation to pipe prior to installation of PVDC jacket.
 2. Wrap presized jackets around individual pipe insulation sections, with one end overlapping the previously installed sheet. Install presized jacket with an approximate overlap at butt joint of 2 inches over the previous section. Adhere lap seal using adhesive or SSL, and then apply 1-1/4 circumferences of appropriate PVDC tape around overlapped butt joint.
 3. Continuous jacket can be spiral-wrapped around a length of pipe insulation. Apply adhesive or PVDC tape at overlapped spiral edge. When electing to use adhesives, refer to manufacturer's written instructions for application of adhesives along this spiral edge to maintain a permanent bond.
 4. Jacket can be wrapped in cigarette fashion along length of roll for insulation systems with an outer circumference of 33-1/2 inches or less. The 33-1/2-inch-circumference limit allows for 2-inch-overlap seal. Using the length of roll allows for longer sections of jacket to be installed at one time. Use adhesive on the lap seal. Visually inspect lap seal for "fishmouthing," and use PVDC tape along lap seal to secure joint.
 5. Repair holes or tears in PVDC jacket by placing PVDC tape over the hole or tear and wrapping a minimum of 1-1/4 circumferences to avoid damage to tape edges.

3.8 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections: Inspect pipe, fittings, strainers, and valves, randomly selected by Architect, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to three locations of straight pipe, three locations of threaded fittings, three locations of welded fittings, two locations of threaded strainers, two locations of welded strainers, three locations of threaded valves, and three locations of flanged valves for each pipe service defined in the "Piping Insulation Schedule, General" Article.

C. All insulation applications will be considered defective if they do not pass tests and inspections.

D. Prepare test and inspection reports.

3.9 PIPING INSULATION SCHEDULE, GENERAL

A. Insulation conductivity and thickness per pipe size shall comply with schedules in this Section or with requirements of authorities having jurisdiction, whichever is more stringent.

B. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.

C. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:

1. Underground piping.
2. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

3.10 INDOOR PIPING INSULATION SCHEDULE

A. Refrigerant Suction Piping:

1. All Pipe Sizes: Insulation shall be one of the following:
 - a. Flexible Elastomeric: 1 inch thick.

3.11 INDOOR, FIELD-APPLIED JACKET SCHEDULE

A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.

3.12 OUTDOOR, FIELD APPLIED JACKET SCHEDULE

A. Install jacket over insulation material. For insulation factory-applied jacket, install the field-applied jacket over the factory-applied jacket.

B. Piping, Exposed:

1. Provide Polyguard Alumaguard or equal wrap for all exposed refrigerant piping. This product shall be a flexible weather-proffing jacket with self-healing membrane, multi-ply, UV-resistant aluminum foil/polymer laminate, self-adhesive, and 10-year warranty.

END OF SECTION 230719

SECTION 232300

REFRIGERANT PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Copper tube and fittings.
2. Refrigerants.

1.2 ACTION SUBMITTALS

A. Product Data Submittals: For each product.

1. Submit data for each type of refrigerant piping, fitting, valve, piping specialty, and refrigerant.

1.3 INFORMATIONAL SUBMITTALS

1.4 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.5 QUALITY ASSURANCE

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Comply with ASHRAE 15.

B. Line Test Pressure for Refrigerant R-410A:

1. Suction Lines for Heat-Pump Applications: 535 psig.
2. Hot-Gas and Liquid Lines: 535 psig.

2.2 COPPER TUBE AND FITTINGS

A. Soft Copper Tube: ASTM B280, Type ACR.

- B. Rigid Copper Tube: ASTM B88, Type L.
- C. Wrought-Copper Fittings, Brazed Joint: ASME B16.50.
- D. Brazing Filler Metals: AWS A5.8M/A5.8.

2.3 REFRIGERANTS

- A. R-410A, ASHRAE 34: Pentafluoroethane/Difluoromethane.

PART 3 - EXECUTION

3.1 PIPING APPLICATION SCHEDULES R-410A

- A. Suction, Hot-Gas, and Liquid Tubing for Heat-Pump Applications, NPS 4 (DN 100) and Smaller: Copper, Type ACR, drawn-temper tubing and wrought-copper fittings with brazed joints.
- B. PIPING INSTALLATIONS FOR REFRIGERANT R-410A EXPOSED AND INACCESSIBLE LOCATIONS SHALL BE ACR. REFRIGERANT PIPING CONCEALED ABOVE LAY-IN TILE CEILINGS MAY BE SOFT TUBING.

3.2 VALVE AND SPECIALTY APPLICATIONS

- A. Install valves in suction and discharge lines of compressor.
- B. Except as otherwise indicated, install valves on inlet and outlet side of filter dryers.
- C. Install a full-size, three-valve bypass around filter dryers.
- D. Install flexible connectors at compressors.

3.3 INSTALLATION OF PIPING, GENERAL

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems; indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Shop Drawings.
- B. Install refrigerant piping in accordance with ASHRAE 15.
- C. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- F. Install piping adjacent to machines to allow service and maintenance.
- G. Install piping free of sags and bends.
- H. Install fittings for changes in direction and branch connections.
- I. Select system components with pressure rating equal to or greater than system operating pressure.
- J. Install piping as short and direct as possible, with a minimum number of joints, elbows, and fittings.
- K. Arrange piping to allow inspection and service of refrigeration equipment. Install valves and specialties in accessible locations to allow for service and inspection. Install access doors or panels as specified in Section 083113 "Access Doors and Frames" if valves or equipment requiring maintenance is concealed behind finished surfaces.
- L. Install refrigerant piping in protective conduit where installed belowground.
- M. Install refrigerant piping in rigid or flexible conduit in locations where exposed to mechanical injury.
- N. Slope refrigerant piping as follows:
 - 1. Install horizontal hot-gas discharge piping with a uniform slope downward away from compressor.
 - 2. Install horizontal suction lines with a uniform slope downward to compressor.
 - 3. Install traps and double risers to entrain oil in vertical runs.
 - 4. Liquid lines may be installed level.
- O. When brazing or soldering, remove solenoid-valve coils and sight glasses; also remove valve stems, seats, packing, and accessible internal parts of refrigerant specialties. Do not apply heat near expansion-valve bulb.
- P. Install piping with adequate clearance between pipe and adjacent walls and hangers or between pipes for insulation installation.
- Q. Identify refrigerant piping and valves in accordance with Section 230553 "Identification for HVAC Piping and Equipment."
- R. Install sleeves for piping penetrations of walls, ceilings, and floors.
- S. Install sleeve seals for piping penetrations of concrete walls and slabs.
- T. Install escutcheons for piping penetrations of walls, ceilings, and floors.

3.4 PIPE JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- C. Fill pipe and fittings with an inert gas (nitrogen or carbon dioxide), during brazing or welding, to prevent scale formation.
- D. Brazed Joints: Construct joints in accordance with AWS BRH, "Brazing Handbook," Ch. 35, "Pipe and Tubing."
 - 1. Use Type BCuP (copper-phosphorus) alloy for joining copper socket fittings with copper pipe.
 - 2. Use Type BAg (cadmium-free silver) alloy for joining copper with bronze or steel.
- E. Threaded Joints: Thread steel pipe with tapered pipe threads in accordance with ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and to restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads unless dry-seal threading is specified.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

3.5 INSTALLATION OF HANGERS AND SUPPORTS

- A. Comply with Section 230529 "Hangers and Supports for HVAC Piping and Equipment" for hangers, supports, and anchor devices.
- B. Install the following pipe attachments:
 - 1. Adjustable steel clevis hangers for individual horizontal runs less than 20 ft. long.
 - 2. Roller hangers and spring hangers for individual horizontal runs 20 ft. or longer.
 - 3. Pipe Roller: MSS SP-58, Type 44 for multiple horizontal piping 20 ft. or longer, supported on a trapeze.
 - 4. Spring hangers to support vertical runs.
 - 5. Copper-clad hangers and supports for hangers and supports in direct contact with copper pipe.
- C. Install hangers for copper tubing with maximum horizontal spacing and minimum rod diameters, to comply with MSS SP-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
- D. Support horizontal piping within 12 inches of each fitting.
- E. Support vertical runs of copper tubing to comply with MSS SP-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

3.6 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Tests and Inspections:
 - 1. Comply with ASME B31.5, Chapter VI.
 - 2. Test refrigerant piping, specialties, and receivers. Isolate compressor, condenser, evaporator, and safety devices from test pressure if they are not rated above the test pressure.
 - 3. Test high- and low-pressure side piping of each system separately at not less than the pressures indicated in "Performance Requirements" Article.
 - a. Fill system with nitrogen to the required test pressure.
 - b. System must maintain test pressure at the manifold gauge throughout duration of test.
 - c. Test joints and fittings with electronic leak detector or by brushing a small amount of soap and glycerin solution over joints.
 - d. Remake leaking joints using new materials, and retest until satisfactory results are achieved.
- C. Prepare test and inspection reports.

3.7 SYSTEM CHARGING

- A. Charge system using the following procedures:
 - 1. Install core in filter dryers after leak test but before evacuation.
 - 2. Evacuate entire refrigerant system with a vacuum pump to 500 micrometers. If vacuum holds for 12 hours, system is ready for charging.
 - 3. Break vacuum with refrigerant gas, allowing pressure to build up to 2 psig.
 - 4. Charge system with a new filter-dryer core in charging line.

3.8 ADJUSTING

- A. Adjust high- and low-pressure switch settings to avoid short cycling in response to fluctuating suction pressure.
- B. Perform the following adjustments before operating the refrigeration system, according to manufacturer's written instructions:
 - 1. Open shutoff valves in condenser water circuit.
 - 2. Verify that compressor oil level is correct.
 - 3. Open compressor suction and discharge valves.
 - 4. Open refrigerant valves but not bypass valves that are used for other purposes.
 - 5. Check open compressor-motor alignment and verify lubrication for motors and bearings.
- C. Replace core of replaceable filter dryer after system has been adjusted and after design flow rates and pressures are established.

END OF SECTION 232300

SECTION 233113

METAL DUCTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Single-wall rectangular ducts and fittings.
2. Single-wall round ducts and fittings.
3. Sheet metal materials.
4. Sealants and gaskets.
5. Hangers and supports.

B. Related Requirements:

1. Section 230593 "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing requirements for metal ducts.
2. Section 233300 "Air Duct Accessories" for dampers, sound-control devices, duct-mounting access doors and panels, turning vanes, and flexible ducts.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of the following products:

1. Sealants and gaskets.

1.3 INFORMATIONAL SUBMITTALS

1.4 QUALITY ASSURANCE

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Airstream Surfaces: Surfaces in contact with airstream comply with requirements in ASHRAE 62.1.
- B. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment," and Section 7 - "Construction and System Startup."

- C. ASHRAE/IES Compliance: Applicable requirements in ASHRAE/IES 90.1, Section 6.4.4 - "HVAC System Construction and Insulation."
- D. Duct Dimensions: Unless otherwise indicated, all duct dimensions indicated on Drawings are inside clear dimensions and do not include insulation or duct wall thickness.

2.2 SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS

- A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.
 - 1. Construct ducts of galvanized sheet steel unless otherwise indicated.
- B. Transverse Joints: Fabricate joints in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-1, "Rectangular Duct/Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
 - 1. For ducts with longest side less than 36 inches, select joint types in accordance with Figure 2-1.
- C. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Ch. 4, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.3 SINGLE-WALL ROUND DUCTS AND FITTINGS

- A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Ch. 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.
 - 1. Construct ducts of galvanized sheet steel unless otherwise indicated.
- B. Transverse Joints: Select joint types and fabricate in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Round Duct Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- C. Longitudinal Seams: Select seam types and fabricate in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Round Duct Longitudinal Seams," for static-pressure class, applicable sealing requirements,

materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

- D. Tees and Laterals: Select types and fabricate in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.4 SHEET METAL MATERIALS

- A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials are to be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.
- B. Galvanized Sheet Steel: Comply with ASTM A653/A653M.
 - 1. Galvanized Coating Designation: G90.
 - 2. Finishes for Surfaces Exposed to View: Mill phosphatized.
- C. Reinforcement Shapes and Plates: ASTM A36/A36M, steel plates, shapes, and bars; black and galvanized.
 - 1. Where black- and galvanized-steel shapes and plates are used to reinforce aluminum ducts, isolate the different metals with butyl rubber, neoprene, or EPDM gasket materials.
- D. Stainless Steel Sheets: Comply with ASTM A480/A480M, Type 304 or 316, as indicated in "Duct Schedule" Article; cold rolled, annealed, sheet. Exposed surface finish is to be No. 2B, No. 2D, No. 3, or No. 4 as indicated in "Duct Schedule" Article.
- E. Aluminum Sheets: Comply with ASTM B209 Alloy 3003, H14 temper; with mill finish for concealed ducts, and standard, one-side bright finish for duct surfaces exposed to view.
- F. Tie Rods: Galvanized steel, 1/4-inch-minimum diameter for lengths 36 inches or less; 3/8-inch-minimum diameter for lengths longer than 36 inches.

2.5 SEALANT AND GASKETS

- A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets are to be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested in accordance with UL 723; certified by an NRTL.
- B. Water-Based Joint and Seam Sealant:
 - 1. Application Method: Brush on.

2. Solids Content: Minimum 65 percent.
3. Shore A Hardness: Minimum 20.
4. Water resistant.
5. Mold and mildew resistant.
6. VOC: Maximum 75 g/L (less water).
7. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
8. Service: Indoor or outdoor.
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.
10. Maximum Static-Pressure Class: 10-inch wg, positive or negative.
11. Service: Indoor or outdoor.
12. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

2.6 HANGERS AND SUPPORTS

- A. Hanger Rods for Noncorrosive Environments: Galvanized-steel rods and nuts.
- B. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct."
- C. Steel Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A603.
- D. Steel Cables for Stainless Steel Ducts: Stainless steel complying with ASTM A492.
- E. Steel Cable End Connections: Galvanized-steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.
- F. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.
- G. Trapeze and Riser Supports:
 1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.

PART 3 - EXECUTION

3.1 DUCT INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and coordination drawings.
- B. Install ducts in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.

- C. Install ducts in maximum practical lengths with fewest possible joints.
- D. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.
- E. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.
- F. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.
- G. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.
- H. Route ducts to avoid passing through transformer vaults and electrical equipment rooms and enclosures.
- I. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches.
- J. Protect duct interiors from moisture, construction debris and dust, and other foreign materials both before and after installation. Comply with SMACNA's "IAQ Guidelines for Occupied Buildings Under Construction," Appendix G, "Duct Cleanliness for New Construction Guidelines."
- K. Elbows: Refer to details on drawings for acceptable fittings.
 - 1. Fabricate 90-degree rectangular mitered elbows to include turning vanes.
 - 2. Fabricate 90-degree round elbows with a minimum of three segments for 12 inches and smaller and a minimum of five segments for 14 inches and larger.
- L. Branch Connections: Use lateral or conical branch connections.

3.2 INSTALLATION OF EXPOSED DUCTWORK

- A. Protect ducts exposed in finished spaces from being dented, scratched, or damaged.
- B. Trim duct sealants flush with metal. Create a smooth and uniform exposed bead. Do not use two-part tape sealing system.
- C. Grind welds to provide smooth surface free of burrs, sharp edges, and weld splatter. When welding stainless steel with a No. 3 or 4 finish, grind the welds flush, polish the exposed welds, and treat the welds to remove discoloration caused by welding.
- D. Maintain consistency, symmetry, and uniformity in arrangement and fabrication of fittings, hangers and supports, duct accessories, and air outlets.
- E. Repair or replace damaged sections and finished work that does not comply with these requirements.

3.3 DUCT SEALING

- A. Seal ducts for duct static-pressure, seal classes, and leakage classes specified in "Duct Schedule" Article in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

3.4 HANGER AND SUPPORT INSTALLATION

- A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 5, "Hangers and Supports."
- B. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.
 - 1. Where practical, install concrete inserts before placing concrete.
 - 2. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
 - 3. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches thick.
 - 4. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches thick.
- C. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.
- D. Hangers Exposed to View: Threaded rod and angle or channel supports.
- E. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum intervals of 16 feet.
- F. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

3.5 DUCTWORK CONNECTIONS

- A. Make connections to equipment with flexible connectors complying with Section 233300 "Air Duct Accessories."
- B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

3.6 PAINTING

- A. Paint interior of metal ducts that are visible through registers and grilles and that do not have duct liner. Apply one coat of flat, black, latex paint over a compatible galvanized-steel primer. Paint materials and application requirements are specified in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."

3.7 STARTUP

- A. Air Balance: Comply with requirements in Section 230593 "Testing, Adjusting, and Balancing for HVAC."

3.8 DUCT SCHEDULE

- A. Fabricate ducts with galvanized sheet steel except as otherwise indicated and as follows:
 - 1. Fabricate all ducts to achieve SMACNA pressure class, seal class, and leakage class as indicated below.
- B. Supply, Return, General Exhaust, and Outside Air Ducts:
 - 1. Ducts Connected to Air-Handling Units:
 - a. Pressure Class (Supply): Positive 2-inch wg.
 - b. Pressure Class (Return, Exhaust, Outside Air): Negative 2-inch wg.
 - c. Minimum SMACNA Seal Class: B.
 - d. SMACNA Leakage Class for Rectangular: 16.
 - e. SMACNA Leakage Class for Round and Flat Oval: 16.
 - 2. Ducts Connected to Equipment Not Listed Above:
 - a. Pressure Class: Positive 2-inch wg.
 - b. Minimum SMACNA Seal Class: B.
 - c. SMACNA Leakage Class for Rectangular: 16.
 - d. SMACNA Leakage Class for Round and Flat Oval: 16.
- C. Elbow Configuration:
 - 1. Refer to details on drawings. Alternative fittings are unacceptable.

END OF SECTION 233113

SECTION 233300

AIR DUCT ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Manual volume dampers.
2. Control dampers.
3. Turning vanes.
4. Flexible connectors.

B. Related Requirements:

1. Section 233346 "Flexible Ducts" for insulated and non-insulated flexible ducts.

1.2 ACTION SUBMITTALS

- ###### A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

1.4 CLOSEOUT SUBMITTALS

- ###### A. Operation and maintenance data.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- ###### A. Comply with NFPA 90A and NFPA 90B.
- ###### B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

2.2 MANUAL VOLUME DAMPERS

- ###### A. Standard, Steel, Manual Volume Dampers:

1. Performance:
 - a. Leakage Rating Class III: Leakage not exceeding 40 cfm/sq. ft. against 1-inch wg differential static pressure.
2. Construction:
 - a. Linkage out of airstream.
 - b. Suitable for horizontal or vertical airflow applications.
3. Frames:
 - a. Hat-shaped, 16-gauge-thick, galvanized sheet steel.
 - b. Mitered and welded corners.
 - c. Flanges for attaching to walls and flangeless frames for installing in ducts.
4. Blades:
 - a. Multiple or single blade.
 - b. Parallel- or opposed-blade design.
 - c. Stiffen damper blades for stability.
 - d. Galvanized steel; 16 gauge thick.
5. Blade Axles: Stainless steel.
6. Bearings:
 - a. Oil-impregnated bronze.
 - b. Dampers mounted with vertical blades to have thrust bearing at each end of every blade.
7. Tie Bars and Brackets: Galvanized steel.
8. Locking device to hold damper blades in a fixed position without vibration.

B. Jackshaft:

1. Size: 0.5-inch diameter.
2. Material: Galvanized-steel pipe rotating within pipe-bearing assembly mounted on supports at each mullion and at each end of multiple-damper assemblies.
3. Length and Number of Mountings: As required to connect linkage of each damper in multiple-damper assembly.

C. Damper Hardware:

1. Zinc-plated, die-cast core with dial and handle, made of 3/32-inch-thick zinc-plated steel, and a 3/4-inch hexagon locking nut.
2. Include center hole to suit damper operating-rod size.
3. Include elevated platform for insulated duct mounting.

2.3 CONTROL DAMPERS

A. General Requirements:

1. Unless otherwise indicated, use parallel-blade configuration for two-position control, equipment isolation service, and when mixing two airstreams. For other applications, use opposed-blade configuration.
2. Factory or field assemble multiple damper sections to provide a single damper assembly of size required by the application.

B. Performance:

1. AMCA Certification: Test and rate in accordance with AMCA 511.
2. Leakage:
 - a. Class IA: Leakage shall not exceed 3 cfm/sq. ft. against 1-inch wg differential static pressure.
 - b. Class I: Leakage shall not exceed 4 cfm/sq. ft. against 1-inch wg differential static pressure.
 - c. Class II: Leakage shall not exceed 10 cfm/sq. ft. against 1-inch wg differential static pressure.
 - d. Class III: Leakage shall not exceed 40 cfm/sq. ft. against 1-inch wg differential static pressure.
3. Pressure Drop: 0.05 inch wg at 1500 fpm across a 24-by-24-inch damper when tested in accordance with AMCA 500-D, Figure 5.3.
4. Velocity: Up to 3000 fpm.
5. Temperature: Minus 25 to plus 180 deg F.
6. Pressure Rating: Damper close-off pressure equal to fan shutoff pressure with a maximum blade deflection of 1/200 of blade length.

C. Construction:

1. Linkage out of airstream.
2. Suitable for horizontal or vertical airflow applications.
3. Frames:
 - a. Hat, U, or angle shaped.
 - b. 16-gauge-thick, galvanized sheet steel.
 - c. Mitered and welded corners.
 - d. Flanges for attaching to walls and flangeless frames for installing in ducts.
4. Blades:
 - a. Multiple blade with maximum blade width of 6 inches.
 - b. Opposed-blade design.
 - c. Galvanized steel.
 - d. 16-gauge-thick single skin.
5. Blade Edging Seals:
 - a. Replaceable PVC.
6. Blade Jamb Seal: Flexible stainless steel, compression type.
7. Blade Axles: 1/2-inch diameter; galvanized steel.
8. Blade-Linkage Hardware: Zinc-plated steel and brass; ends sealed against blade bearings. Linkage mounted out of air stream.
9. Bearings:
 - a. Oil-impregnated bronze.
 - b. Dampers mounted with vertical blades to have thrust bearings at each end of every blade.

D. Damper Actuator - Electric:

1. Electric – See drawings.
2. UL 873, plenum rated.
3. Two position with fail-safe spring return.
 - a. Sufficient motor torque and spring torque to drive damper fully open and fully closed with adequate force to achieve required damper seal.
 - b. Minimum 90-degree drive rotation.
4. Clockwise or counterclockwise drive rotation as required for application.

5. Environmental Operating Range:
 - a. Temperature: Minus 40 to plus 130 deg F.
 - b. Humidity: 5 to 95 percent relative humidity noncondensing.
 6. Environmental enclosure: NEMA 2.
 7. Actuator to be factory mounted and provided with a single-point wiring connection.
- E. Controllers, Electrical Devices, and Wiring:
1. Electrical Connection: 24 V, 60 Hz.

2.4 TURNING VANES

- A. Manufactured Turning Vanes for Metal Ducts: Fabricate curved blades of galvanized sheet steel; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.
 1. Acoustic Turning Vanes: Fabricate airfoil-shaped aluminum extrusions with perforated faces and fibrous-glass fill.
- B. General Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figure 4-3, "Vaness and Vane Runners," and Figure 4-4, "Vane Support in Elbows."
- C. Vane Construction:
 1. Single wall.
 2. Single wall for ducts up to 48 inches wide and double wall for larger dimensions.

2.5 FLEXIBLE CONNECTORS

- A. Fire-Performance Characteristics: Adhesives, sealants, fabric materials, and accessory materials shall have flame-spread index not exceeding 25 and smoke-developed index not exceeding 50 when tested in accordance with ASTM E84.
- B. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.
- C. Materials: Flame-retardant or noncombustible fabrics.
- D. Coatings and Adhesives: Comply with UL 181, Class 1.
- E. Indoor System, Flexible Connector Fabric: Glass fabric double coated with neoprene.
 1. Minimum Weight: 26 oz./sq. yd..
 2. Tensile Strength: 480 lbf/inch in the warp and 360 lbf/inch in the filling.
 3. Service Temperature: Minus 40 to plus 200 deg F.

F. Thrust Limits: Combination coil spring and elastomeric insert with spring and insert in compression, and with a load stop. Include rod and angle-iron brackets for attaching to fan discharge and duct.

1. Frame: Steel, fabricated for connection to threaded rods and to allow for a maximum of 30 degrees of angular rod misalignment without binding or reducing isolation efficiency.
2. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
3. Minimum Additional Travel: 50 percent of the required deflection at rated load.
4. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
6. Elastomeric Element: Molded, oil-resistant rubber or neoprene.
7. Coil Spring: Factory set and field adjustable for a maximum of 1/4-inch movement at start and stop.

2.6 DUCT ACCESSORY HARDWARE

- A. Instrument Test Holes: Cast iron or cast aluminum to suit duct material, including screw cap and gasket. Size to allow insertion of pitot tube and other testing instruments and of length to suit duct-insulation thickness.
- B. Adhesives: High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.

2.7 MATERIALS

- A. Galvanized Sheet Steel: Comply with ASTM A653/A653M.
1. Galvanized Coating Designation: G90.
 2. Exposed-Surface Finish: Mill phosphatized.
- B. Stainless Steel Sheets: Comply with ASTM A480/A480M, Type 304, and having a No. 2 finish for concealed ducts and finish for exposed ducts.
- C. Aluminum Sheets: Comply with ASTM B209, Alloy 3003, Temper H14; with mill finish for concealed ducts and standard, one-side bright finish for exposed ducts.
- D. Extruded Aluminum: Comply with ASTM B221, Alloy 6063, Temper T6.
- E. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts; compatible materials for aluminum and stainless steel ducts.
- F. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install duct accessories in accordance with applicable details in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for metal ducts and in NAIMA AH116 for fibrous-glass ducts.
- B. Install duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel and fibrous-glass ducts, stainless steel accessories in stainless steel ducts, and aluminum accessories in aluminum ducts.
- C. Install control dampers at inlet of exhaust fans or exhaust ducts as close as possible to exhaust fan unless otherwise indicated.
- D. Where multiple damper sections are necessary to achieve required dimensions, provide reinforcement to fully support damper assembly when fully closed at full system design static pressure.
- E. Install volume dampers at points on supply, return, and exhaust systems where branches extend from larger ducts. Where dampers are installed in ducts having duct liner, install dampers with hat channels of same depth as liner, and terminate liner with nosing at hat channel.
 - 1. Install steel volume dampers in steel ducts.
 - 2. Install aluminum volume dampers in aluminum ducts.
- F. Set dampers to fully open position before testing, adjusting, and balancing.
- G. Install test holes at fan inlets and outlets and elsewhere as indicated and as needed for testing and balancing.
- H. Install duct access doors on sides of ducts to allow for inspecting, adjusting, and maintaining accessories and equipment at the following locations:
 - 1. Adjacent to and close enough to fire or smoke dampers, to reset or reinstall fusible links. Access doors for access to fire or smoke dampers having fusible links shall be pressure relief access doors and shall be outward operation for access doors installed upstream from dampers and inward operation for access doors installed downstream from dampers.
 - 2. Upstream from turning vanes.
 - 3. Control devices requiring inspection.
 - 4. Elsewhere as indicated.
- I. Install access doors with swing against duct static pressure.
- J. Access Door Sizes:
 - 1. Head and Hand Access: 18 by 10 inches.
- K. Install flexible connectors to connect ducts to equipment.

- L. For fans developing static pressures of 5 inches wg and more, cover flexible connectors with loaded vinyl sheet held in place with metal straps.
- M. Install duct test holes where required for testing and balancing purposes.
- N. Install thrust limits at centerline of thrust, symmetrical on both sides of equipment. Attach thrust limits at centerline of thrust and adjust to a maximum of 1/4-inch movement during start and stop of fans.

END OF SECTION 233300

SECTION 233346

FLEXIBLE DUCTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Flexible ducts, insulated.

1.2 ACTION SUBMITTALS

A. Product data.

- B. Product Data Submittals: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

PART 2 - PRODUCTS

2.1 ASSEMBLY DESCRIPTION

- A. Comply with NFPA 90A and NFPA 90B.

- B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials must be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

- C. Comply with the Air Duct Council's (formerly, Air Diffusion Council) "ADC Flexible Air Duct Test Code - FD 72-R1" and "Flexible Duct Performance & Installation Standards."

- D. Comply with ASTM E96/E96M.

2.2 FLEXIBLE DUCTS, INSULATED

- A. Standard: Product is to be UL 181 listed and bearing the UL label.

- B. Flexible Ducts, Insulated - Class 1, Two-Ply Vinyl Film Supported by Helically Wound, Spring-Steel Wire; Fibrous-Glass Insulation:

1. Pressure Rating: 10 inch wg positive and 1.0 inch wg negative.

2. Maximum Air Velocity: 4000 fpm.
3. Temperature Range: Minus 10 to plus 160 deg F.
4. Insulation R-Value: R6 .
5. Vapor-Barrier Film: Aluminized.

PART 3 - EXECUTION

3.1 INSTALLATION OF FLEXIBLE DUCTS

- A. Install flexible ducts in accordance with applicable details in the following publications:
 1. ADC's "Flexible Duct Performance & Installation Standards" for flexible ducts.
 2. NAIMA AH116.
 3. SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for metal ducts.
 4. SMACNA's "Fibrous Glass Duct Construction Standards" for fibrous-glass ducts.
- B. Install in indoor applications only. Do not install flexible duct in locations where it will be exposed to UV lighting.
- C. Connect terminal units to supply ducts with maximum 12-inch lengths of flexible duct. Do not use flexible ducts to change directions.
- D. Connect diffusers and light troffer boots to ducts with maximum 60-inch lengths of flexible duct clamped or strapped in place.
- E. Connect flexible ducts to metal ducts with draw bands .
- F. Installation:
 1. Install ducts fully extended.
 2. Do not bend ducts across sharp corners.
 3. Bends of flexible ducting must not exceed a minimum of one-duct diameter.
 4. Avoid contact with metal fixtures, water lines, pipes, or conduits.
 5. Install flexible ducts in a direct line, without sags, twists, or turns.
 6. Install in accordance with ADC instructions.
- G. Supporting Flexible Ducts:
 1. Support flexible duct at manufacturer's recommended intervals, but at no greater distance than 4 ft.. Provide sufficient support so that maximum centerline sag is 1/2 in. per ft. between supports. A connection to rigid duct or equipment may be considered a support joint.
 2. Install extra supports at bends placed approximately one-duct diameter from center line of the bend.
 3. Ducts may rest on ceiling joists or truss supports. Spacing between supports must not exceed the maximum spacing in accordance with manufacturer's written installation instructions.

4. Vertically installed ducts must be stabilized by support straps at a maximum of 72 inches o.c.

END OF SECTION 233346

SECTION 233400

HVAC FANS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Ventilators, centrifugal - ceiling mounted.

1.2 ACTION SUBMITTALS

- A. Product data.
- B. Shop Drawings:
 - 1. Plans, elevations, sections, and attachment details.
 - 2. Details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 3. Diagrams for power, signal, and control wiring.
 - 4. Design Calculations: Calculate requirements for selecting vibration isolators and for designing vibration isolation bases.
 - 5. Vibration Isolation Base Details: Detail fabrication, including anchorages and attachments to structure and to supported equipment. Include adjustable motor bases, rails, and frames for equipment mounting.

1.3 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Floor plans showing fan rooms and fan system layouts, reflected ceiling plans, and other drawings required to illustrate relationships between components and adjacent structural and mechanical elements. Show support locations, type of support, and weight on each support. Indicate and certify field measurements.
- B. Startup service reports.
- C. Field quality-control reports.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.
 - 1. Operation in normal and emergency modes.
 - 2. Operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
- B. NFPA Compliance: Comply with NFPA 90A for design, fabrication, and installation of unit components.
- C. Capacities and Characteristics: Refer to schedule on Drawings.

2.2 VENTILATORS, CENTRIFUGAL - CEILING MOUNTED

- A. Greenheck, Panasonic, or Approved Equal
- B. Standards: Comply with UL 705.
- C. Housing: Steel, lined with acoustical insulation.
- D. Fan Wheel: Centrifugal wheels directly mounted on motor shaft. Fan shrouds, motor, and fan wheel are removable for service.
- E. Back-draft damper: Integral.
- F. Grille: Plastic, louvered grille with flange on intake and thumbscrew or spring retainer attachment to fan housing.
- G. Electrical Requirements: Junction box for electrical connection on housing and receptacle for motor plug-in.
- H. Accessories:
 - 1. Variable-Frequency Motor Controller: Solid-state control to reduce speed from 100 to less than 50 percent.
 - 2. Isolation: Rubber-in-shear vibration isolators.
 - 3. Manufacturer's standard roof jack or wall cap, and transition fittings.

2.3 MOTORS

- A. Comply with NEMA designation, temperature rating, service factor, and efficiency requirements for motors specified in Section 230500 "Common Work Results for HVAC."
- B. Where variable-frequency drives are indicated or scheduled, provide fan motor compatible with variable-frequency drive.

2.4 SOURCE QUALITY CONTROL

- A. AMCA Certification for Fan Sound Performance Rating: Test, rate, and label in accordance with AMCA 311.
- B. AMCA Certification for Fan Aerodynamic Performance Ratings: Test, rate, and label in accordance with AMCA 211.
- C. Fan Operating Limits: Classify fans in accordance with AMCA 99, Section 14.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Install fans level and plumb.
- B. Disassemble and reassemble units, as required for moving to the final location, in accordance with manufacturer's written instructions.
- C. Lift and support units with manufacturer's designated lifting or supporting points.
- D. Equipment Mounting:
 - 1. Install roof-mounted fans on roof curbs or support steel. See Drawings for specific requirements.
 - 2. Unit Support: Install fans level on structural curbs. Coordinate with duct connections. Coordinate wall penetrations and flashing with wall construction. Secure units to structural support with anchor bolts.
 - 3. Support duct-mounted and other hanging fans directly from the building structure, using suitable hanging systems as specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."
 - 4. Comply with requirements for vibration isolation and seismic-control devices specified in Section 230548 "Vibration and Seismic Controls for HVAC."
 - 5. Comply with requirements for vibration isolation devices specified in Section 230548.13 "Vibration Controls for HVAC."
- E. Unit Support: Coordinate with duct connections. Coordinate wall penetrations and flashing with wall construction. Secure units to structural support with anchor bolts.
- F. Install units with adequate clearances for service and maintenance.
- G. Label fans in accordance with requirements specified in Section 230553 "Identification for HVAC Piping and Equipment."

3.2 DUCTWORK CONNECTIONS

- A. Drawings indicate general arrangement of ducts and duct accessories. Make final duct connections with flexible connectors. Flexible connectors are specified in Section 233300 "Air Duct Accessories."

- B. Where installing ducts adjacent to fans, allow space for service and maintenance.

3.3 PIPING CONNECTIONS

- A. Install piping from scroll drain connection, with trap with seal equal to 1.5 times specified static pressure, to nearest floor drain with pipe sizes matching the drain connection.
- B. Install heat tracing on all drain piping subject to freezing temperature and as indicated on Drawings. Furnish and install heat tracing in accordance with Section 230533 "Heat Tracing for HVAC Piping."

3.4 ELECTRICAL CONNECTIONS

- A. Connect wiring in accordance with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- B. Ground equipment in accordance with Section 260526 "Grounding and Bonding for Electrical Systems."
- C. Install electrical devices furnished by manufacturer, but not factory mounted, in accordance with NFPA 70 and NECA 1.
- D. Install nameplate for each electrical connection, indicating electrical equipment designation and circuit number feeding connection.
 - 1. Nameplate is to be laminated acrylic or melamine plastic signs, as specified in Section 260553 "Identification for Electrical Systems."
 - 2. Nameplate is to be laminated acrylic or melamine plastic signs with a black background and engraved white letters at least 1/2 inch high.

3.5 CONTROL CONNECTIONS

- A. Install control and electrical power wiring to field-mounted control devices.
- B. Connect wiring in accordance with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

3.6 STARTUP SERVICE:

- A. Perform startup service.
 - 1. Complete installation and startup checks in accordance with manufacturer's written instructions.
 - 2. Verify that shipping, blocking, and bracing are removed.
 - 3. Verify that unit is secure on mountings and supporting devices and that connections to ducts and electrical components are complete. Verify that proper

thermal-overload protection is installed in motors, starters, and disconnect switches.

4. Verify that cleaning and adjusting are complete.
5. For direct-drive fans, verify proper motor rotation direction and verify fan wheel free rotation and smooth bearing operation.
6. For belt-drive fans, disconnect fan drive from motor, verify proper motor rotation direction, and verify fan wheel free rotation and smooth bearing operation. Reconnect fan drive system, align and adjust belts, and install belt guards.
7. Adjust belt tension.
8. Adjust damper linkages for proper damper operation.
9. Verify lubrication for bearings and other moving parts.
10. Verify that manual and automatic volume control and fire and smoke dampers in connected ductwork systems are in fully open position.
11. Disable automatic temperature-control operators, energize motor and confirm proper motor rotation and unit operation, adjust fan to indicated rpm, and measure and record motor voltage and amperage.
12. Shut unit down and reconnect automatic temperature-control operators.
13. Remove and replace malfunctioning units and retest as specified above.

3.7 ADJUSTING

- A. Adjust damper linkages for proper damper operation.
- B. Adjust belt tension.
- C. Lubricate bearings.
- D. Comply with requirements in Section 230593 "Testing, Adjusting, and Balancing for HVAC."

3.8 CLEANING

- A. After completing system installation and testing, adjusting, and balancing and after completing startup service, clean fans internally to remove foreign material and construction dirt and dust.

3.9 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- B. Perform tests and inspections.
 1. Fan Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
 2. Test and adjust controls and safeties.

3. Fans and components will be considered defective if they do not pass tests and inspections.
4. Prepare test and inspection reports.

3.10 DEMONSTRATION

- A. Train Owner's maintenance personnel to adjust, operate, and maintain HVAC fans.

END OF SECTION 233400

SECTION 233713.13

AIR DIFFUSERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Rectangular and square ceiling diffusers.

B. Related Requirements:

1. Section 233300 "Air Duct Accessories" for fire and smoke dampers and volume-control dampers not integral to diffusers.
2. Section 233713.23 "Air Registers and Grilles" for adjustable-bar register and grilles, fixed-face registers and grilles, and linear bar grilles.

1.2 ACTION SUBMITTALS

- ###### A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 CEILING DIFFUSERS – Refer to schedule on drawings

- A. Devices shall be specifically designed for variable-air-volume flows.
- B. Material: Aluminum.
- C. Finish: Anodized aluminum .
- D. Pattern: Adjustable.
- E. Dampers: Butterfly .

PART 3 - EXECUTION

3.1 INSTALLATION

- ###### A. Install diffusers level and plumb.

- B. Ceiling-Mounted Outlets and Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practical. For units installed in lay-in ceiling panels, locate units in the center of panel. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.
- C. Install diffusers with airtight connections to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.

3.2 ADJUSTING

- A. After installation, adjust diffusers to air patterns indicated, or as directed, before starting air balancing.

END OF SECTION 233713.13

SECTION 233713.23

REGISTERS AND GRILLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fixed face grilles.

B. Related Requirements:

1. Section 233300 "Air Duct Accessories" for fire and smoke dampers and volume-control dampers not integral to registers and grilles.
2. Section 233713.13 "Air Diffusers" for various types of air diffusers.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 GRILLES

- A. Fixed Face Grille: Refer to Schedule on Drawings.

1. Material: Steel .
2. Finish: Baked enamel, white .
3. Core Construction: Integral .
4. Frame: 1 inch wide.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install registers and grilles level and plumb.
- B. Outlets and Inlets Locations: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practical. For units installed in lay-in

ceiling panels, locate units in the center of panel. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.

- C. Install registers and grilles with airtight connections to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.

3.2 ADJUSTING

- A. After installation, adjust registers and grilles to air patterns indicated, or as directed, before starting air balancing.

END OF SECTION 233713.23

SECTION 238126

SPLIT-SYSTEM AIR-CONDITIONERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes split-system air-conditioning and heat-pump units consisting of separate evaporator-fan and compressor-condenser components.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

1.3 INFORMATIONAL SUBMITTALS

- A. Warranty: Sample of special warranty.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

1.5 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of split-system air-conditioning units that fail in materials or workmanship within specified warranty period.

1. Warranty Period:

- a. For Compressor: Five year(s) from date of Substantial Completion.
- b. For Parts: One year(s) from date of Substantial Completion.
- c. For Labor: One year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Carrier, Trane, Lennox, or approved equal.

2.2 INDOOR UNITS (5 TONS OR LESS)

A. Evaporator-Fan Components:

1. Cabinet: Enameled steel with removable panels.
2. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins and thermal-expansion valve. Comply with ARI 206/110.
3. Fan: Direct drive, centrifugal.
4. Fan Motors:
 - a. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements specified in Section 230513 "Common Motor Requirements for HVAC Equipment."
 - b. Multitapped, multispeed with internal thermal protection and permanent lubrication.
 - c. Enclosure Type: Totally enclosed, fan cooled.
 - d. NEMA Premium (TM) efficient motors as defined in NEMA MG 1.
 - e. Controllers, Electrical Devices, and Wiring: Comply with requirements for electrical devices and connections specified in electrical Sections.
 - f. Mount unit-mounted disconnect switches on exterior or interior of unit.
5. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.
6. Condensate Drain Pans:
 - a. Fabricated with one percent slope in at least two planes to collect condensate from cooling coils (including coil piping connections, coil headers, and return bends) and humidifiers, and to direct water toward drain connection.
 - 1) Length: Extend drain pan downstream from leaving face to comply with ASHRAE 62.1.
 - 2) Depth: A minimum of 1 inch deep.
 - b. Drain Connection: Located at lowest point of pan and sized to prevent overflow. Terminate with threaded nipple on one end of pan.
 - 1) Minimum Connection Size: NPS 1.

2.3 ACCESSORIES

- A. Thermostat: Low voltage with subbase to control compressor and evaporator fan.
- B. Refrigerant Line Kits: Soft-annealed copper suction and liquid lines factory cleaned, dried, pressurized, and sealed; factory-insulated suction line with flared fittings at both ends.
- C. Drain Hose: For condensate.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install units level and plumb.
- B. Install evaporator-fan components using manufacturer's standard mounting devices securely fastened to building structure.
- C. Equipment Mounting:
 - 1. Install ground-mounted, compressor-condenser components on cast-in-place concrete equipment base(s). Comply with requirements for equipment bases and foundations specified in Section 033000 "Cast-in-Place Concrete."
- D. Install and connect precharged refrigerant tubing to component's quick-connect fittings. Install tubing to allow access to unit.

3.2 CONNECTIONS

- A. Piping installation requirements are specified in other Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Where piping is installed adjacent to unit, allow space for service and maintenance of unit.
- C. Duct Connections: Duct installation requirements are specified in Section 233113 "Metal Ducts." Drawings indicate the general arrangement of ducts. Connect supply and return ducts to split-system air-conditioning units with flexible duct connectors. Flexible duct connectors are specified in Section 233300 "Air Duct Accessories."

3.3 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain units.

END OF SECTION 238126

DIVISION 26

ELECTRICAL

SECTION 260519

LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Copper building wire rated 600 V or less.
2. Connectors, splices, and terminations rated 600 V and less.

PART 2 - PRODUCTS

2.1 COPPER BUILDING WIRE

A. Description: Flexible, insulated and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.

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

1. Alpha Wire Company.
2. American Bare Conductor.
3. Belden Inc.
4. Cerro Wire LLC.
5. Encore Wire Corporation.
6. General Cable Technologies Corporation.
7. Okonite Company (The).
8. Service Wire Co.
9. Southwire Company.
10. WESCO.

C. Standards:

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
2. RoHS compliant.
3. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."

D. Conductors: Copper, complying with ASTM B 3 for bare annealed copper and with ASTM B 8 for stranded conductors.

E. Conductor Insulation:

1. Type NM. Comply with UL 83 and UL 719.
2. Type THHN and Type THWN-2: Comply with UL 83.
3. Type XHHW-2: Comply with UL 44.

2.2 CONNECTORS AND SPLICES

- A. Description:** Factory-fabricated connectors, splices, and lugs of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
- B. Manufacturers:** Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. 3M Electrical Products.
 2. AFC Cable Systems; a part of Atkore International.
 3. Gardner Bender.
 4. Hubbell Power Systems, Inc.
 5. Ideal Industries, Inc.
 6. ILSCO.
 7. NSi Industries LLC.
 8. O-Z/Gedney; a brand of Emerson Industrial Automation.
 9. Service Wire Co.
 10. TE Connectivity Ltd.
 11. Thomas & Betts Corporation; A Member of the ABB Group.
- C. Jacketed Cable Connectors:** For steel and aluminum jacketed cables, zinc die-cast with set screws, designed to connect conductors specified in this Section.
- D. Lugs:** One piece, seamless, designed to terminate conductors specified in this Section.
1. Material: Copper.
 2. Type: One with standard barrels.
 3. Termination: Compression.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

- A. Feeders:** Copper for feeders smaller than No. 4 AWG; copper or aluminum for feeders No. 4 AWG and larger. Conductors shall be solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

- B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
 - C. Power-Limited Fire Alarm and Control: Solid for No. 12 AWG and smaller.
- 3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS
- A. Exposed Branch Circuits, exterior to the building: Type THHN/THWN-2, single conductors in RMC raceway.
 - B. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Nonmetallic-sheathed cable, Type NM.
 - C. Lighting fixture whips: Nonmetallic-sheathed, Type MN.
- 3.3 INSTALLATION OF CONDUCTORS AND CABLES
- A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.
 - B. Complete raceway installation between conductor and cable termination points according to Section 26 05 33 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.
 - C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
 - D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
 - E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
 - F. Support cables according to Section 26 05 29 "Hangers and Supports for Electrical Systems."
- 3.4 CONNECTIONS
- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
 - B. Make splices, terminations, and taps that are compatible with conductor material.
 - 1. Use oxide inhibitor in each splice, termination, and tap for aluminum conductors.
 - C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

3.5 IDENTIFICATION

- A. Identify and color-code conductors and cables according to Section 26 05 53 "Identification for Electrical Systems."
- B. Identify each spare conductor at each end with identity number and location of other end of conductor and identify as spare conductor.

3.6 FIRESTOPPING

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Section 07 84 13 "Penetration Firestopping."

END OF DOCUMENT

SECTION 260526

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

GENERAL

1.1 SUMMARY

- A. Section includes grounding and bonding systems and equipment.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Burndy; Part of Hubbell Electrical Systems.
 2. Dossert; AFL Telecommunications LLC.
 3. ERICO International Corporation.
 4. Fushi Copperweld Inc.
 5. Galvan Industries, Inc.; Electrical Products Division, LLC.
 6. Harger Lightning and Grounding.
 7. ILSCO.
 8. O-Z/Gedney; A Brand of the EGS Electrical Group.
 9. Robbins Lightning, Inc.
 10. Siemens Power Transmission & Distribution, Inc.

2.2 SYSTEM DESCRIPTION

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with UL 467 for grounding and bonding materials and equipment.

2.3 CONDUCTORS

- A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
 - 1. Solid Conductors: ASTM B 3.
 - 2. Stranded Conductors: ASTM B 8.
 - 3. Tinned Conductors: ASTM B 33.
 - 4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch in diameter.
 - 5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
 - 6. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
 - 7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

2.4 CONNECTORS

- A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.
- B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy.
- C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.
- D. Bus-Bar Connectors: Mechanical type, cast silicon bronze, solderless compression-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.

PART 3 - EXECUTION

3.1 APPLICATIONS

- A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.
- B. Conductor Terminations and Connections:
 - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
 - 2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.
 - 3. Connections to Structural Steel: Welded connectors.

3.2 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with all feeders and branch circuits.
- B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:
 - 1. Feeders and branch circuits.
 - 2. Lighting circuits.
 - 3. Receptacle circuits.
 - 4. Single-phase motor and appliance branch circuits.
 - 5. Three-phase motor and appliance branch circuits.
- C. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.

3.3 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- B. Ground Bonding Common with Lightning Protection System: Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system. Bond electrical power system ground directly to lightning protection system grounding conductor at closest point to electrical service grounding electrode. Use bonding conductor sized same as system grounding electrode conductor, and install in conduit.
- C. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.
 - 1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
 - 2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
 - 3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.
- D. Grounding and Bonding for Piping:
 - 1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes; use a bolted clamp connector or bolt a lug-type connector to a pipe flange by using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
 - 2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.

3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.

3.4 FIELD QUALITY CONTROL

- A. Perform tests and inspections. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.

END OF DOCUMENT

SECTION 260533

RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Metal conduits, tubing, and fittings.
 2. Boxes, enclosures, and cabinets.
 3. Solvent cements.

1.2 ACTION SUBMITTALS

- A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.
- B. Shop Drawings: For custom enclosures and cabinets. Include plans, elevations, sections, and attachment details.

PART 2 - PRODUCTS

2.1 METAL CONDUITS, TUBING, AND FITTINGS

- A. Listing and Labeling: Metal conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. GRC: Comply with ANSI C80.1 and UL 6.
- C. IMC: Comply with ANSI C80.6 and UL 1242.
- D. EMT: Comply with ANSI C80.3 and UL 797.
- E. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.
1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886 and NFPA 70.
 2. Fittings for EMT:
 - A. Material: Steel or die cast.
 - B. Type: Setscrew or compression.
 3. Expansion Fittings: PVC or steel to match conduit type, complying with UL 651, rated for environmental conditions where installed, and including flexible external bonding jumper.

- F. Joint Compound for IMC, GRC, or ARC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.2 BOXES, ENCLOSURES, AND CABINETS

- A. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.
- B. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.
- C. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.
- D. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- E. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, cast aluminum with gasketed cover.
- F. Box extensions used to accommodate new building finishes shall be of same material as recessed box.
- G. Device Box Dimensions: 4 inches by 2-1/8 inches by 2-1/8 inches deep.
- H. Gangable boxes are prohibited.
- I. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 3R with continuous-hinge cover with flush latch unless otherwise indicated.
 - 1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.

2.3 SOLVENT CEMENTS

- A. UL VBEW - Solvent Cements for Nonmetallic Duct Raceways and Fittings:
 - 1. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following UL product categories:
 - a. Solvent Cements: UL CCN VBEW; including UL 340.
 - b. Solvent Cement Compatibility with PVC Conduit Fittings: UL CCN DWTT; including UL 514B. Follow solvent manufacturer's published instructions.
 - c. Solvent Cement Compatibility with Rigid PVC Conduit: UL CCN DZYR; including UL 651. Follow solvent manufacturer's published instructions.
 - d. Solvent Cement Compatibility with Rigid EPEC and HDPE Underground Conduit: UL CCN EAZX; including UL 651A. Follow solvent manufacturer's published instructions.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

- A. Outdoors: Apply raceway products as specified below unless otherwise indicated:
 - 1. Exposed Conduit: GRC.
 - 2. Concealed Conduit, Aboveground: GRC.
 - 3. Underground Conduit: PVC, direct buried.

4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
 5. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.
- B. Indoors: Apply raceway products as specified below unless otherwise indicated.
1. Exposed, Not Subject to Physical Damage: EMT.
 2. Exposed, Not Subject to Severe Physical Damage: EMT.
 3. Exposed and Subject to Severe Physical Damage: GRC.
 4. Concealed in Ceilings and Interior Walls and Partitions: EMT or MC Cable as permitted by N.E.C.
 5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
 6. Damp or Wet Locations: GRC.
 7. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4 stainless steel in institutional and commercial kitchens and damp or wet locations.
- C. Minimum Raceway Size: 3/4-inch trade size.
- D. Raceway Fittings: Compatible with raceways and suitable for use and location.
1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
 2. EMT: Use setscrew or compression, steel fittings. Comply with NEMA FB 2.10.
- E. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.
- F. Install surface raceways only where indicated on Drawings.

3.2 INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
- B. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- C. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.
- D. Arrange stub-ups so curved portions of bends are not visible above finished slab.
- E. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches of changes in direction.
- F. Conceal conduit within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.

- G. Support conduit within 12 inches of enclosures to which attached.
- H. Raceways Embedded in Slabs:
 - 1. Run conduit larger than 1-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support. Secure raceways to reinforcement at maximum 10-foot intervals.
 - 2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
 - 3. Arrange raceways to keep a minimum of 2 inches of concrete cover in all directions.
 - 4. Do not embed threadless fittings in concrete unless specifically approved by Architect for each specific location.
 - 5. Change from ENT to GRC or IMC before rising above floor.
- I. Stub-ups to Above Recessed Ceilings:
 - 1. Use EMT, IMC, or RMC for raceways.
 - 2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.
- J. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- K. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG.
- L. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch trade size and insulated throat metal bushings on 1-1/2-inch trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.
- M. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.
- N. Surface Raceways:
 - 1. Install surface raceway with a minimum 2-inch radius control at bend points.
 - 2. Secure surface raceway with screws or other anchor-type devices at intervals not exceeding 48 inches and with no less than two supports per straight raceway section. Support surface raceway according to manufacturer's written instructions. Tape and glue are not acceptable support methods.
- O. Install raceway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces.
- P. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:

1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 2. Where an underground service raceway enters a building or structure.
 3. Where otherwise required by NFPA 70.
- Q. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 72 inches of flexible conduit for recessed and semi-recessed luminaires, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
1. Use LFMC in damp or wet locations subject to severe physical damage.
 2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.
- R. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to center of box unless otherwise indicated.
- S. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall. Prepare block surfaces to provide a flat surface for a raintight connection between the box and cover plate or the supported equipment and box.
- T. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.
- U. Locate boxes so that cover or plate will not span different building finishes.
- V. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.

3.3 FIRESTOPPING

- A. Install firestopping at penetrations of fire-rated floor and wall assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

3.4 PROTECTION

- A. Protect coatings, finishes, and cabinets from damage and deterioration.
1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.

END OF DOCUMENT

SECTION 262726

WIRING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Receptacles, receptacles with integral GFCI, and associated device plates.
 - 2. Weather-resistant receptacles.
 - 3. Snap switches and wall-box dimmers.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Receptacles for Owner-Furnished Equipment: Match plug configurations.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.

1.4 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Eaton (Arrow Hart).
 - 2. Hubbell Incorporated; Wiring Device-Kellems.
 - 3. Leviton Manufacturing Co., Inc.
 - 4. Pass & Seymour/Legrand (Pass & Seymour).

- B. Source Limitations: Obtain each type of wiring device and associated wall plate from single source from single manufacturer.

2.2 GENERAL WIRING-DEVICE REQUIREMENTS

- A. Wiring Devices, Components, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NFPA 70.
- C. Devices that are manufactured for use with modular plug-in connectors may be substituted under the following conditions:
 - 1. Connectors shall comply with UL 2459 and shall be made with stranding building wire.
 - 2. Devices shall comply with the requirements in this Section.

2.3 STRAIGHT-BLADE RECEPTACLES

- A. Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498, and FS W-C-596.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Eaton (Arrow Hart).
 - b. Hubbell Incorporated; Wiring Device-Kellems.
 - c. Leviton Manufacturing Co., Inc.
 - d. Pass & Seymour/Legrand (Pass & Seymour).

2.4 GFCI RECEPTACLES

- A. General Description:
 - 1. Straight blade, feed-through type.
 - 2. Comply with NEMA WD 1, NEMA WD 6, UL 498, UL 943 Class A, and FS W-C-596.
 - 3. Include indicator light that shows when the GFCI has malfunctioned and no longer provides proper GFCI protection.
- B. Duplex GFCI Convenience Receptacles, 125 V, 20 A:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Eaton (Arrow Hart).
 - b. Hubbell Incorporated; Wiring Device-Kellems.
 - c. Leviton Manufacturing Co., Inc.
 - d. Pass & Seymour/Legrand (Pass & Seymour).

2.5 TOGGLE SWITCHES

- A. Comply with NEMA WD 1, UL 20, and FS W-S-896.
- B. Switches, 120/277 V, 20 A:
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - Single Pole:
 - 1) Cooper; AH1221.
 - 2) Hubbell; HBL1221.
 - 3) Leviton; 1221-2.
 - 4) Pass & Seymour; CSB20AC1.

 - Two Pole:
 - 1) Cooper; AH1222.
 - 2) Hubbell; HBL1222.
 - 3) Leviton; 1222-2.
 - 4) Pass & Seymour; CSB20AC2.

 - Three Way:
 - 1) Cooper; AH1223.
 - 2) Hubbell; HBL1223.
 - 3) Leviton; 1223-2.
 - 4) Pass & Seymour; CSB20AC3.

 - Four Way:
 - 1) Cooper; AH1224.
 - 2) Hubbell; HBL1224.
 - 3) Leviton; 1224-2.
 - 4) Pass & Seymour; CSB20AC4.

2.6 WALL PLATES

- A. Single and combination types shall match corresponding wiring devices.
 - 1. Plate-Securing Screws: Metal with head material or color to match plate finish.
 - 2. Material for Finished Spaces:
 - a. Above counter: smooth thermoplastic, white color.
 - b. Other indoor locations: Smooth thermoplastic, white color.
 - 3. Material for Unfinished Spaces: Galvanized steel.
 - 4. Material for Damp Locations: Cast aluminum with spring-loaded lift cover, and listed and labeled for use in wet and damp locations.
- B. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with Type 3R, weather-resistant, die-cast aluminum thermoplastic with lockable cover.

2.7 FINISHES

- A. Device Color:
 - 1. Interior Above Counter: White unless noted otherwise.
 - 2. Other Locations Connected to Normal Power System: White unless otherwise indicated or required by NFPA 70 or device listing.

3. Wiring devices connected to emergency power system: Red

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with NECA 1, including mounting heights listed in that standard, unless otherwise indicated.
- B. Coordination with Other Trades:
 1. Protect installed devices and their boxes. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of boxes.
 2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
 3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
 4. Install wiring devices after all wall preparation, including painting, is complete.
- C. Conductors:
 1. Do not strip insulation from conductors until right before they are spliced or terminated on devices.
 2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
 3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.
 4. Existing Conductors:
 - a. Cut back and pigtail, or replace all damaged conductors.
 - b. Straighten conductors that remain and remove corrosion and foreign matter.
 - c. Pigtail existing conductors is permitted, provided the outlet box is large enough.
- D. Device Installation:
 1. Replace devices that have been in temporary use during construction and that were installed before building finishing operations were complete.
 2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
 3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
 4. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.
 5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, two-thirds to three-fourths of the way around terminal screw.
 6. Use a torque screwdriver when a torque is recommended or required by manufacturer.

7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
 8. Tighten unused terminal screws on the device.
 9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.
- E. Receptacle Orientation: Install ground pin of vertically mounted receptacles up, and on horizontally mounted receptacles to the left.
- F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening. Color to match device.
- G. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.
- H. Adjust locations of service poles to suit arrangement of partitions and furnishings.

3.2 GFCI RECEPTACLES

- A. Install non-feed-through-type GFCI receptacles where protection of downstream receptacles is not required.

3.3 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
1. Test Instruments: Use instruments that comply with UL 1436.
 2. Test Instrument for Convenience Receptacles: Digital wiring analyzer with digital readout or illuminated digital-display indicators of measurement.
- B. Tests for Convenience Receptacles:
1. Line Voltage: Acceptable range is 105 to 132 V.
 2. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is unacceptable.
 3. Ground Impedance: Values of up to 2 ohms are acceptable.
 4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
 5. Using the test plug, verify that the device and its outlet box are securely mounted.
 6. Tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.
- C. Wiring device will be considered defective if it does not pass tests and inspections.

END OF DOCUMENT

SECTION 262816

ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Fusible and Nonfusible switches.
 - 2. Molded-case circuit breakers (MCCBs).
 - 3. Enclosures.

1.2 DEFINITIONS

- A. NC: Normally closed.
- B. NO: Normally open.
- C. SPDT: Single pole, double throw.

1.3 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Enclosed switches and circuit breakers shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
 - 1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated.

1.5 INFORMATIONAL SUBMITTALS

- A. Seismic Qualification Certificates: For enclosed switches and circuit breakers, accessories, and components, from manufacturer.
- B. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

1.7 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 FUSIBLE AND NONFUSIBLE SWITCHES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 - 2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
 - 3. Siemens Energy & Automation, Inc.
 - 4. Square D; a brand of Schneider Electric.
- B. Type HD, Heavy Duty, Single Throw: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- C. Accessories:
 - 1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
 - 2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
 - 3. Lugs: Suitable for number, size, and conductor material.

2.2 MOLDED-CASE CIRCUIT BREAKERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 - 2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
 - 3. Siemens Energy & Automation, Inc.
 - 4. Square D; a brand of Schneider Electric.
- B. General Requirements: Comply with UL 489, NEMA AB 1, and NEMA AB 3, with interrupting capacity to comply with available fault currents.
- C. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
- D. Electronic Trip Circuit Breakers: Field-replaceable rating plug, RMS sensing, with the following field-adjustable settings:

1. Instantaneous trip.
 2. Long- and short-time pickup levels.
 3. Long- and short-time time adjustments.
 4. Ground-fault pickup level, time delay, and I²t response.
- E. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller, and let-through ratings less than NEMA FU 1, RK-5.
- F. Features and Accessories:
1. Standard frame sizes, trip ratings, and number of poles.
 2. Lugs: Suitable for number, size, trip ratings, and conductor material.
 3. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge lighting circuits.
 4. Ground-Fault Protection: Comply with UL 1053; integrally mounted, self-powered type with mechanical ground-fault indicator; relay with adjustable pickup and time-delay settings, push-to-test feature, internal memory, and shunt trip unit; and three-phase, zero-sequence current transformer/sensor.
 5. Shunt Trip: Trip coil energized from separate circuit, with coil-clearing contact.
 6. Auxiliary Contacts: One SPDT switch with "a" and "b" contacts; "a" contacts mimic circuit-breaker contacts, "b" contacts operate in reverse of circuit-breaker contacts.
 7. Alarm Switch: One NO contact that operates only when circuit breaker has tripped.

2.3 ENCLOSURES

- A. Enclosed Switches and Circuit Breakers: NEMA AB 1, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.
1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.
 2. Outdoor Locations: NEMA 250, Type 3R.
 3. Other Wet or Damp, Indoor Locations: NEMA 250, Type 4.
 4. Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids: NEMA 250, Type 12.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.
- B. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.
- C. Install fuses in fusible devices.
- D. Comply with NECA 1.

3.2 IDENTIFICATION

- A. Comply with requirements in Section 260553 "Identification for Electrical Systems."
 - 1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
 - 2. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.3 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Acceptance Testing Preparation:
 - 1. Test insulation resistance for each enclosed switch and circuit breaker, component, connecting supply, feeder, and control circuit.
 - 2. Test continuity of each circuit.
- C. Tests and Inspections:
 - 1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
 - 2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
- D. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.

END OF DOCUMENT

SECTION 265100

INTERIOR LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior lighting fixtures, lamps, and ballasts.
2. Emergency lighting units.
3. Exit signs.
4. Lighting fixture supports.

B. Related Sections:

1. Section 26 09 23 "Lighting Control Devices" for automatic control of lighting, including time switches, photoelectric relays, occupancy sensors, and multipole lighting relays and contactors.
2. Section 26 27 26 "Wiring Devices" for manual wall-box dimmers for incandescent lamps.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of lighting fixture, arranged in order of fixture designation. Include data on features, accessories, and finishes.
- B. Shop Drawings: Show details of nonstandard or custom lighting fixtures. Indicate dimensions, weights, methods of field assembly, components, features, and accessories. Product Certificates: For each type of ballast for bi-level and dimmer-controlled fixtures, from manufacturer.

1.3 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide product or equivalent of that indicated on Drawings with architect or engineers approval.

2.2 GENERAL REQUIREMENTS FOR LIGHTING FIXTURES AND COMPONENTS

- A. Recessed Fixtures: Comply with NEMA LE 4 for ceiling compatibility for recessed fixtures.
- B. Metal Parts: Free of burrs and sharp corners and edges.
- C. Sheet Metal Components: Steel unless otherwise indicated. Form and support to prevent warping and sagging.
- D. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.
- E. Diffusers and Globes:
 - 1. Acrylic Lighting Diffusers: 100 percent virgin acrylic plastic. High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
 - a. Lens Thickness: At least 0.125 inch minimum unless otherwise indicated.
 - b. UV stabilized.
 - 2. Glass: Annealed crystal glass unless otherwise indicated.

2.3 BALLASTS FOR DIMMER-CONTROLLED LIGHTING FIXTURES:

- 1. Dimming Range: 100 to 5 percent of rated lamp lumens.
- 2. Compatibility: Certified by manufacturer for use with specific dimming control system and lamp type indicated.

2.4 EXIT SIGNS

- A. General Requirements for Exit Signs: Comply with UL 924; for sign colors, visibility, luminance, and lettering size, comply with authorities having jurisdiction.
- B. Internally Lighted Signs:
 - 1. Lamps for AC Operation: LEDs, 50,000 hours minimum rated lamp life.

2.5 LIGHTING FIXTURE SUPPORT COMPONENTS

- A. Single-Stem Hangers: 1/2-inch steel tubing with swivel ball fittings and ceiling canopy. Finish same as fixture.
- B. Twin-Stem Hangers: Two, 1/2-inch steel tubes with single canopy designed to mount a single fixture. Finish same as fixture.
- C. Wires: ASTM A 641/A 641M, Class 3, soft temper, zinc-coated steel, 12 gage.
- D. Wires for Humid Spaces: ASTM A 580/A 580M, Composition 302 or 304, annealed stainless steel, 12 gage.
- E. Rod Hangers: 3/16-inch minimum diameter, cadmium-plated, threaded steel rod.
- F. Hook Hangers: Integrated assembly matched to fixture and line voltage and equipped with threaded attachment, cord, and locking-type plug.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Lighting fixtures: Set level, plumb, and square with ceilings and walls. Install lamps in each fixture.
- B. Comply with NFPA 70 for minimum fixture supports.
- C. Suspended Lighting Fixture Support:
 - 1. Pendants and Rods: Where longer than 48 inches, brace to limit swinging.
 - 2. Stem-Mounted, Single-Unit Fixtures: Suspend with twin-stem hangers.
 - 3. Continuous Rows: Use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of fixture chassis, including one at each end.
- D. Adjust aimable lighting fixtures to provide required light intensities.
- E. Connect wiring according to Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables."

3.2 FIELD QUALITY CONTROL

- A. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery and retransfer to normal.

END OF SECTION 265100

HOUSING AUTHORITY OF FRANKFORT

CAPITAL FUNDING PROGRAMS KY36P003-501(22)

SITE NO. KY03-04

FRANKFORT, KENTUCKY

PROJECT SCOPE

KY36P003-501(22)

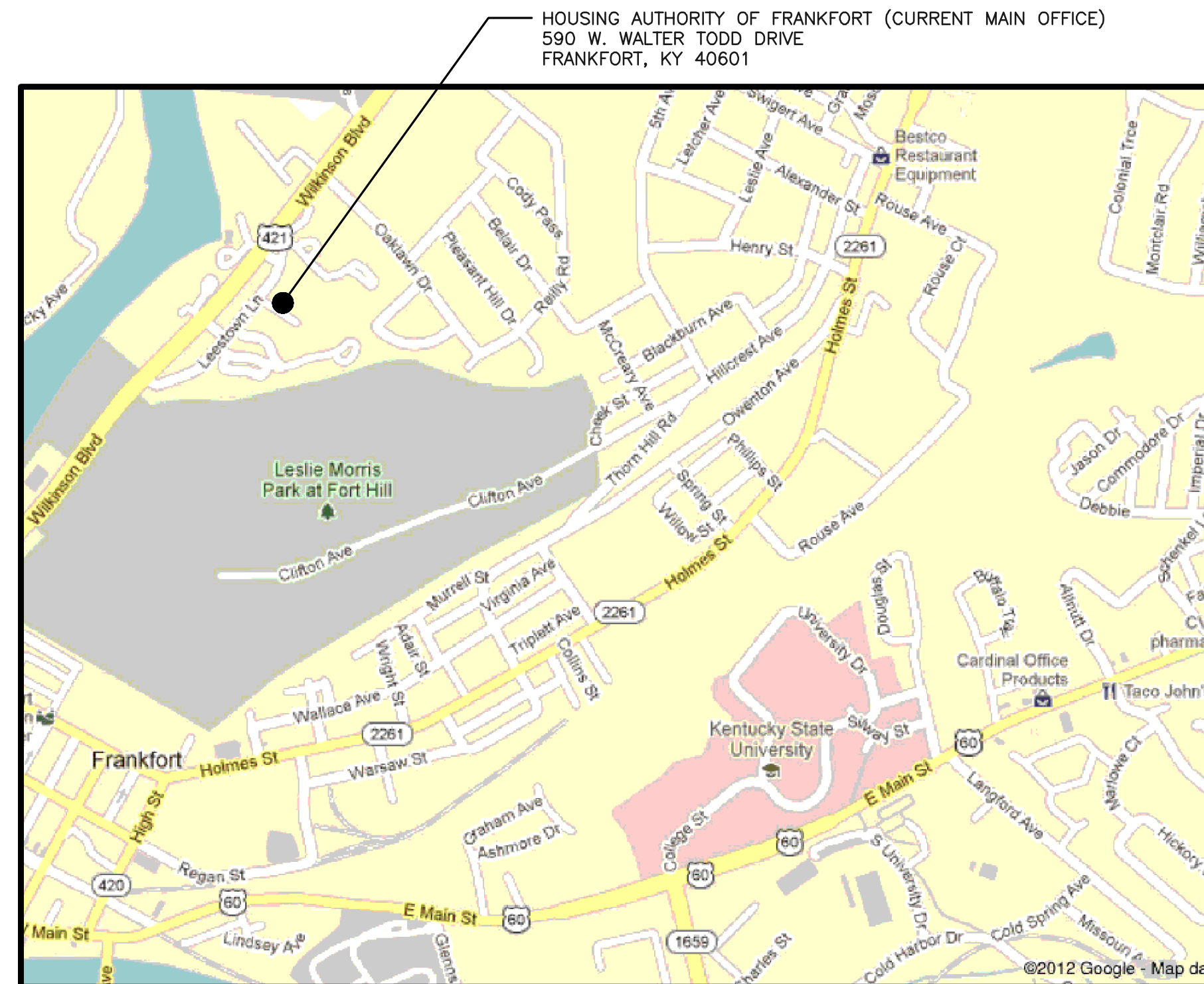
- I. SITE IMPROVEMENTS
 - A. CONCRETE STOOPS
- II. NON-DWELLING STRUCTURES
 - A. DEMOLITION
 - B. CONSTRUCT NEW VESTIBULE
 - C. CONSTRUCT NEW CANOPIES
 - D. CONCRETE TRENCHING & REPAIR
 - E. WALL FRAMING
 - F. DRYWALL
 - G. DOORS
 - H. WINDOWS
 - I. CASEWORK
 - J. FLOORING & BASE
 - K. PAINTING
 - L. HVAC
 - M. PLUMBING
 - N. ELECTRICAL

PROJECT DATA

CODE RELATED
USE GROUP: B

BUILDING AREA DATA
AREA TO BE COMPLETELY RENOVATED: 1,966 S.F.
AREA TO HAVE MINOR RENOVATIONS: 2,012 S.F.
NEW CANOPY AREA: 220 S.F.
TOTAL AREA: 4,198 S.F.

SITE DATA
PARKING: EXISTING



VICINITY MAP

NOT TO SCALE

DRAWING INDEX

GENERAL

G0.00 COVER SHEET

CIVIL

C1.01 SITE PLAN: KY03-04 (WALTER TODD DRIVE)
C7.01 PLANTING SCHEDULE AND SITE DETAILS

ARCHITECTURAL

A0.01 DEMOLITION FLOOR PLAN: ADMINISTRATION BUILDING
A1.01 FLOOR PLAN: ADMINISTRATION BUILDING
A1.02 EXTERIOR ELEVATIONS: ADMINISTRATION BUILDING
A1.03 FOUNDATION PLAN: ADMINISTRATION BUILDING
A1.04 DIMENSIONED FLOOR PLAN: ADMINISTRATION BUILDING
A2.01 ROOM FINISH SCHEDULE AND INTERIOR ELEVATIONS
A7.01 SECTIONS AND DETAILS
A9.01 DOOR SCHEDULE AND DETAILS
A9.02 WINDOW TYPE AND DETAILS

MECHANICAL

M0.00 MECHANICAL LEGEND AND NOTES
P0.01 PLUMBING DEMOLITION
P1.01 PLUMBING PLAN
P5.01 PLUMBING SCHEDULES AND DETAILS
M0.01 MECHANICAL DEMOLITION
M1.01 MECHANICAL PLAN
M5.01 MECHANICAL DETAILS
M6.01 MECHANICAL SCHEDULES

ELECTRICAL

E0.00 ELECTRICAL LEGEND AND NOTES
E0.01 ELECTRICAL DEMOLITION
E1.01 LIGHTING PLAN
E1.02 POWER AND SYSTEMS PLAN
E5.01 ELECTRICAL DETAILS AND SCHEDULES

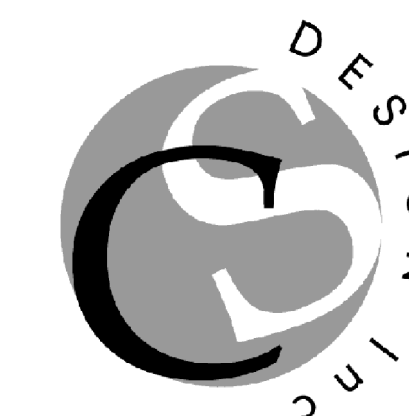
PHA BOARD OF COMMISSIONERS

CHAIRPERSON: PATTY NORRIS PEAVLER
VICE CHAIRPERSON: LAWRENCE MARTIN PERRY
COMMISSIONER: HARRY CARVER

MAYOR: LAYNE WILKERSON

EXECUTIVE DIRECTOR: DAVID SMALL

MECHANICAL & ELECTRICAL ENGINEER



1088 WELLINGTON WAY
LEXINGTON, KENTUCKY 40513
859.367.7521
www.csdesigninc.com

SET NUMBER

GO.00

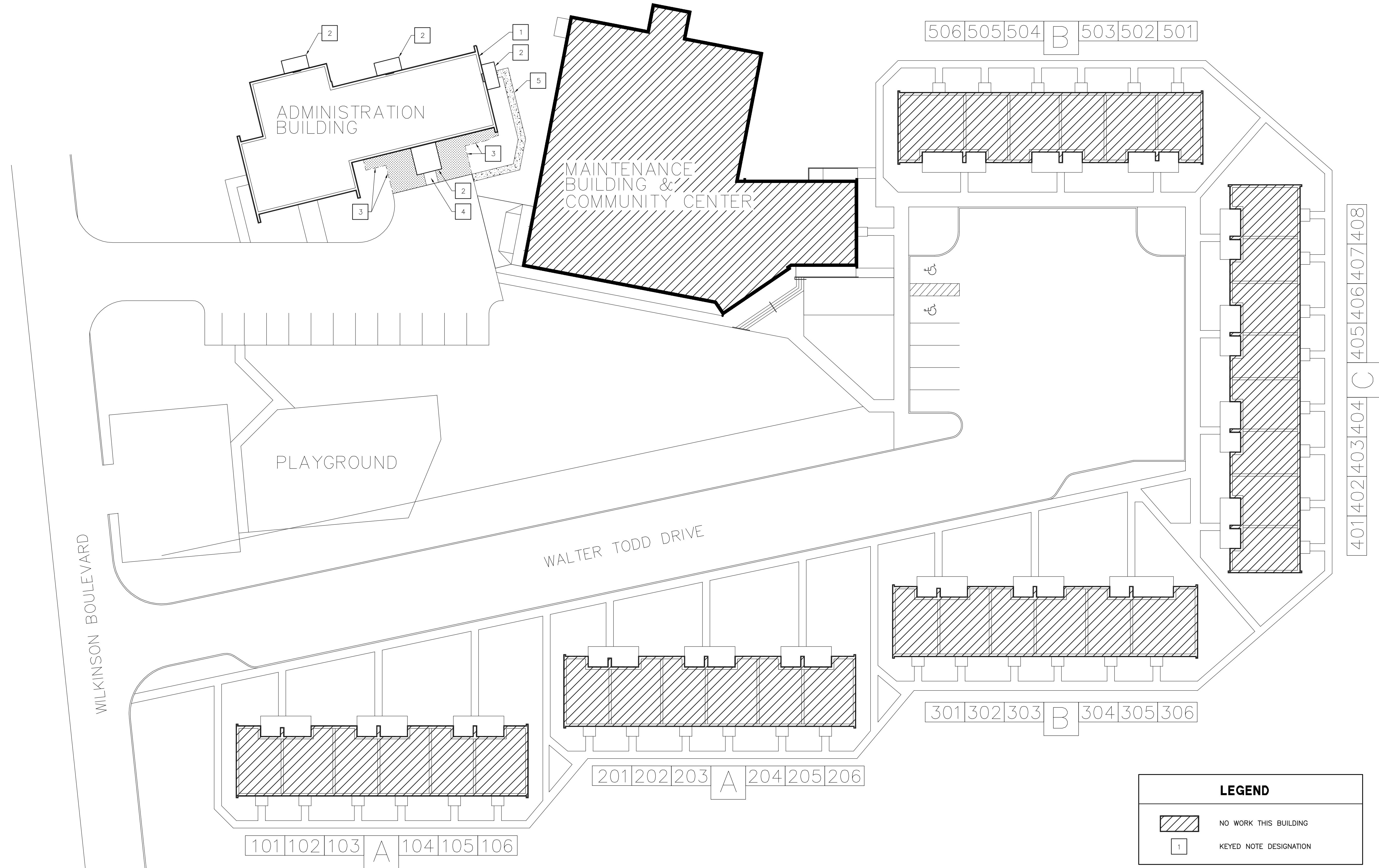
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SITE GENERAL NOTES:

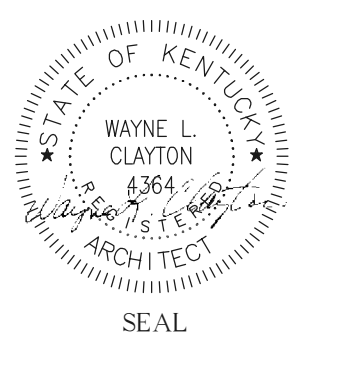
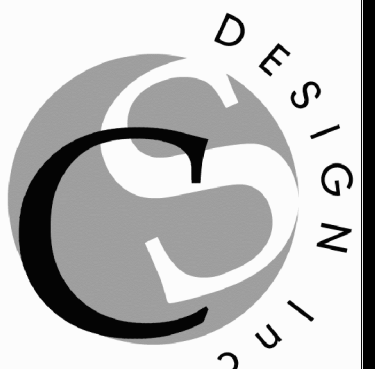
1. CONTRACTOR SHALL GIVE ALL NECESSARY NOTICES AND OBTAIN ALL PERMITS REQUIRED FOR PROJECT CONSTRUCTION.
2. CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE CODES.
3. IN THE EVENT OF ANY DISCREPANCIES AND/OR ERRORS FOUND IN THE DRAWINGS, OR IF PROBLEMS ARE ENCOUNTERED DURING CONSTRUCTION, THE CONTRACTOR SHALL BE REQUIRED TO NOTIFY THE ARCHITECT BEFORE PROCEEDING WITH THE WORK. IF THE ARCHITECT IS NOT NOTIFIED, THE CONTRACTOR SHALL BEAR RESPONSIBILITY FOR THE COST OF ANY REVISIONS.

SITE NEW WORK KEYED NOTES:

1. RENOVATE INTERIOR OF EXISTING STRUCTURE. REFER TO FLOOR PLAN ON SHEET A1.01.
2. CONSTRUCT NEW CANOPY. REFER TO FLOOR PLAN ON SHEET A1.01.
3. REMOVE SECTIONS OF EXISTING CONCRETE PAVEMENT (APPROXIMATELY 625 S.F.). BACKFILL AREA WITH TOP SOIL AND INSTALL NEW LANDSCAPING IN THIS AREA. REFER TO PLANTING SCHEDULE ON SHEET C7.01.
4. NEW 5'-0" x 5'-0" SLOPED CONCRETE RAMP (1:12 MAX. SLOPE). REFER TO DETAIL B/C7.01.
5. NEW 3'-0" WIDE CONCRETE WALK (APPROXIMATELY 185 S.F.). REFER TO DETAIL B/C7.01.



1 SITE PLAN: KY3-04 (WALTER TODD DRIVE)
SCALE: 1" = 30'-0"



ARCHITECT
ENGINEER

SITE PLAN: KY03-04 (WALTER TODD DRIVE)
CFP NO. KY36P003-501(22)
HOUSING AUTHORITY OF FRANKFORT
FRANKFORT, KENTUCKY

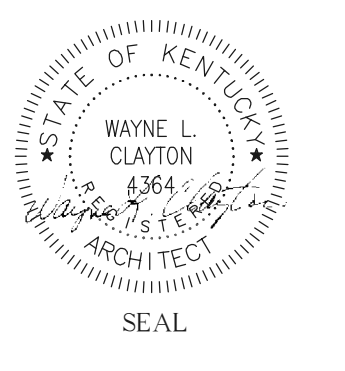
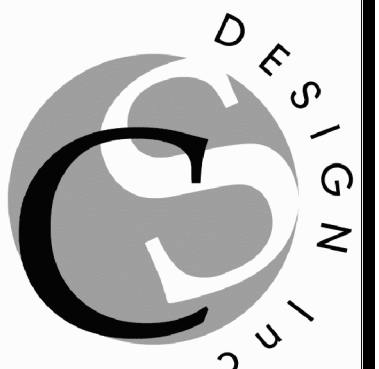
DR.	CHK.	DATE	DESCRIPTION
W.C.	DWS	08-15-24	PRELIMINARY DESIGN
W.C.	DWS	10-08-24	OWNER REVIEW
W.C.	DWS	11-22-24	OUT TO BID

PLANTING SCHEDULE

KEY	BOTANICAL NAME	COMMON NAME	SIZE	QTY.	SPACING	REMARKS
GROUND COVER AND SHRUBS						
IC	ILEX CORNUTA 'BURFORDI DWARF'	DWARF BURFORD HOLLY	36"HT	15	SEE A/E	1, 2, 3, 4
TC	TAXUS CUSPIDATA 'DENSIFORMIS'	DENSE JAPANESE YEW	36"HT	15	SEE A/E	1, 2, 3, 4
JC	JUNIPERUS CHINENSIS 'PFITZERANA PARSON'	PARSON'S JUNIPER	24"HT	15	SEE A/E	1, 2, 3, 4

REMARKS:

- LANDSCAPE CONTRACTOR TO PROVIDE DETAILED PLANTING PLAN FOR APPROVAL OF A/E PRIOR TO ORDERING OR INSTALLING ANY MATERIALS.
- SUBSTITUTIONS AND/OR VARIATIONS IN MATERIALS USED MUST BE APPROVED BY THE A/E.
- PROVIDE LANDSCAPE FABRIC OVER COMPLETE PLANTING AREA (MINIMUM AREA 800 S.F.).
- PROVIDE 4" DEEP LAYER OF HARDWOOD MULCH OVER ENTIRE PLANTING AREA (MINIMUM AREA 800 S.F.).



ARCHITECT

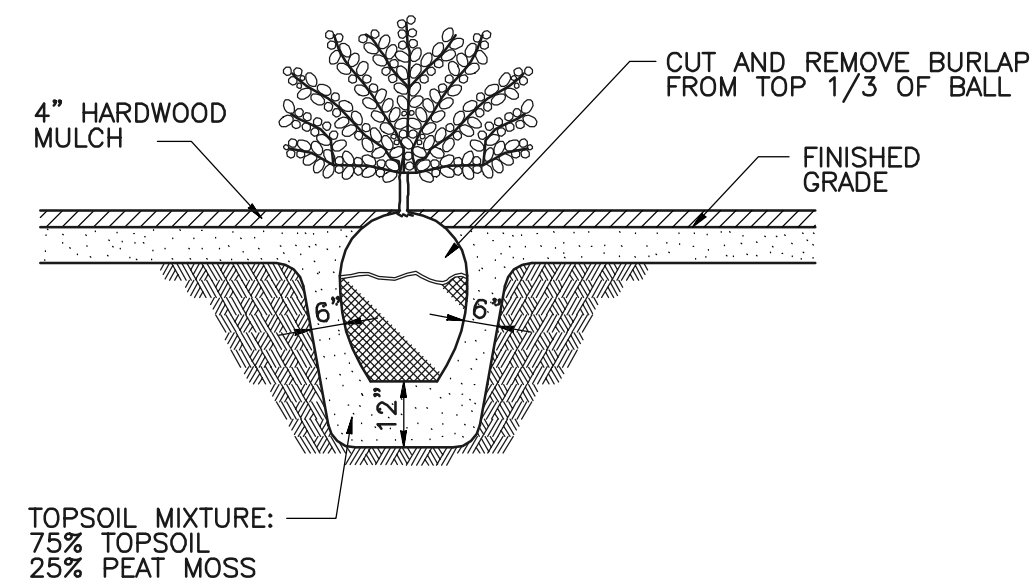
ENGINEER

PLANTING SCHEDULE AND SITE DETAILS
CFP NO. KY36P003-501(22)
HOUSING AUTHORITY OF FRANKFORT
 FRANKFORT, KENTUCKY

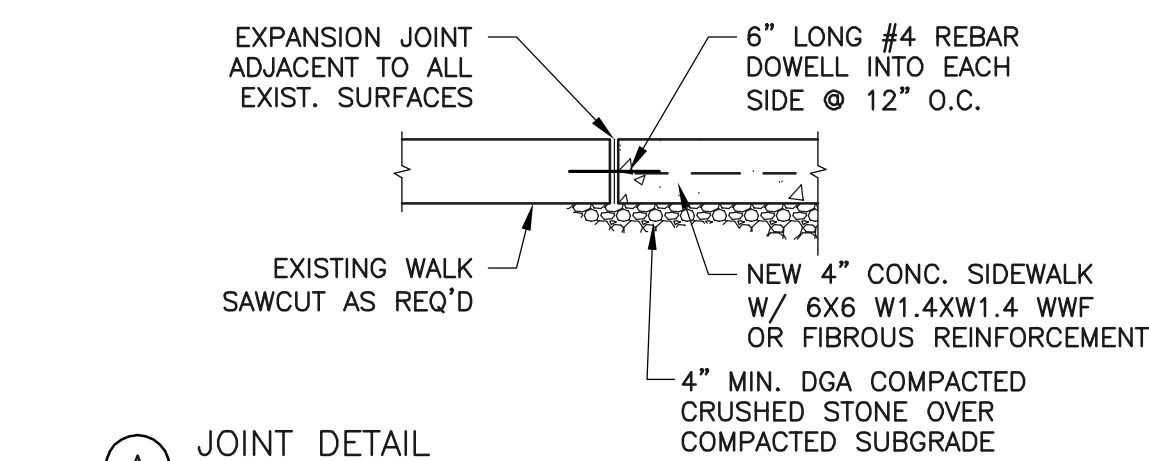
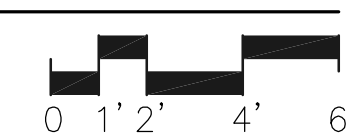
DR.	CHK.	DATE	DESCRIPTION
	WLC	08-15-24	PRELIMINARY DESIGN
	DWS	10-08-24	OWNER REVIEW
	WLC	11-22-24	OUT TO BID

C7.01
 FILE NO. 19003-22

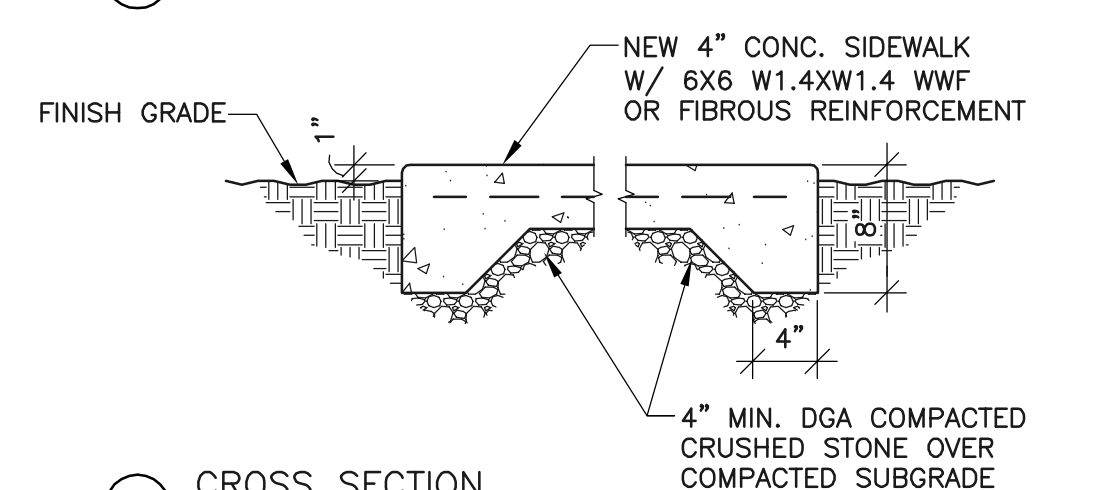
- NOTES:
- BROOM FINISH ALL WALKS.
 - TOOL CONTROL JOINTS @ 5'-0" O.C.
 - CONSTRUCT EXPANSION JOINTS @ 20'-0" O.C.
 - INSTALL 1/2" EXPANSION MATERIAL AT ALL LOCATIONS ADJACENT TO EXISTING WALKS OR DISSIMILAR OBJECTS.
 - SLOPE WALK 1/4" PER FT. IN DIRECTION OF DRAINAGE.
 - SEED AND STRAW ALL AREAS ADJACENT TO WALK DISTURBED DURING CONSTRUCTION.
 - CONCRETE PADS SIMILAR.



A
 C7.01 SHRUB PLANTING DETAIL
 N.T.S.

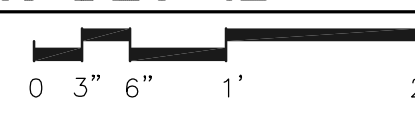


A JOINT DETAIL



B CROSS SECTION

B
 C7.01 CONCRETE WALK DETAIL
 SCALE: 1"=1'-0"

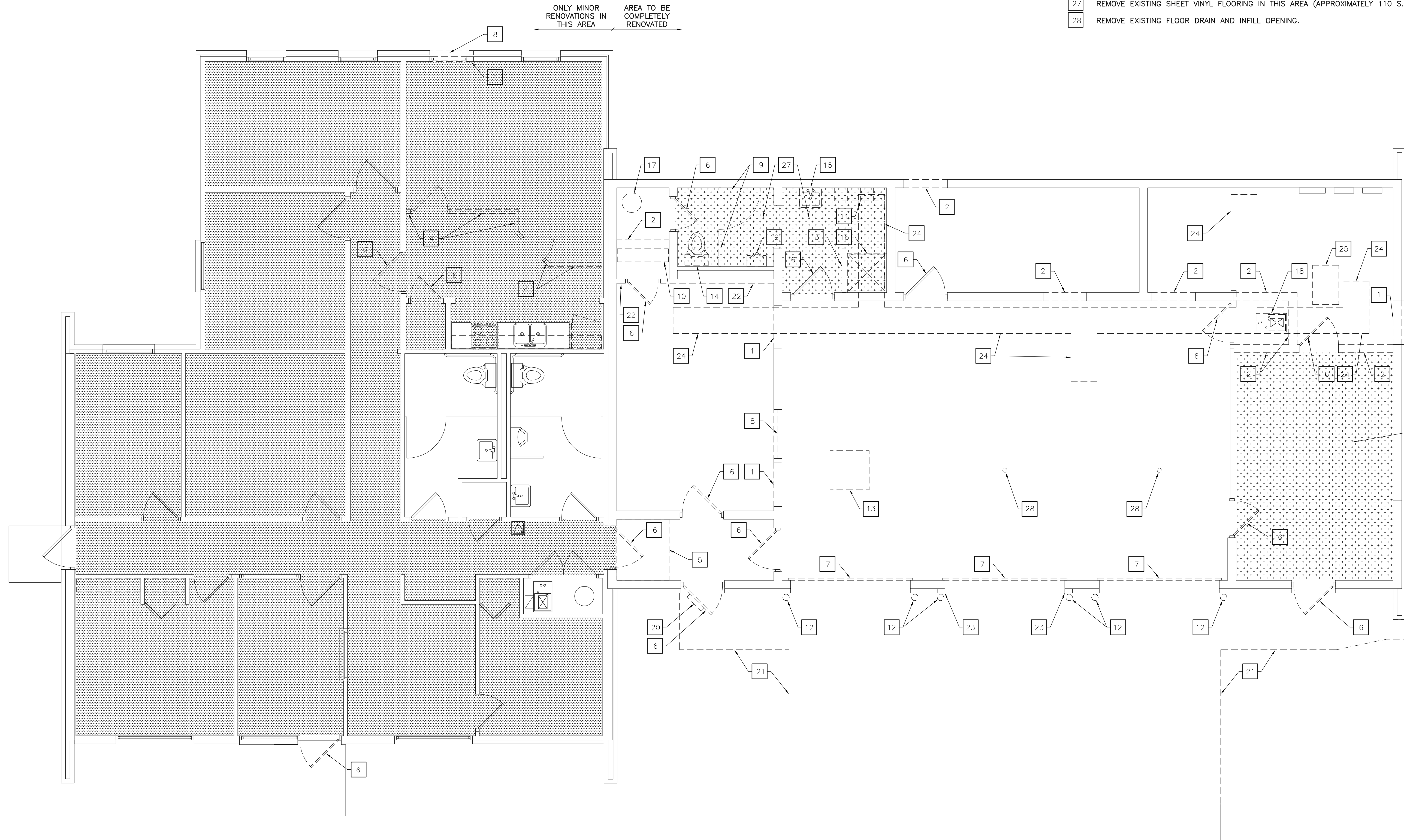


DEMOLITION GENERAL NOTES:

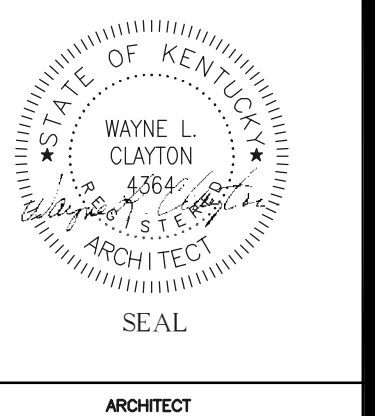
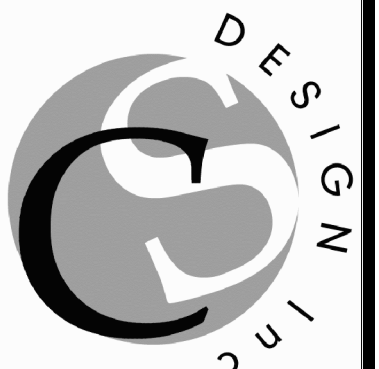
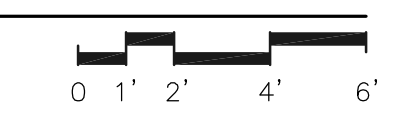
1. CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE CODES. CONTRACTOR SHALL GIVE ALL NECESSARY NOTICES AND OBTAIN ALL PERMITS REQUIRED FOR PROJECT CONSTRUCTION.
2. CONTRACTOR SHALL PROTECT AND RESTORE ALL PROPERTY TO A CONDITION EQUAL TO OR BETTER THAN THAT EXISTING AT THE COMMENCEMENT OF CONSTRUCTION.
3. IN THE EVENT OF ANY DISCREPANCIES AND/OR ERRORS FOUND IN THE DRAWINGS, OR IF PROBLEMS ARE ENCOUNTERED DURING CONSTRUCTION, THE CONTRACTOR SHALL BE REQUIRED TO NOTIFY THE A/E BEFORE PROCEEDING WITH THE WORK. IF THE A/E IS NOT NOTIFIED, THE CONTRACTOR SHALL BEAR RESPONSIBILITY FOR THE COST OF ANY REVISIONS.
4. REMOVE CARPETING AND VINYL COVE BASE FROM ALL SHADED AREAS OF THE EXISTING ADMINISTRATION OFFICES (APPROXIMATELY 1,566 S.F.). CLEAN AND PREPARE CONCRETE SLAB FOR NEW FLOORING INSTALLATION.
5. REMOVE EXISTING INSULATION IN ATTIC OF AREA TO BE COMPLETELY RENOVATED.

DEMOLITION KEYED NOTES:

- | | |
|---|--|
| <ol style="list-style-type: none"> 1 REMOVE PORTION OF EXISTING 8" CMU & FACE BRICK PARTITION (PROVIDE TEMPORARY SHORING AS NECESSARY). 2 REMOVE PORTION OF EXISTING 8" CMU PARTITION (PROVIDE TEMPORARY SHORING AS NECESSARY). 3 REMOVE PORTION OF EXISTING 4" CMU PARTITION (PROVIDE TEMPORARY SHORING AS NECESSARY). 4 REMOVE PORTION OF EXISTING WOOD FRAMED PARTITION. 5 REMOVE PORTION OF CONCRETE FLOOR IN THIS AREA TO PREPARE FOR CONSTRUCTION OF NEW RAMP. 6 REMOVE EXISTING DOOR AND FRAME COMPLETELY. 7 REMOVE EXISTING OVERHEAD DOOR AND TRACKS COMPLETELY. 8 REMOVE EXISTING WINDOW COMPLETELY. 9 REMOVE EXISTING TOILET PARTITION COMPLETELY. 10 REMOVE EXISTING SHELVING COMPLETELY. 11 REMOVE EXISTING STORAGE LOCKERS. 12 REMOVE EXISTING STEEL PIPE BOLLARD. | <ol style="list-style-type: none"> 13 REMOVE EXISTING DRAIN GRATE AND INFILL PIT. 14 REMOVE EXISTING TOILET. REFER TO PLUMBING DRAWINGS FOR ADDITIONAL INFORMATION. 15 REMOVE EXISTING WALL-HUNG LAVATORY. REFER TO PLUMBING DRAWINGS FOR ADDITIONAL INFORMATION. 16 REMOVE EXISTING SHOWER. REFER TO PLUMBING DRAWINGS FOR ADDITIONAL INFORMATION. 17 REMOVE EXISTING WATER HEATER. REFER TO PLUMBING DRAWINGS FOR ADDITIONAL INFORMATION. 18 REMOVE EXISTING GAS FURNACE AND COIL. REFER TO HVAC DRAWINGS FOR ADDITIONAL INFORMATION. 19 REMOVE EXISTING URINAL. REFER TO PLUMBING DRAWINGS FOR ADDITIONAL INFORMATION. 20 REMOVE EXISTING DROP BOX AND TURN OVER TO PHA. 21 REMOVE SECTIONS OF EXISTING CONCRETE WALK OR PAVING. REFER TO SITE PLAN FOR ADDITIONAL INFORMATION. 22 REMOVE EXISTING CHAIR RAIL. 23 REMOVE PORTION OF EXISTING FACE BRICK AND SILL COURSE. 24 SAW-CUT EXISTING CONCRETE SLAB AS NECESSARY TO ROUTE NEW PLUMBING WASTE PIPING. REFER TO PLUMBING DRAWINGS FOR ADDITIONAL INFORMATION. 25 REMOVE EXISTING ATTIC ACCESS DOOR COMPLETELY. INFILL OPENING WITH 2x4 WOOD FRAMING AT 16" O.C. AND 1/2" DRYWALL. 26 REMOVE EXISTING VCT FLOORING IN THIS AREA (APPROXIMATELY 210 S.F.). 27 REMOVE EXISTING SHEET VINYL FLOORING IN THIS AREA (APPROXIMATELY 110 S.F.). 28 REMOVE EXISTING FLOOR DRAIN AND INFILL OPENING. |
|---|--|



1
A0.01
DEMOLITION FLOOR PLAN: ADMINISTRATION BUILDING
SCALE: 1/4"=1'-0"



ARCHITECT

ENGINEER

DEMOLITION FLOOR PLAN: ADMINISTRATION BUILDING

CFP NO. KY36P003-501(22)
HOUSING AUTHORITY OF FRANKFORT
FRANKFORT, KENTUCKY

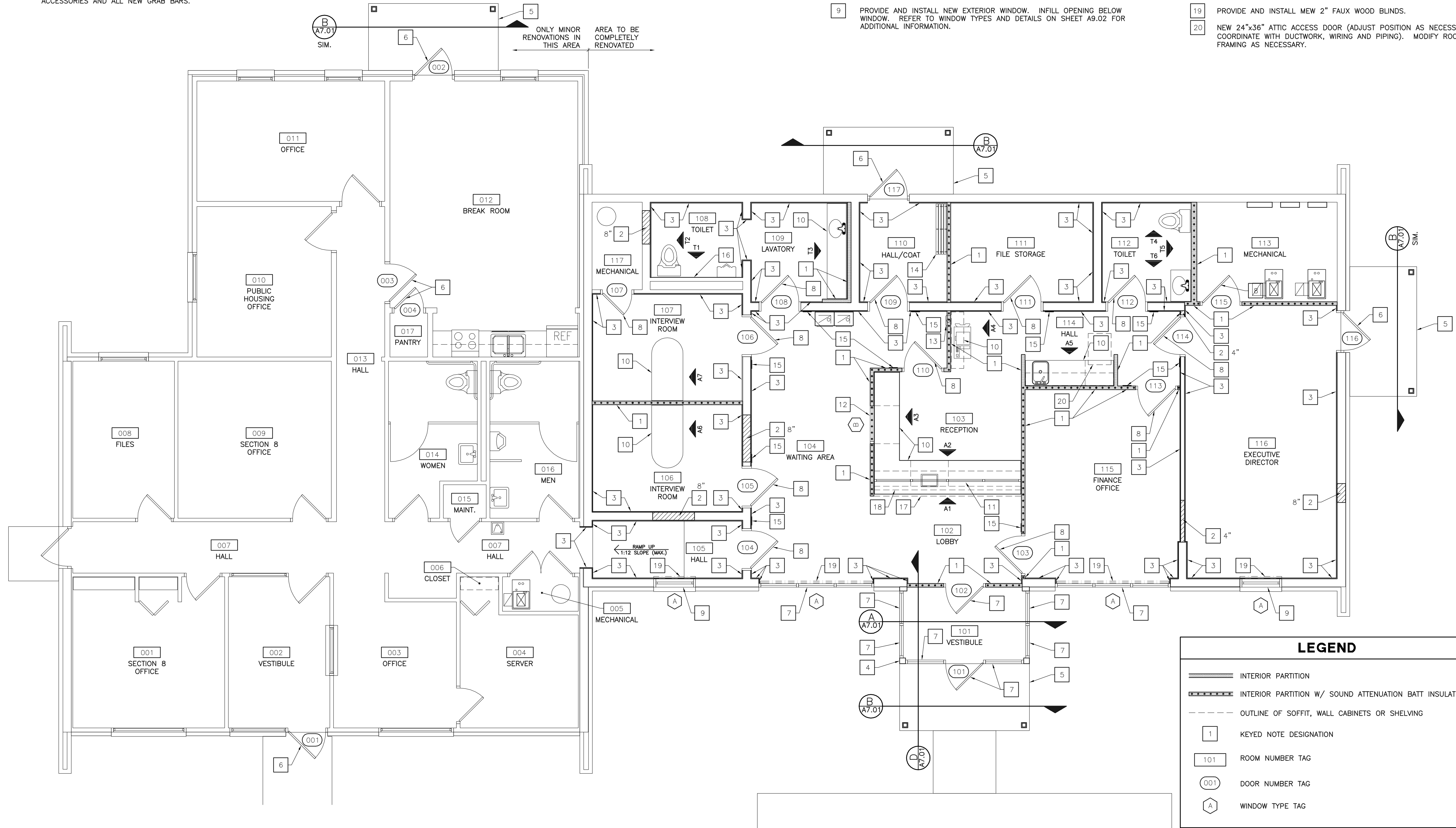
DR.	CHK.	DATE	DESCRIPTION
W.C.	DWS	08-15-24	PRELIMINARY DESIGN
W.C.	DWS	10-08-24	OWNER REVIEW
W.C.	DWS	11-22-24	OUT TO BID

NEW WORK GENERAL NOTES:

- CONTRACTOR SHALL GIVE ALL NECESSARY NOTICES AND OBTAIN ALL PERMITS REQUIRED FOR PROJECT CONSTRUCTION.
- CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE CODES.
- IN THE EVENT OF ANY DISCREPANCIES AND/OR ERRORS FOUND IN THE DRAWINGS, OR IF PROBLEMS ARE ENCOUNTERED DURING CONSTRUCTION, THE CONTRACTOR SHALL BE REQUIRED TO NOTIFY THE ARCHITECT BEFORE PROCEEDING WITH THE WORK. IF THE ARCHITECT IS NOT NOTIFIED, THE CONTRACTOR SHALL BEAR RESPONSIBILITY FOR THE COST OF ANY REVISIONS.
- DIMENSIONS WHERE SHOWN ARE FOR CONTRACTORS CONVENIENCE ONLY. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
- INFILL TRENCHES CUT IN CONCRETE SLAB WITH COMPACTED DGA AND 4" THICK CONCRETE (FLUSH WITH EXISTING CONCRETE SURFACE). PROVIDE 8" LONG #5 REBAR DOWELS TO PIN NEW CONCRETE TO EXISTING CONCRETE. POUR NEW 3" THICK CONCRETE SLAB OVER EXISTING CONCRETE SLAB THROUGHOUT AREA TO BE COMPLETELY RENOVATED (APPROXIMATELY 1,780 S.F.). PROVIDE ARDEX FLOOR LEVELER TO ENSURE A SMOOTH FINISH PRIOR TO INSTALLING NEW FLOORING (WHERE APPLICABLE).
- FILL CAVITIES OF NEW INTERIOR PARTITIONS WITH 3-1/2" SOUND BATT INSULATION WHERE IDENTIFIED.
- PROVIDE AND INSTALL 2x6 WOOD BLOCKING CONCEALED IN WALL CAVITY FOR ANCHORING OF ALL NEW CASEWORK, NEW COAT RACK, ALL NEW TOILET FIXTURES, ALL NEW TOILET ACCESSORIES AND ALL NEW GRAB BARS.
- PROVIDE AND INSTALL [1] LAYER OF 5/8" TYPE X FIRECODE DRYWALL ON BOTTOM OF EXISTING DRYWALL CEILING THROUGHOUT AREA TO BE COMPLETELY RENOVATED.
- PROVIDE AND INSTALL R-48 BLOWN-IN INSULATION IN ATTIC ABOVE AREA TO BE COMPLETELY RENOVATED.
- PRIME AND PAINT ALL NEW INTERIOR SURFACES (NOT PRE-FINISHED) THROUGHOUT AREA TO BE COMPLETELY RENOVATED.
- REFER TO DIMENSIONED FLOOR PLAN ON SHEET A1.03.
- REFER TO ROOM FINISH SCHEDULE AND INTERIOR ELEVATIONS ON SHEET A2.01.
- REFER TO DOOR SCHEDULE AND DETAILS ON SHEET A9.01.
- REFER TO WINDOW TYPES AND DETAILS ON SHEET A9.01.
- PROVIDE AND INSTALL INTERIOR SIGNAGE AT DOORS. REFER TO SPECIFICATION SECTION 10426.
- NEW CEILING HEIGHT OF AREA TO BE TOTALLY RENOVATE SHALL BE APPROXIMATELY 8'-5" A.F.F.

NEW WORK KEYED NOTES:

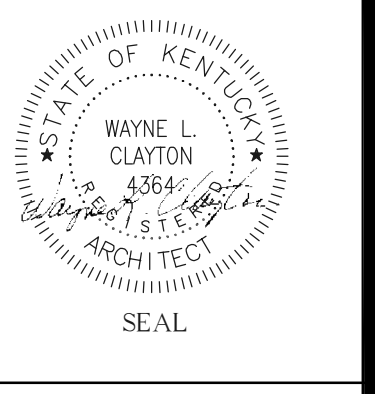
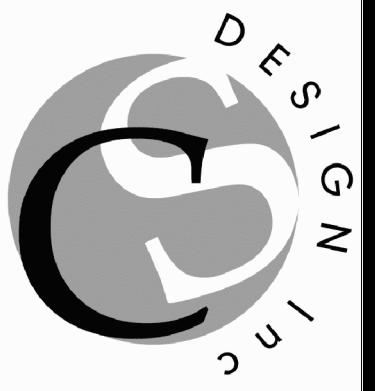
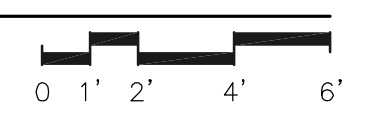
- NEW INTERIOR PARTITION TO BE CONSTRUCTED OF 3-1/2" OR 5-1/2" (REFER TO DIMENSIONED FLOOR PLAN) WOOD FRAMING AT 16" O.C., WITH 5/8" DRYWALL ON EACH SIDE (REFER TO LEGEND THIS SHEET). ANCHOR ALL NEW PARTITIONS TO CONCRETE SLAB WITH 1/4" TAPCON SCREWS AT 48" O.C. (MAX.). ALL BOTTOM PLATES MUST HAVE A MIN. OF TWO ANCHORS, NO CLOSER THAN 4" OR FURTHER THAN 12" FROM END OF PLATE.
- INFILL OPENING IN CMU WALL WITH NEW CMU (THICKNESS AS SHOWN).
- FURR EXISTING CMU WALL WITH 3/4" WOOD FURRING STRIPS AT 16" O.C. AND CLAD WITH 5/8" DRYWALL.
- CONSTRUCT NEW VESTIBULE.
- CONSTRUCT NEW PORCH STOOP AND CANOPY.
- PROVIDE AND INSTALL NEW EXTERIOR DOOR AND FRAME. REFER TO DOOR SCHEDULE AND DETAILS ON SHEET A9.01 FOR ADDITIONAL INFORMATION.
- PROVIDE AND INSTALL NEW STOREFRONT SYSTEM. REFER TO DOOR SCHEDULE AND DETAILS ON SHEET A9.01 FOR ADDITIONAL INFORMATION.
- PROVIDE AND INSTALL NEW HOLLOW METAL INTERIOR DOOR AND FRAME. REFER TO DOOR SCHEDULE AND DETAILS ON SHEET A9.01 FOR ADDITIONAL INFORMATION.
- PROVIDE AND INSTALL NEW EXTERIOR WINDOW. INFILL OPENING BELOW WINDOW. REFER TO WINDOW TYPES AND DETAILS ON SHEET A9.02 FOR ADDITIONAL INFORMATION.
- PROVIDE AND INSTALL NEW CASEWORK. REFER TO ELEVATIONS ON SHEET A2.01 FOR ADDITIONAL INFORMATION.
- NEW RECEPTION COUNTER AND TRANSACTION WINDOW WITH TEMPERED GLASS AND ONE [1] DIP TRAY. REFER TO DETAIL D/A7.01.
- OBSERVATION WINDOW. REFER TO DETAILS ON SHEET A9.02 FOR ADDITIONAL INFORMATION.
- PROVIDE AND INSTALL NEW FIRE EXTINGUISHER, LARSEN'S MODEL MP5-A, SEMI RECESSED (3-1/2") CABINET MODEL AL-2409-R4 WITH FULL PANEL DOOR AND TYPE "A" LETTERING (BLACK).
- PROVIDE AND INSTALL NEW 48" COAT RACK (EMCO SPECIALTIES, MODEL R-2).
- PROVIDE AND INSTALL NEW SIGNAGE. SEE SPECIFICATION SECTION 10426.
- PROVIDE AND INSTALL NEW CERAMIC TILE ON EXISTING CMU WALL FROM WALL TO WALL & FLOOR TO CEILING.
- CONSTRUCT NEW DRYWALL SOFFIT OVER RECEPTION COUNTER. REFER TO DETAIL D/A7.01.
- PONY WALL CONSTRUCTED OF 3-1/2" WOOD FRAMING AT 16" O.C. WITH 5/8" DRYWALL ON BOTH SIDES.
- PROVIDE AND INSTALL MEW 2" FAUX WOOD BLINDS.
- NEW 24"x36" ATTIC ACCESS DOOR (ADJUST POSITION AS NECESSARY TO COORDINATE WITH DUCTWORK, WIRING AND PIPING). MODIFY ROOF FRAMING AS NECESSARY.



LEGEND

	INTERIOR PARTITION
	INTERIOR PARTITION W/ SOUND ATTENUATION BATT INSULATION
	OUTLINE OF SOFFIT, WALL CABINETS OR SHELVING
[1]	KEYED NOTE DESIGNATION
101	ROOM NUMBER TAG
001	DOOR NUMBER TAG
A	WINDOW TYPE TAG

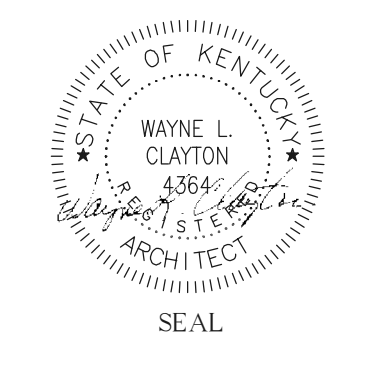
1 NEW WORK FLOOR PLAN: ADMINISTRATION BUILDING
SCALE: 1/4"=1'-0"



ARCHITECT
ENGINEER

FLOOR PLAN: ADMINISTRATION BUILDING
CFP NO. KY36P003-501(22)
HOUSING AUTHORITY OF FRANKFORT
FRANKFORT, KENTUCKY

DR.	CHK.	DATE	DESCRIPTION
W.C.	DWS	08-15-24	PRELIMINARY DESIGN
W.C.	DWS	10-08-24	OWNER REVIEW
W.C.	DWS	11-22-24	OUT TO BID

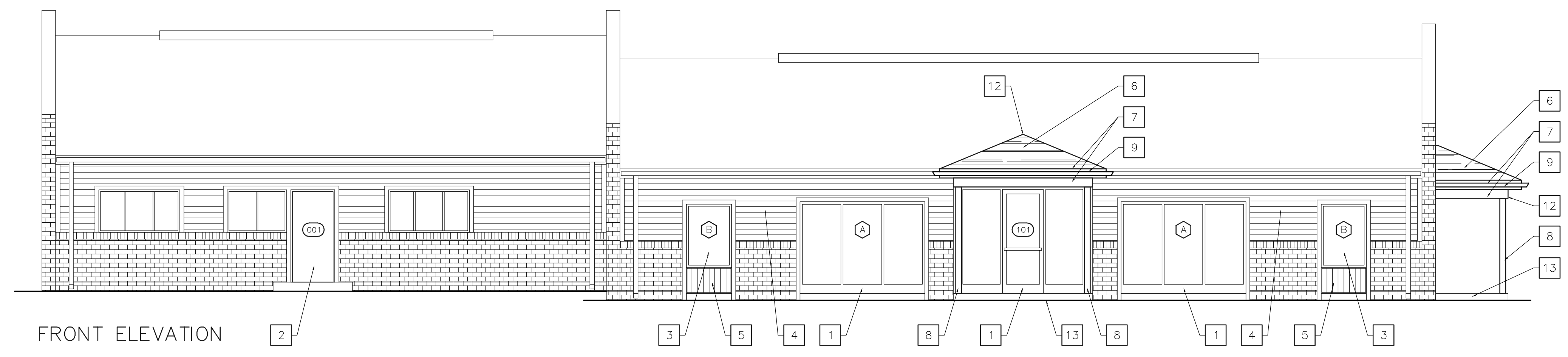


ARCHITECT

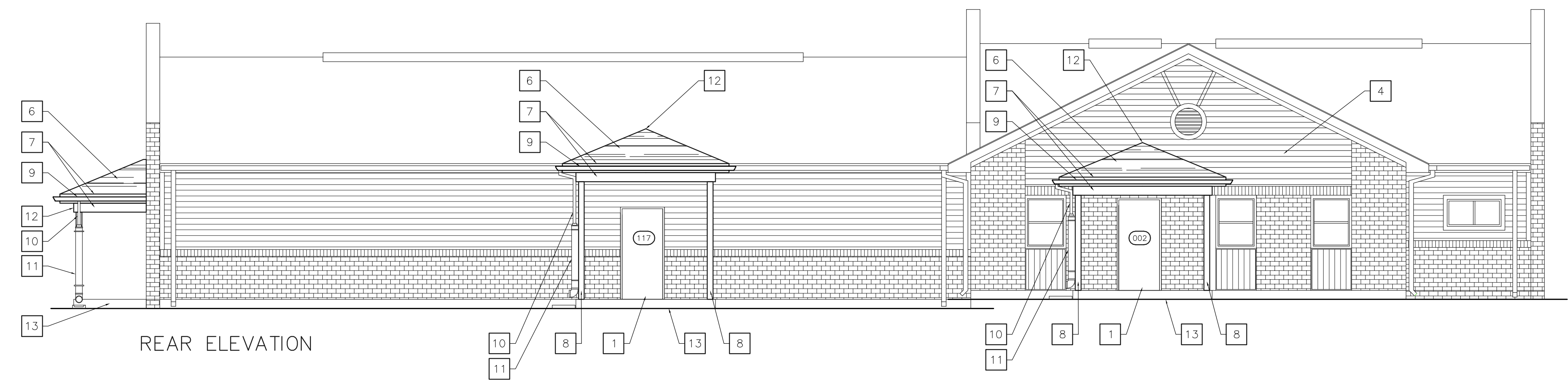
ENGINEER

NEW WORK KEYED NOTES:

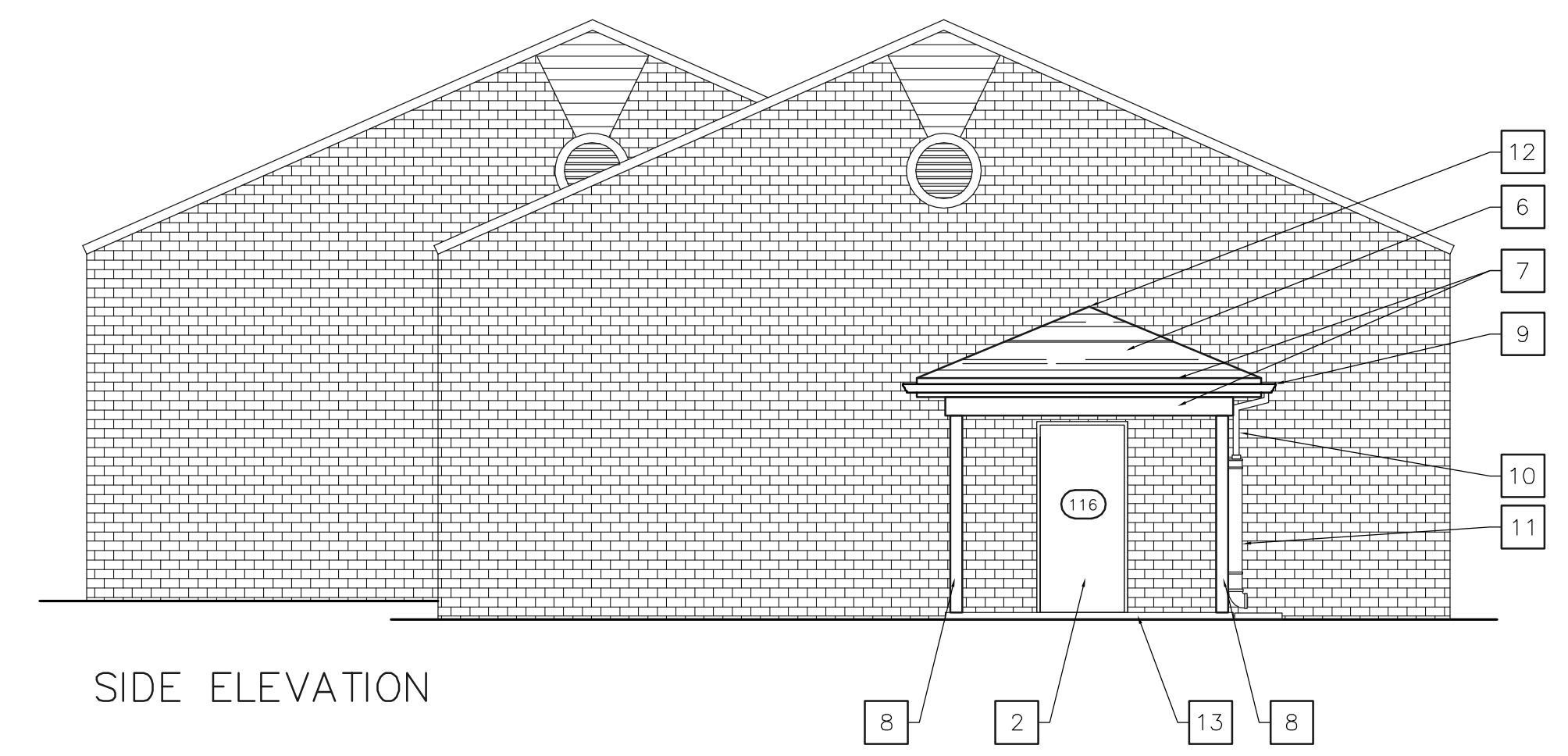
- 1 NEW STOREFRONT SYSTEM. REFER TO DOOR SCHEDULE ON SHEET A9.01 FOR ADDITIONAL INFORMATION.
- 2 NEW EXTERIOR DOOR AND FRAME. REFER TO DOOR SCHEDULE ON SHEET A9.01 FOR ADDITIONAL INFORMATION.
- 3 NEW WINDOW. REFER TO WINDOW TYPES ON SHEET A9.02 FOR ADDITIONAL INFORMATION.
- 4 NEW HORIZONTAL VINYL SIDING.
- 5 HORIZONTAL VERTICAL SIDING.
- 6 NEW COMPOSITION SHINGLE ROOFING.
- 7 NEW PRE-FINISHED METAL FASCIA TRIM.
- 8 NEW 5"x5" PAINTED STEEL COLUMN.
- 9 NEW 6" PRE-FINISHED ALUMINUM GUTTERING.
- 10 NEW 3"x4" PRE-FINISHED ALUMINUM DOWNSPOUT.
- 11 NEW 6" DIA. PVC DOWNSPOUT BOOT.
- 12 NEW PORCH CANOPY.
- 13 NEW CONCRETE SLAB.



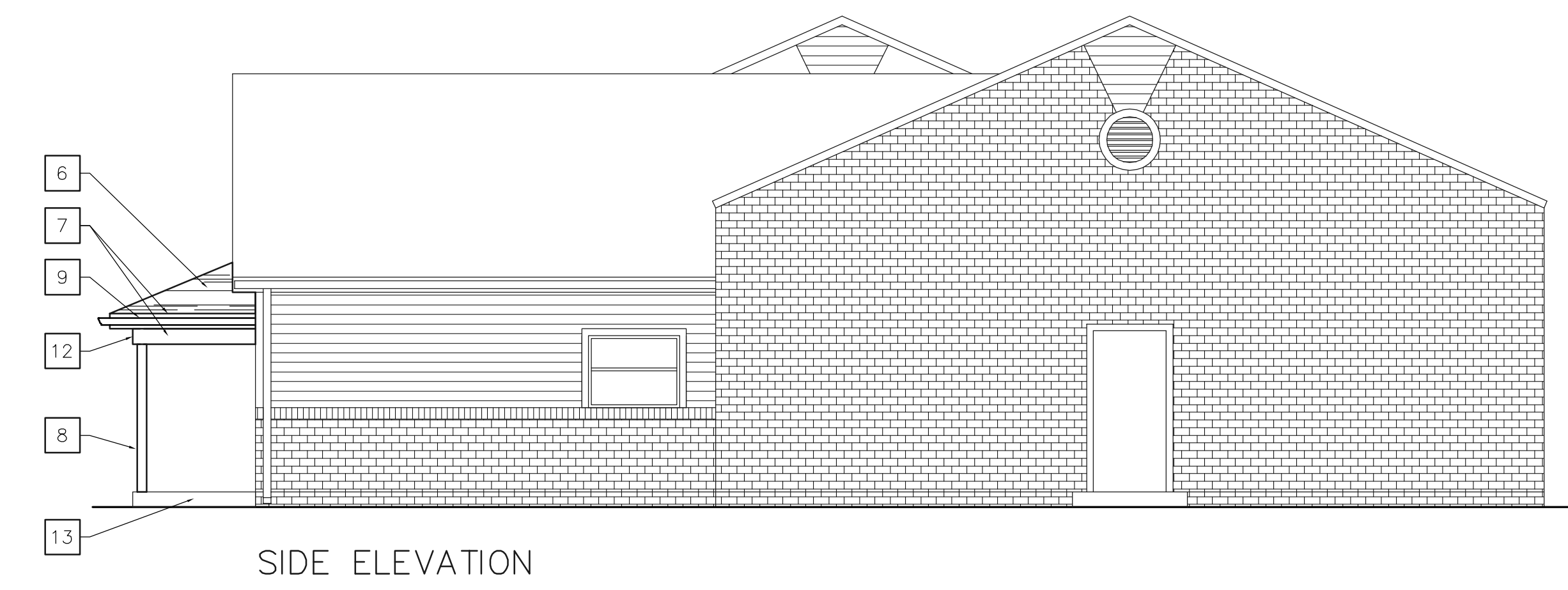
FRONT ELEVATION



REAR ELEVATION

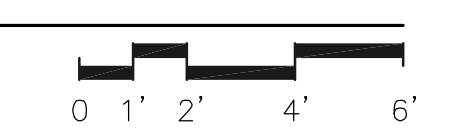


SIDE ELEVATION



SIDE ELEVATION

1 EXTERIOR ELEVATIONS: ADMINISTRATION BUILDING
 A1.02 SCALE: 3/16"=1'-0"



EXTERIOR ELEVATIONS: ADMINISTRATION BUILDING
 CFP NO. KY36P003-501(22)
 HOUSING AUTHORITY OF FRANKFORT
 FRANKFORT, KENTUCKY

DR.	CHK.	DATE	DESCRIPTION
W.C.	DWS	08-15-24	PRELIMINARY DESIGN
W.C.	DWS	10-08-24	OWNER REVIEW
W.C.	DWS	11-22-24	OUT TO BID

A1.02

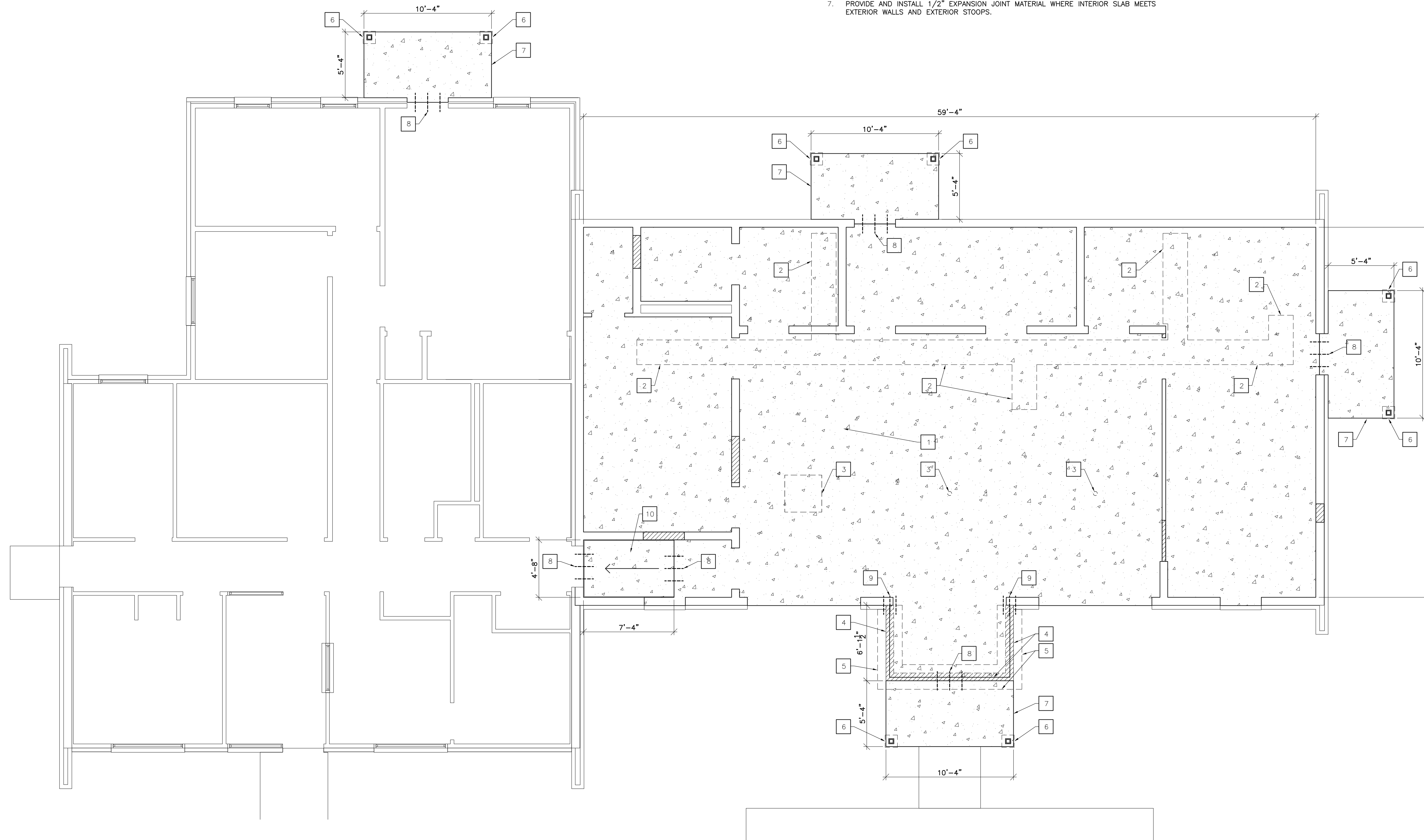
FILE NO. 19003-22

NEW WORK GENERAL NOTES:

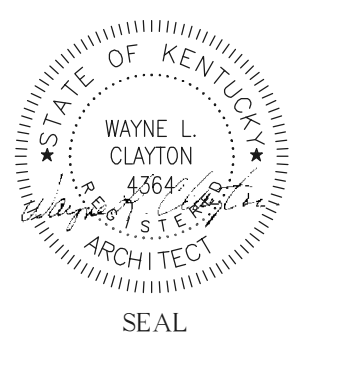
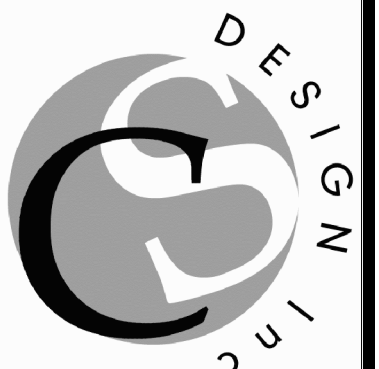
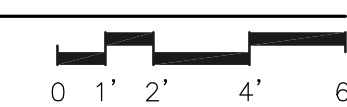
1. CONTRACTOR SHALL GIVE ALL NECESSARY NOTICES AND OBTAIN ALL PERMITS REQUIRED FOR PROJECT CONSTRUCTION.
2. CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE CODES.
3. IN THE EVENT OF ANY DISCREPANCIES AND/OR ERRORS FOUND IN THE DRAWINGS, OR IF PROBLEMS ARE ENCOUNTERED DURING CONSTRUCTION, THE CONTRACTOR SHALL BE REQUIRED TO NOTIFY THE ARCHITECT BEFORE PROCEEDING WITH THE WORK. IF THE ARCHITECT IS NOT NOTIFIED, THE CONTRACTOR SHALL BEAR RESPONSIBILITY FOR THE COST OF ANY REVISIONS.
4. DIMENSIONS WHERE SHOWN ARE FOR CONTRACTORS CONVENIENCE ONLY. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
5. INFILL TRENCHES CUT IN CONCRETE SLAB WITH COMPACTED DGA AND 4" THICK CONCRETE (FLUSH WITH EXISTING CONCRETE SURFACE). PROVIDE 8" LONG #5 REBAR DOWELS TO PIN NEW CONCRETE TO EXISTING CONCRETE.
6. POUR NEW 3" DEEP CONCRETE SLAB OVER EXISTING IN AREA TO BE COMPLETELY RENOVATED. NEW CONCRETE TO EXTEND INTO EXTERIOR OPENINGS SO THAT ANY SEAMS BETWEEN FLOOR SLAB AND CONCRETE STOOP WILL BE CONCEALED UNDER NEW THRESHOLD.
7. PROVIDE AND INSTALL 1/2" EXPANSION JOINT MATERIAL WHERE INTERIOR SLAB MEETS EXTERIOR WALLS AND EXTERIOR STOOPS.

NEW WORK KEYED NOTES:

- 1 NEW 3" DEEP CONCRETE SLAB OVER EXISTING CONCRETE SLAB.
- 2 INFILL EXISTING TRENCH FOR PLUMBING WASTE LINES.
- 3 INFILL EXISTING DRAIN.
- 4 NEW 8" CMU (L-BLOCK) FOUNDATION WALL.
- 5 NEW 24" WIDE x 24" DEEP CONTINUOUS CONCRETE FOOTING.
- 6 NEW 24"x24"x30" DEEP FOUNDATION FOR NEW CANOPY POST.
- 7 NEW 8" DEEP CONCRETE STOOP WITH EDGES TURNED DOWN TO MIN. DEPTH OF 18" BELOW GRADE ON THREE SIDES.
- 8 [3] #5 BARS AT 12" O.C. EMBEDDED INTO BOTH SLABS OF CONCRETE.
- 9 [3] #5 BARS AT 6" O.C. EMBEDDED INTO BOTH NEW AND EXISTING FOOTINGS.
- 10 NEW CONCRETE RAMP (1:12 MAX. SLOPE).



1 FOUNDATION PLAN: ADMINISTRATION BUILDING
A1.03 SCALE: 1/4"=1'-0"



ARCHITECT

ENGINEER

FOUNDATION PLAN: ADMINISTRATION BUILDING

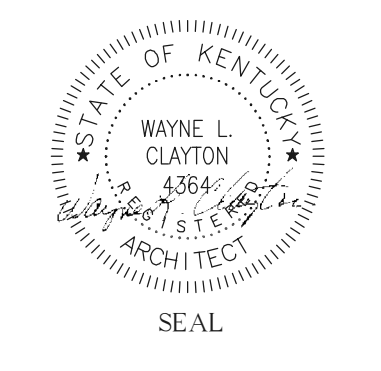
CFP NO. KY36P003-501(22)

HOUSING AUTHORITY OF FRANKFORT
FRANKFORT, KENTUCKY

DR.	CHK.	DATE	DESCRIPTION
W.C.	DWS	08-15-24	PRELIMINARY DESIGN
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A1.03

FILE NO. 19003-22

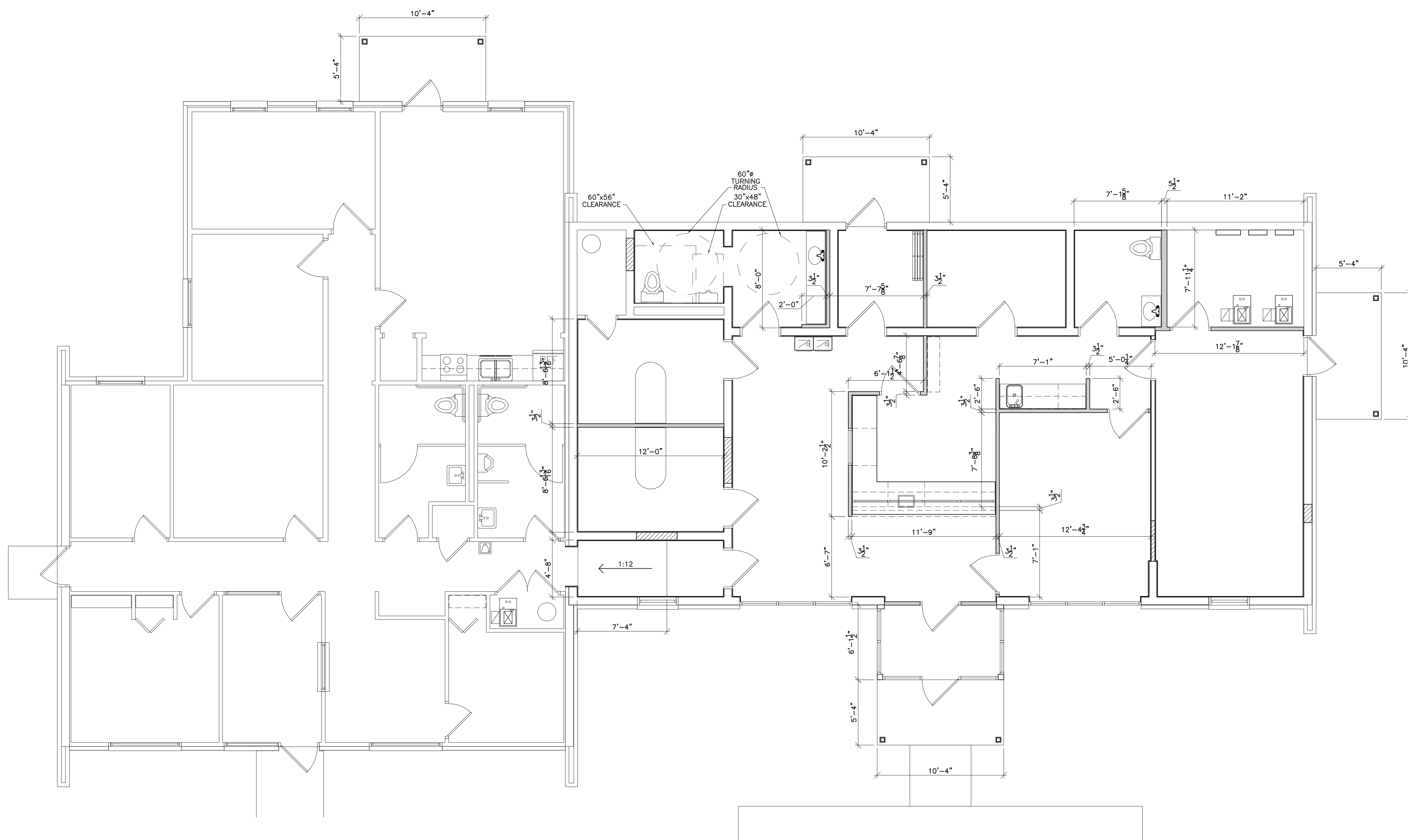


ARCHITECT

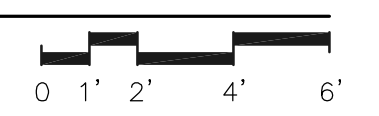
ENGINEER

NEW WORK GENERAL NOTES:

1. ALL DIMENSIONS ARE FROM FACE OF FRAMING (UNLESS OTHERWISE NOTED).
2. FIELD VERIFY CLEARANCES FOR CASEWORK, NEW DOORS, OR ANY OTHER FINISHED PRODUCTS AND MAKE ALL NECESSARY ADJUSTMENTS TO INSURE THAT THESE ITEMS WILL FIT WITHIN ALLOWABLE SPACE.
3. ENSURE ALL FINISHED CLEARANCES MEET ALL APPLICABLE ACCESSIBILITY GUIDELINES.



1 DIMENSIONED FLOOR PLAN: ADMINISTRATION BUILDING
 SCALE: 1/4"=1'-0"



DIMENSIONED FLOOR PLAN: ADMINISTRATION BUILDING

CFP NO. KY36P003-501(22)
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 FRANKFORT, KENTUCKY

DR.	CHK.	DATE	DESCRIPTION
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W.C.	DWS	10-08-24	OWNER REVIEW
W.C.	DWS	11-22-24	OUT TO BID

A1.04

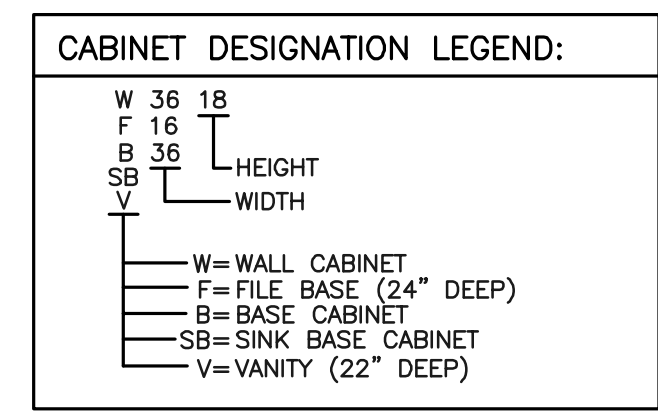
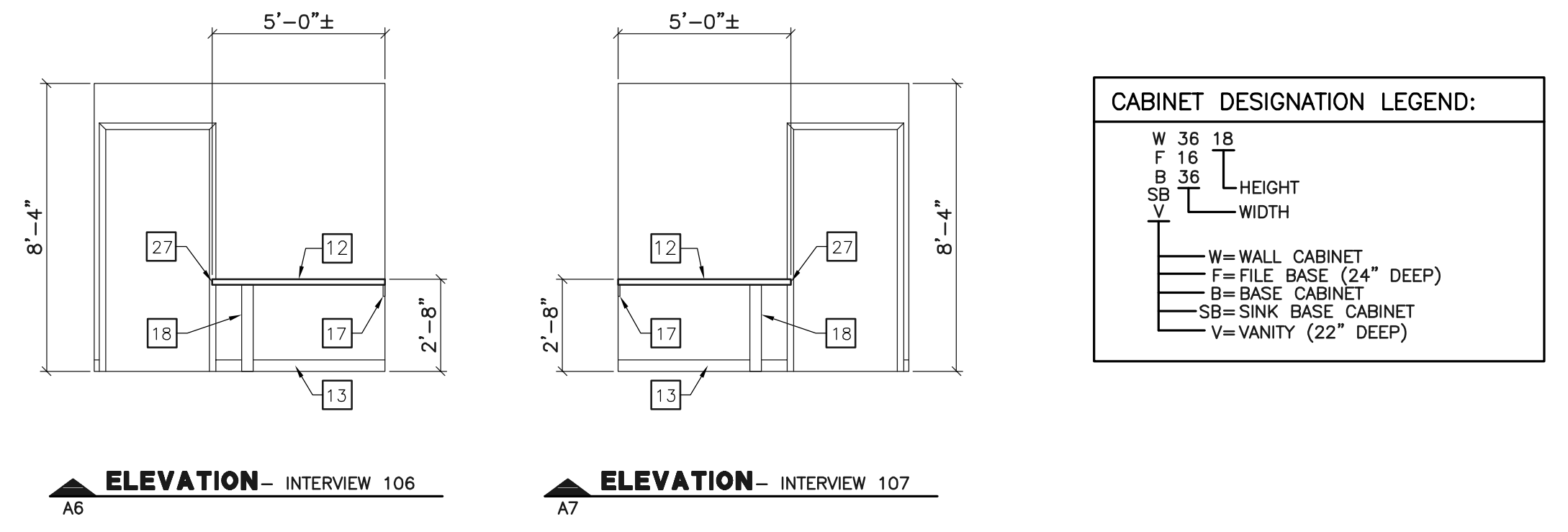
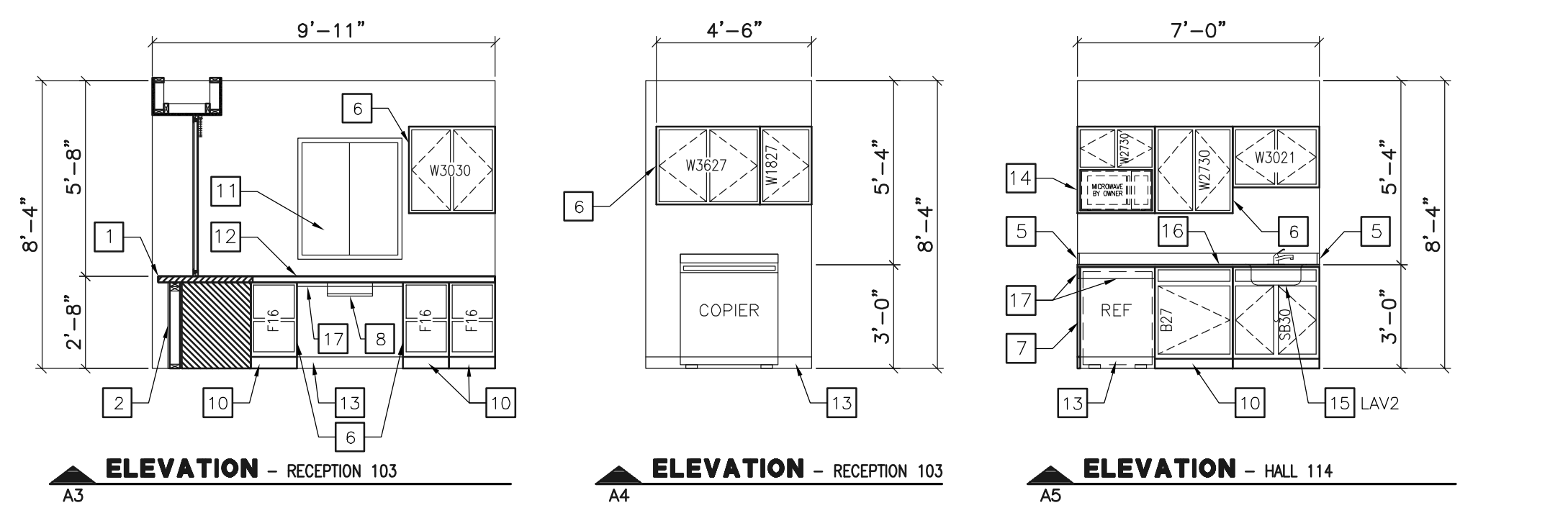
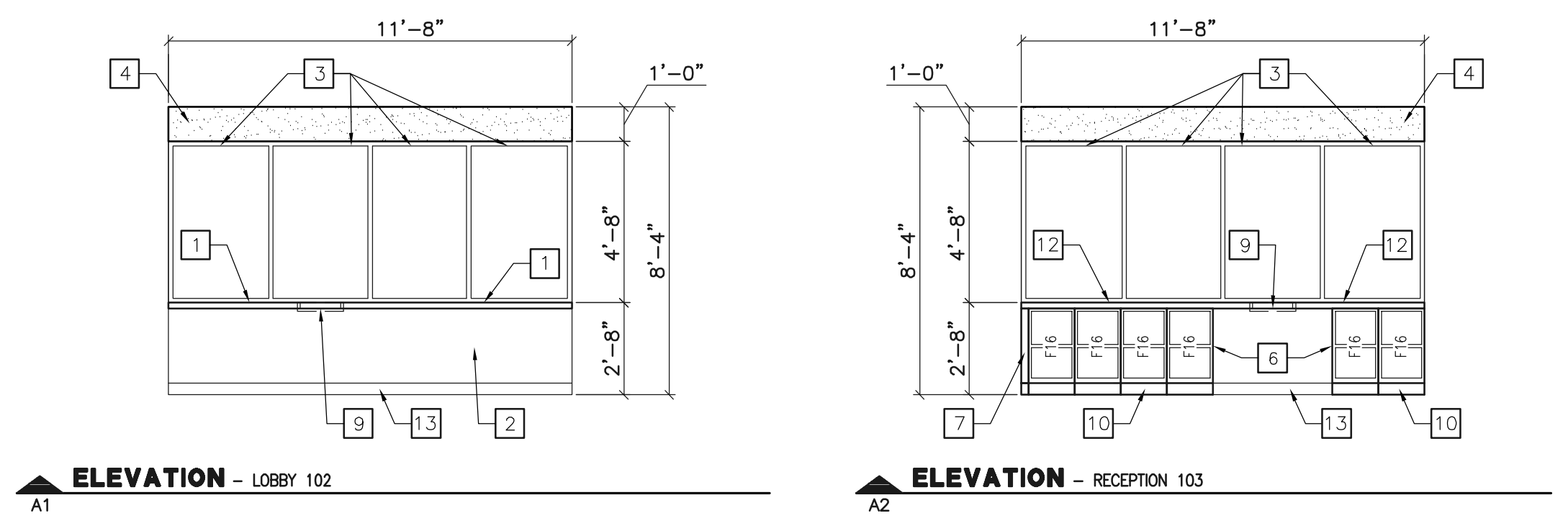
FILE NO. 19003-22

DR.	CHK.	DATE	DESCRIPTION
W.C.	DWS	08-15-24	PRELIMINARY DESIGN
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W.C.	DWS	11-22-24	OUT TO BID

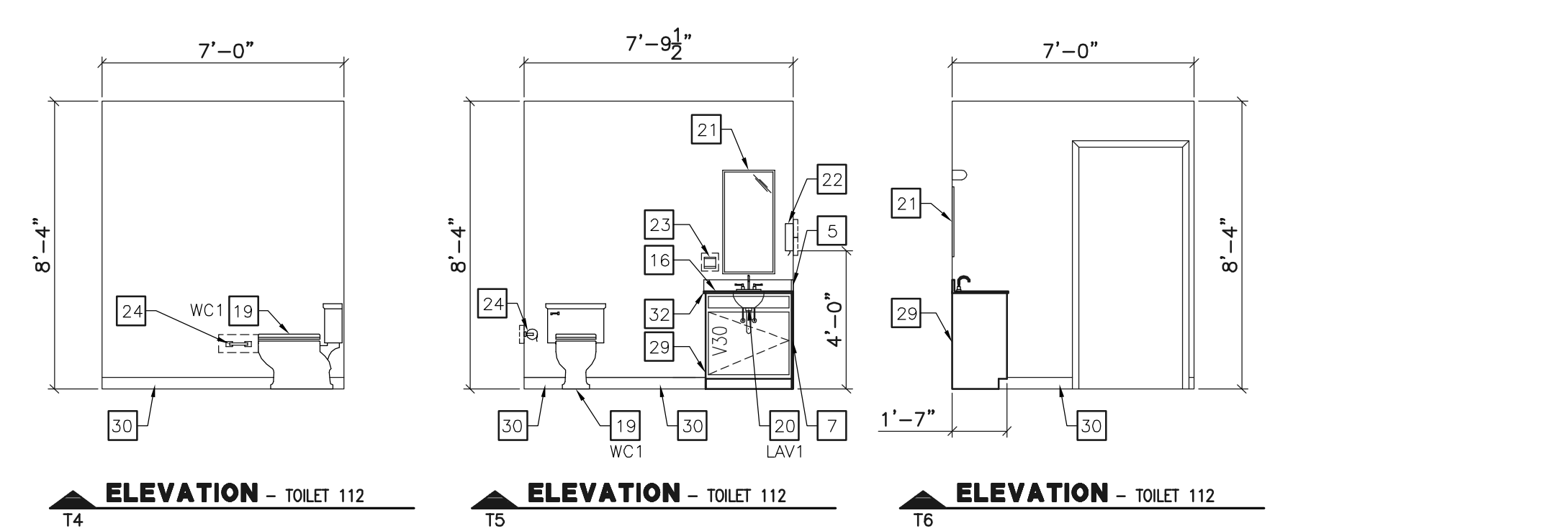
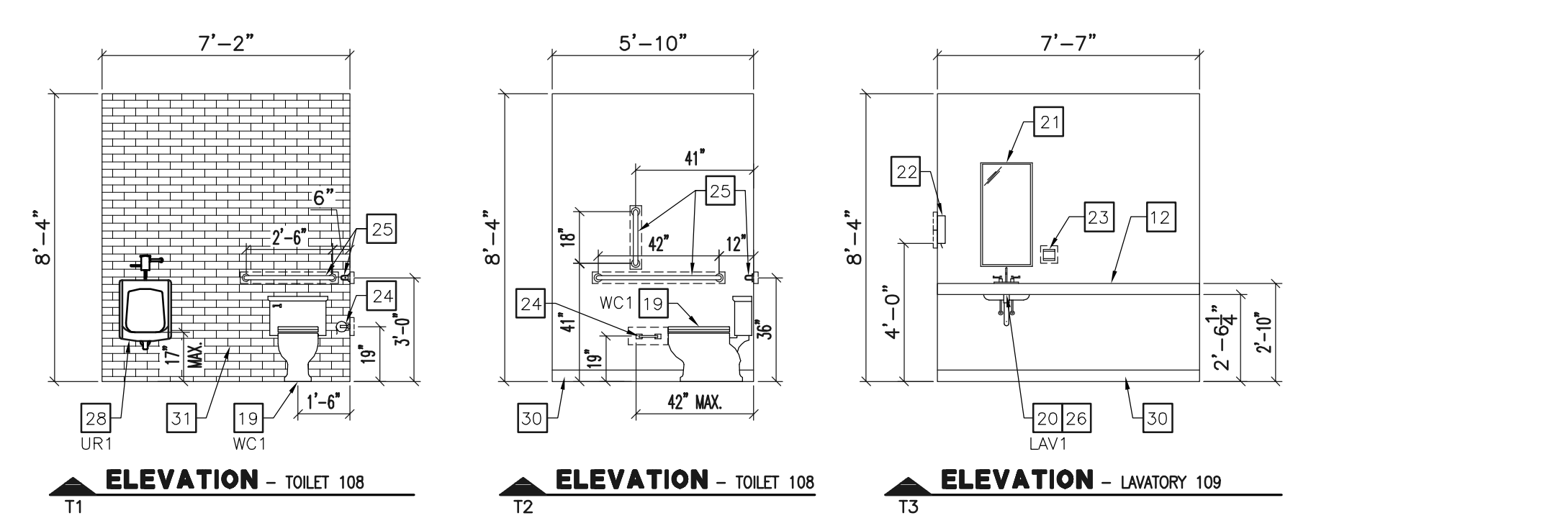
ROOM FINISH SCHEDULE

ROOM NUMBER	ROOM DESCRIPTION	FLOOR		BASE		WALLS		CEILING		REMARKS
		PLANK VINYL	CARPETING	PAINTED WOOD BASE	RESILIENT BASE (MILLWORK)	PAINTED WOOD BASE	PAINTED GYPSUM BOARD	PAINTED GYPSUM BOARD	EXISTING TO REMAIN	
001	SECTION 8 OFFICE									
002	VESTIBULE									D
003	OFFICE									
004	SERVER									
005	MECHNACAL									
006	CLOSET									
007	HALL									
008	FILES									
009	SECTION 8 OFFICE									
010	PUBLIC HOUSING OFFICE									
011	OFFICE									
012	BREAK ROOM									D
013	HALL									
014	WOMEN									
015	MAINT.									
016	MEN									
017	PANTRY									D
101	VESTIBULE									A
102	LOBBY									A, B
103	RECEPTION									A, D
104	WAITING AREA									A, B
105	HALL									A, D
106	INTERVIEW ROOM									A, B, D
107	INTERVIEW ROOM									A, B, D
108	TOILET									A
109	LAVATORY									A, D
110	HALL/COAT									A, B
111	FILE STORAGE									A
112	TOILET									A, D
113	MECHANICAL									A, C, D
114	HALL									A
115	FINANCE OFFICE									A
116	EXECUTIVE DIRECTOR									A
117	MECHANICAL									A, D

- A. ALL WALLS & DOOR FRAMES TO BE PAINTED. ALL DOORS TO BE STAINED. COLORS TO BE SELECTED BY A/E.
- B. PROVIDE TWO COLORS OF PAINT ON WALLS IN THIS AREA. ONE COLOR ABOVE CHAIR RAIL AND ONE COLOR BELOW CHAIR RAIL. CHAIR RAIL TO BE MOUNTED AT 36" A.F.F. PAINT COLORS TO BE SELECTED BY A/E.
- C. FINISHES TO BE COMPLETED IN THIS AREA BEFORE INSTALLING EQUIPMENT AND TOUCHED UP AFTER INSTALLATION IS COMPLETED.
- D. PROVIDE TRANSITION STRIP AT DOOR.



OFFICE CASEWORK ELEVATIONS
SCALE: 1/4"=1'-0"



TOILET ELEVATIONS
SCALE: 1/4"=1'-0"

NEW WORK GENERAL NOTES:

- PROVIDE FINISHED SURFACES ON ALL CABINET ENDS EXPOSED TO VIEW AND ADJACENT TO APPLIANCES.
- PROVIDE AND INSTALL BASE CABINETS, WALL CABINETS AND COUNTERTOPS AS INDICATED ON ELEVATIONS, THIS SHEET.
- FINISHED COUNTERTOP EDGE SHALL BE FLUSH WITH FINISHED END OF CABINETS ADJACENT TO APPLIANCES.
- CONTRACTOR SHALL VERIFY ALL DIMENSIONS PRIOR TO SUBMITTAL OF SHOP DRAWINGS. SHOP DRAWINGS SHALL REFLECT CONTRACTOR'S FIELD VERIFIED DIMENSIONS.
- PROVIDE 2 x 6 WOOD BLOCKING IN WALL FOR ANCHORING OF ALL BASE CABINETS, WALL CABINETS, TOILET ACCESSORIES AND GRAB BARS.
- PROVIDE VINYL COVE BASE ALONG FACE AND ENDS OF ALL BASE CABINETS.
- PROVIDE LOCKS ON ALL OFFICE CASEWORK (DOORS AND FILE DRAWERS), REFER TO OFFICE CASEWORK ELEVATIONS ON THIS SHEET. ALL LOCKS TO BE KEYPED ALIKE.
- ALL FILE CABINETS TO BE CONSTRUCTED FOR STANDARD 8 1/2" X 14" FILING.

NEW WORK KEYED NOTES:

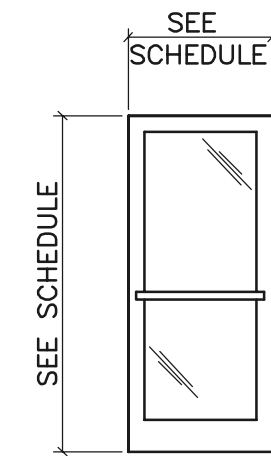
- RECEPTION COUNTERTOP WITH SQUARE EDGES CONSTRUCTED OF PLASTIC LAMINATE OVER [2] LAYERS OF 3/4" EXTERIOR GRADE PLYWOOD (CLAD ALL EXPOSED SURFACES WITH PLASTIC LAMINATE).
- PONY WALL WITH DRYWALL ON BOTH SIDES AT RECEPTION COUNTER. REFER TO DETAIL C/A7.01.
- INSTALL NEW FIXED TRANSACTION WINDOW WITH TEMPERED GLASS & ALUMINUM FRAME. REFER TO DETAIL D/A7.01.
- DRYWALL SOFFIT. REFER TO DETAIL D/A7.01.
- END SPLASH CLAD WITH PLASTIC LAMINATE.
- FINISHED END ON CABINET.
- FILLER TO MATCH CABINET FINISH (3" MAX.).
- PULL OUT KEYBOARD DRAWER.
- DIP TRAY.
- 1/4" PLYWOOD BASE AND WOOD BASE SHOE (STAINED TO MATCH CABINET FINISH).
- OBSERVATION WINDOW. REFER TO DETAIL 2/A9.02.
- COUNTERTOP WITH SQUARE FRONT EDGE CONSTRUCTED OF PLASTIC LAMINATE OVER 3/4" EXTERIOR GRADE PLYWOOD (CLAD ALL EXPOSED SURFACES WITH PLASTIC LAMINATE).
- WOOD BASE AND BASE SHOE.
- OPEN SHELF FOR MICROWAVE (18" DEEP BOTTOM SHELF).
- BAR SINK & FAUCET.
- POST-FORMED COUNTERTOP CONSTRUCTED OF PLASTIC LAMINATE OVER MARINE GRADE PLYWOOD, WITH 4" BACKSPLASH.
- 1x2 WOOD CLEAT WITH MITERED ENDS (PAINTED TO MATCH WALL).
- 4" PVC PIPE FOR VERTICAL SUPPORT (PAINTED TO MATCH TRIM). ANCHOR TO FLOOR AND COUNTERTOP WITH WOOD BLOCKING CUT TO INSERT INTO BOTH ENDS OF PIPE.
- WATER CLOSET.
- DROP-IN LAVATORY BOWL WITH FAUCET..
- 18" x 36" MIRROR
- AUTOMATIC PAPER TOWEL DISPENSER.
- AUTOMATIC SOAP DISPENSER.
- TOILET TISSUE HOLDER.
- GRAB BAR (SIZE AS SHOWN).
- INSTALL TRUBRO PREFABRICATED INSULATION PIPE COVER TO PROTECT ALL SUPPLY AND DRAIN LINES UNDER SINK.
- RADIUS EDGE ON COUNTERTOP CLAD WITH PLASTIC LAMINATE.
- URINAL.
- WOOD VANITY WITH RECESSED FLAT PANEL DOORS.
- RESILIENT BASE AND BASE SHOE (MILLWORK).
- CERAMIC WALL TILE.
- PLASTIC LAMINATE END CAP ON EDGE COUNTERTOP & BACKSPLASH.

DOOR & FRAME SCHEDULE

DOOR SYMBOL	DOOR					FRAME			FIRE RATING LABEL	HOW SET NO.	REMARKS				
	WIDTH	HEIGHT	THICK.	STYLE	TYPE	CLASS	UNDER CUT	MATERIAL				TYPE	DETAILS		
													HEAD	JAMB	SILL
(001)	3'-0"	6'-8"	1-3/4"	IM	B	-	-	HME	1	4	5	6	-	2	EXTERIOR TO VESTIBULE 002
(002)	3'-0"	6'-8"	1-3/4"	IM	B	-	-	HME	1	4	5	6	-	2	EXTERIOR TO BREAK ROOM 012
(003)	3'-0"	6'-8"	1-3/8"	SC	D	-	-	HMI	2	7	8	-	-	3	HALL 013 TO BREAK ROOM 012
(004)	2'-4"	6'-8"	1-3/8"	SC	D	-	-	HMI	2	7	8	-	-	5	BREAK ROOM 012 TO PANTRY 017
(101)	3'-0"	7'-0"	1-3/4"	SF	A	-	-	AL	4	1	2	3	-	1	EXTERIOR TO VESTIBULE 101
(102)	3'-0"	7'-0"	1-3/4"	SF	A	-	-	AL	3	9	10	-	-	7	VESTIBULE 101 TO LOBBY 102
(103)	3'-0"	6'-8"	1-3/8"	VL	C	-	-	HMI	2	7	8	-	-	3	LOBBY 102 TO FINANCE OFFICE 115
(104)	3'-0"	6'-8"	1-3/8"	VL	C	-	-	HMI	2	7	8	-	-	3	LOBBY 102 TO HALL 105
(105)	3'-0"	6'-8"	1-3/8"	VL	C	-	-	HMI	2	7	8	-	-	3	LOBBY 102 TO INTERVIEW 106
(106)	3'-0"	6'-8"	1-3/8"	VL	C	-	-	HMI	2	7	8	-	-	3	LOBBY 102 TO INTERVIEW 107
(107)	2'-4"	6'-8"	1-3/8"	SC	D	-	-	HMI	2	7	8	-	-	5	INTERVIEW 107 TO MECHANICAL 117
(108)	3'-0"	6'-8"	1-3/8"	SC	D	-	-	HMI	2	7	8	-	-	4	WAITING AREA 104 TO LAVATORY 109
(109)	3'-0"	6'-8"	1-3/8"	SC	D	-	-	HMI	2	7	8	-	-	3	WAITING AREA 104 TO HALL/COAT 110
(110)	3'-0"	6'-8"	1-3/8"	VL	C	-	-	HMI	2	7	8	-	-	3	WAITING AREA 104 TO RECEPTION 103
(111)	3'-0"	6'-8"	1-3/8"	VL	C	-	-	HMI	2	7	8	-	-	5	HALL 114 TO FILE STORAGE 111
(112)	3'-0"	6'-8"	1-3/8"	SC	D	-	-	HMI	2	7	8	-	-	4	HALL 114 TO TOILET 112
(113)	3'-0"	6'-8"	1-3/8"	VL	C	-	-	HMI	2	7	8	-	-	3	HALL 114 TO FINANCE OFFICE 115
(114)	3'-0"	6'-8"	1-3/8"	VL	C	-	-	HMI	2	7	8	-	-	3	HALL 114 TO EXECUTIVE DIRECTOR 116
(115)	3'-0"	6'-8"	1-3/8"	SC	D	-	-	HMI	2	7	8	-	-	6	EXECUTIVE DIRECTOR 116 TO MECHANICAL 113
(116)	3'-0"	6'-8"	1-3/4"	IM	B	-	-	HME	1	4	5	6	-	2	EXTERIOR TO EXECUTIVE DIRECTOR 116
(117)	3'-0"	6'-8"	1-3/4"	IM	B	-	-	HME	1	4	5	6	-	2	EXTERIOR TO HALL/COAT 110

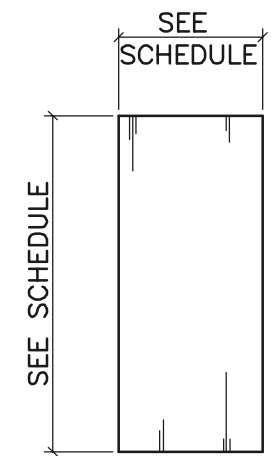
GENERAL NOTES:

1. FIELD VERIFY ALL DOORS, FRAME SIZES AND WALL THICKNESS BEFORE ORDERING DOORS OR FRAMES.
2. PAINT ALL INTERIOR DOOR FRAMES, TRIM AND DOORS (COLOR TO BE SELECTED BY A/E).
3. PROVIDE ALL NECESSARY BLOCKING, SHIMS, ANCHORS, AND/OR BREAK METAL TRIM ACCESSORIES AS NEEDED TO INSTALL DOORS AND FRAMES.
4. ALL LOCKS TO BE KEYPED TO THE OWNERS MASTER KEY.
5. REFER TO DOOR TYPES AND DETAILS ON THIS SHEET.



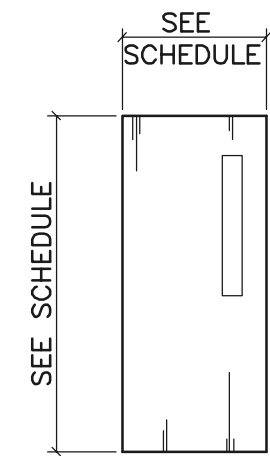
SF = STOREFRONT SYSTEM (ALUMINUM)

TYPE A



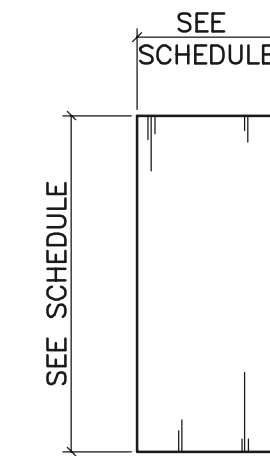
IM=INSULATED METAL (STEEL)

TYPE B



VL = VISION LITE SOLID CORE (FLUSH WOOD)

TYPE C

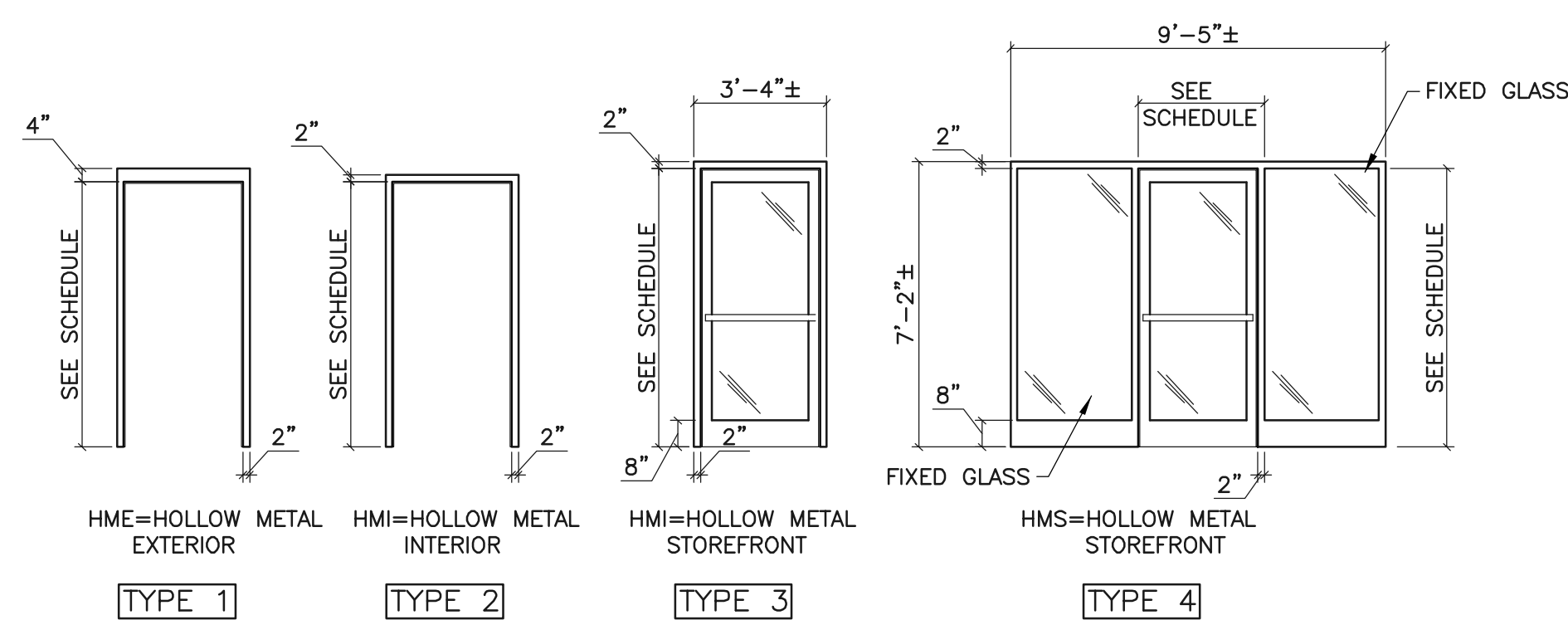


SC = SOLID CORE (FLUSH WOOD)
HC = HOLLOW CORE (FLUSH WOOD)

TYPE D

DOOR TYPES

N.T.S.



HME=HOLLOW METAL EXTERIOR

HMI=HOLLOW METAL INTERIOR

HMI=HOLLOW METAL STOREFRONT

HMS=HOLLOW METAL STOREFRONT

TYPE 1

TYPE 2

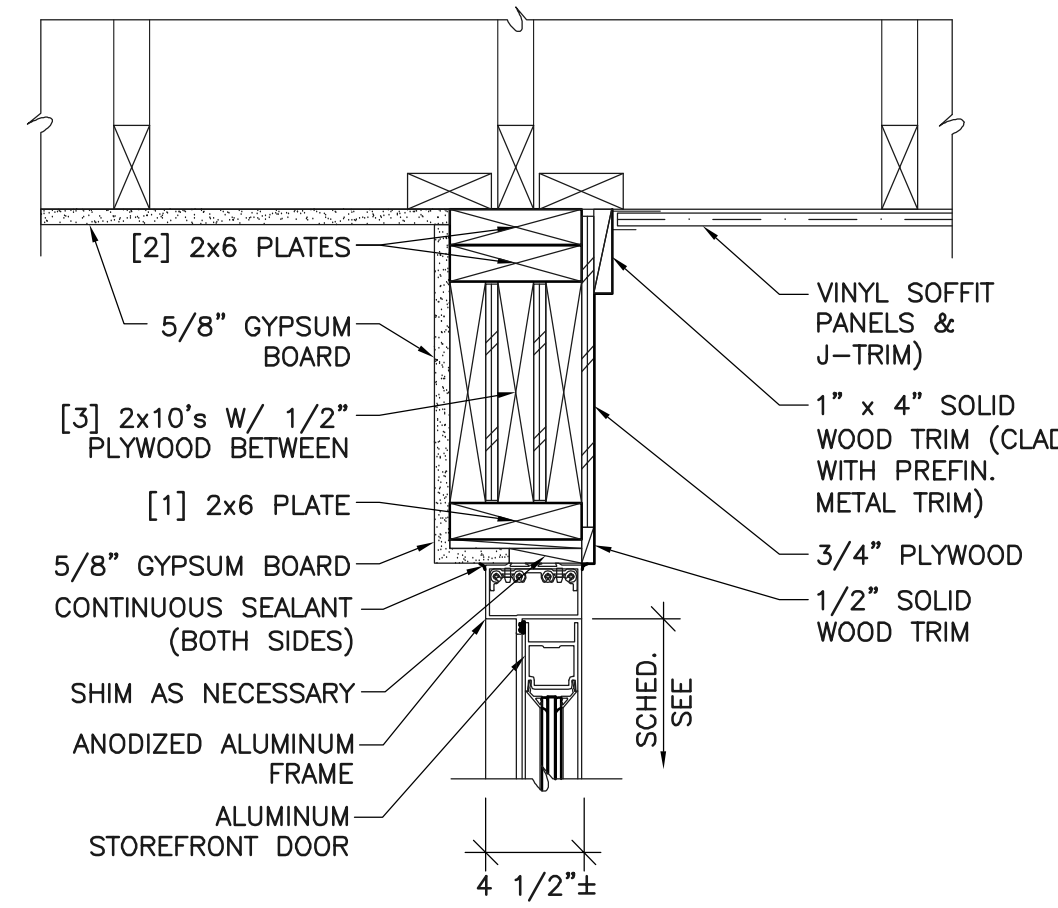
TYPE 3

TYPE 4

FRAME TYPES

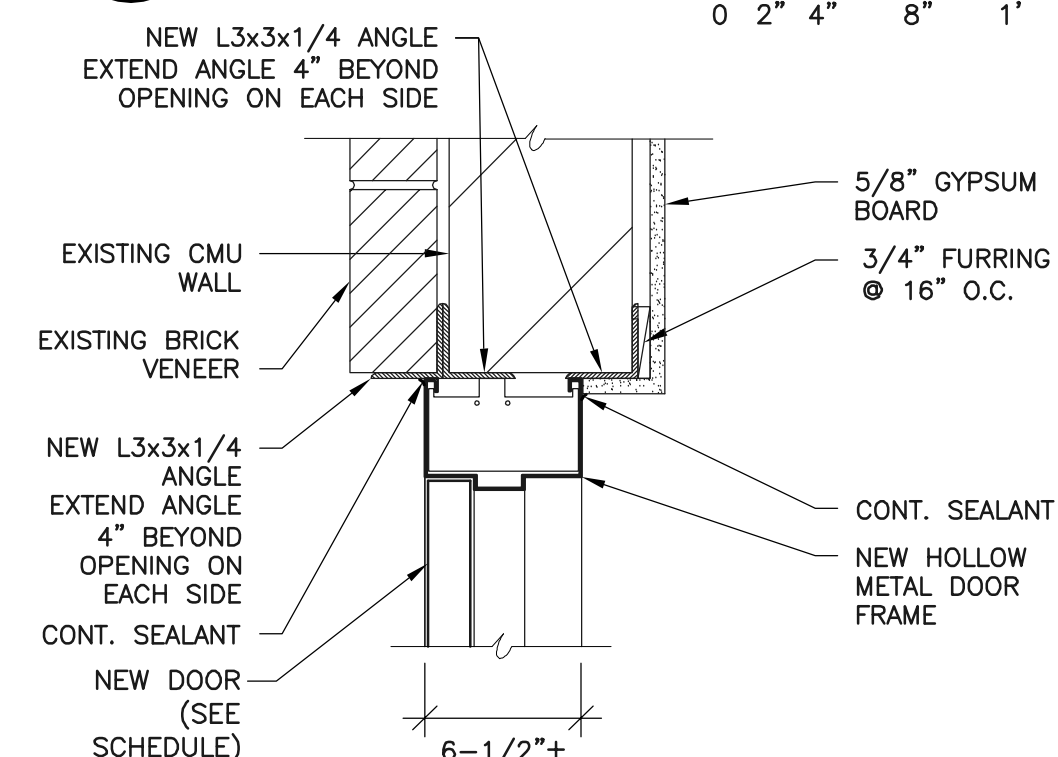
N.T.S.

HARDWARE LOCATION



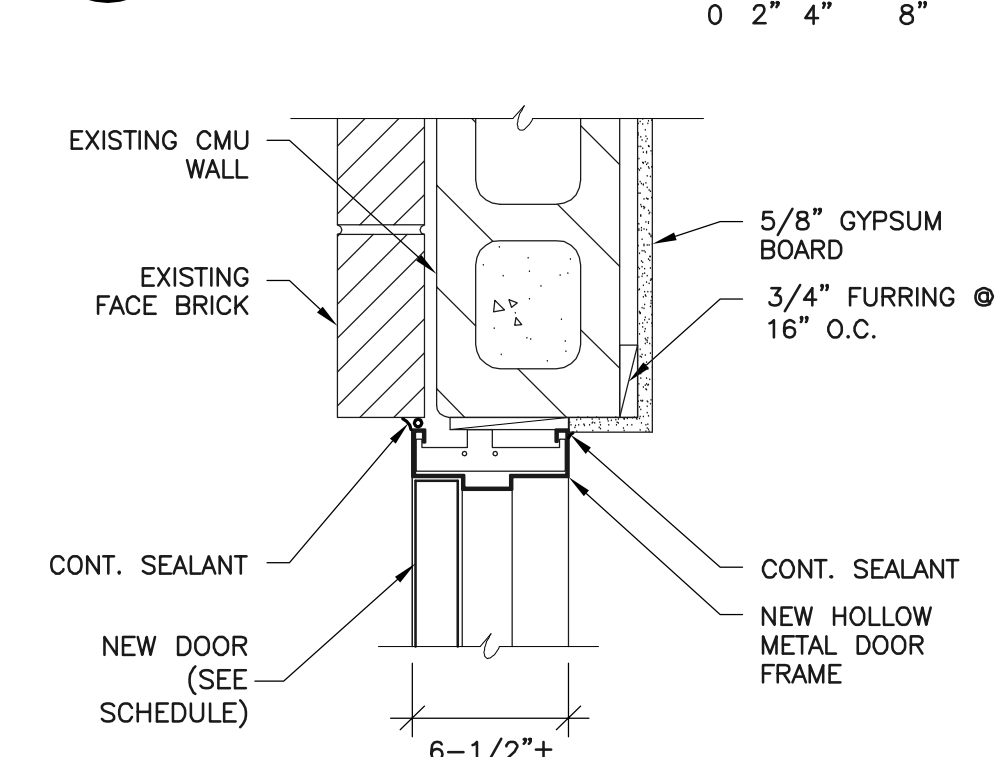
1 HEAD: STOREFRONT DOOR

A9.01 SCALE: 1-1/2"=1'-0"



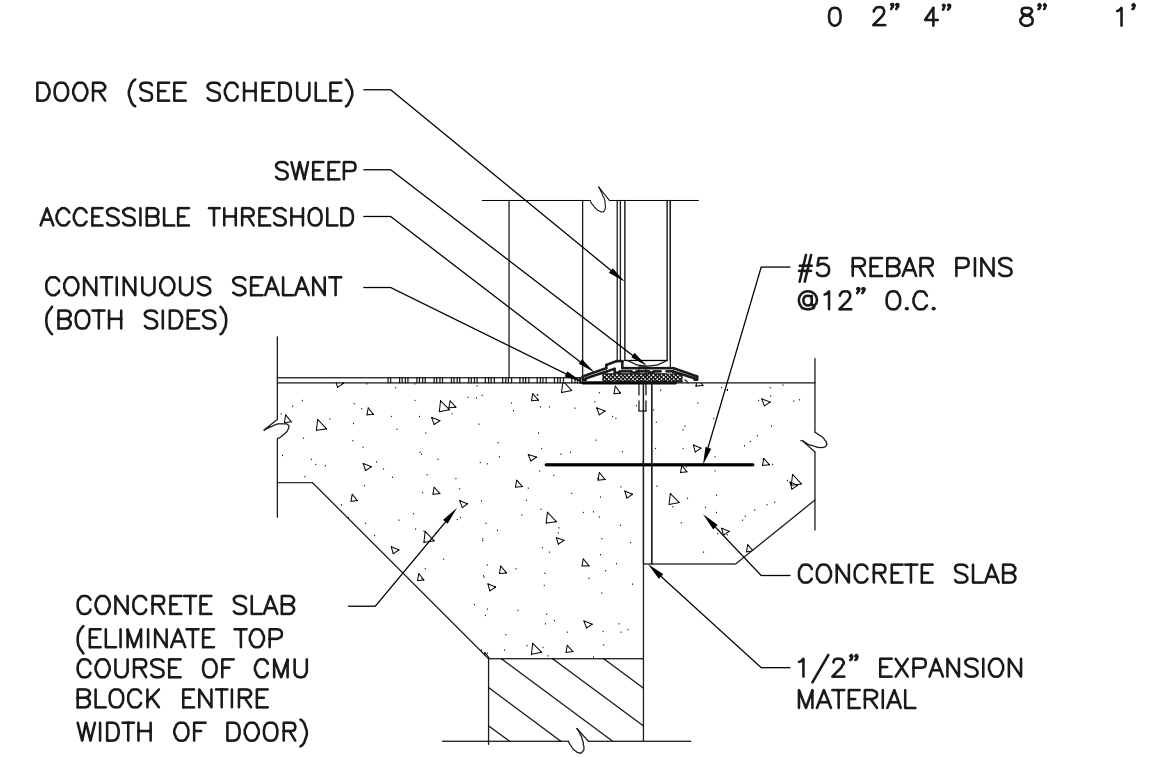
2 JAMB: STOREFRONT DOOR

A9.01 SCALE: 1-1/2"=1'-0"



3 THRESHOLD: STOREFRONT DOOR

A9.01 SCALE: 1 1/2"=1'-0"



4 HEAD: INSULATED METAL

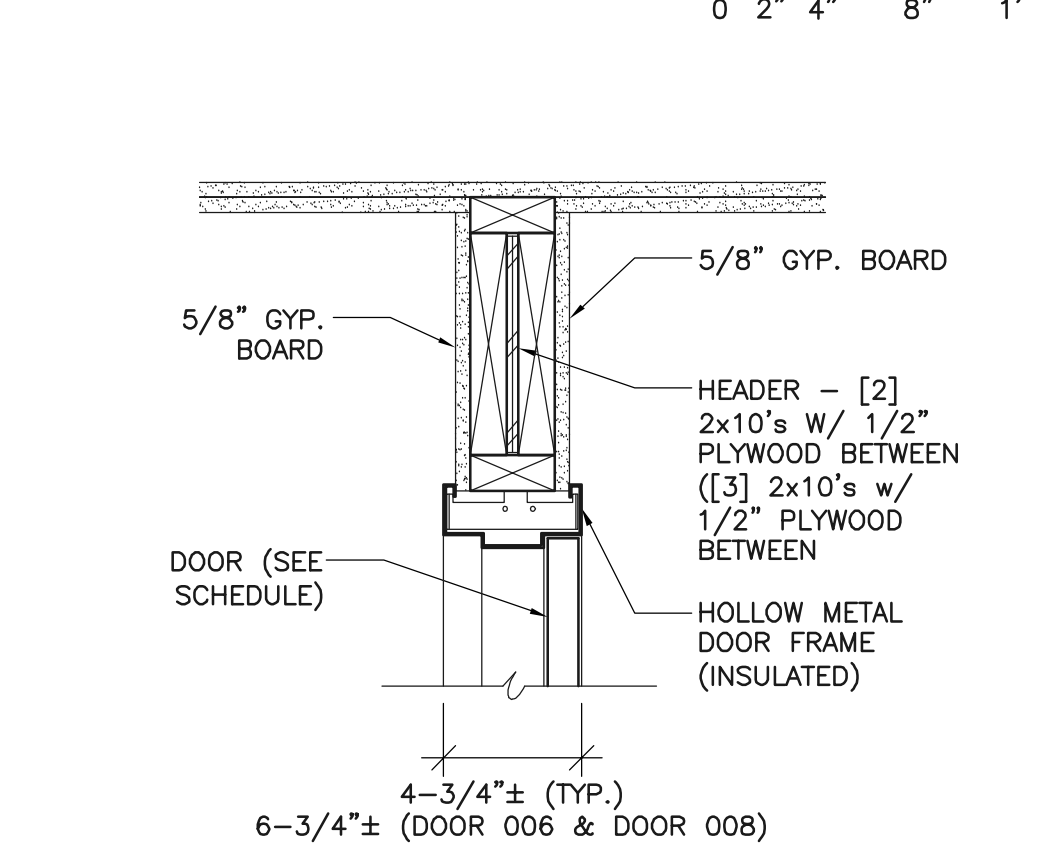
A9.01 SCALE: 1-1/2"=1'-0"

5 JAMB: INSULATED METAL

A9.01 SCALE: 1-1/2"=1'-0"

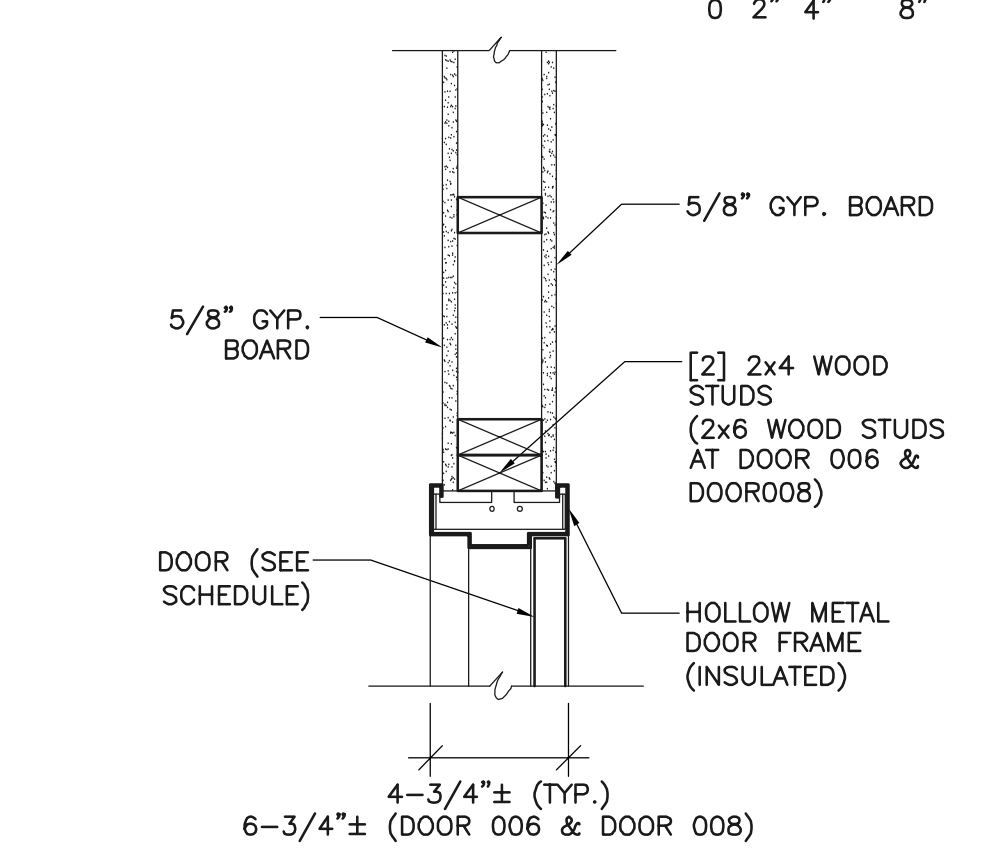
6 THRESHOLD: INSULATED METAL

A9.01 SCALE: 1 1/2"=1'-0"



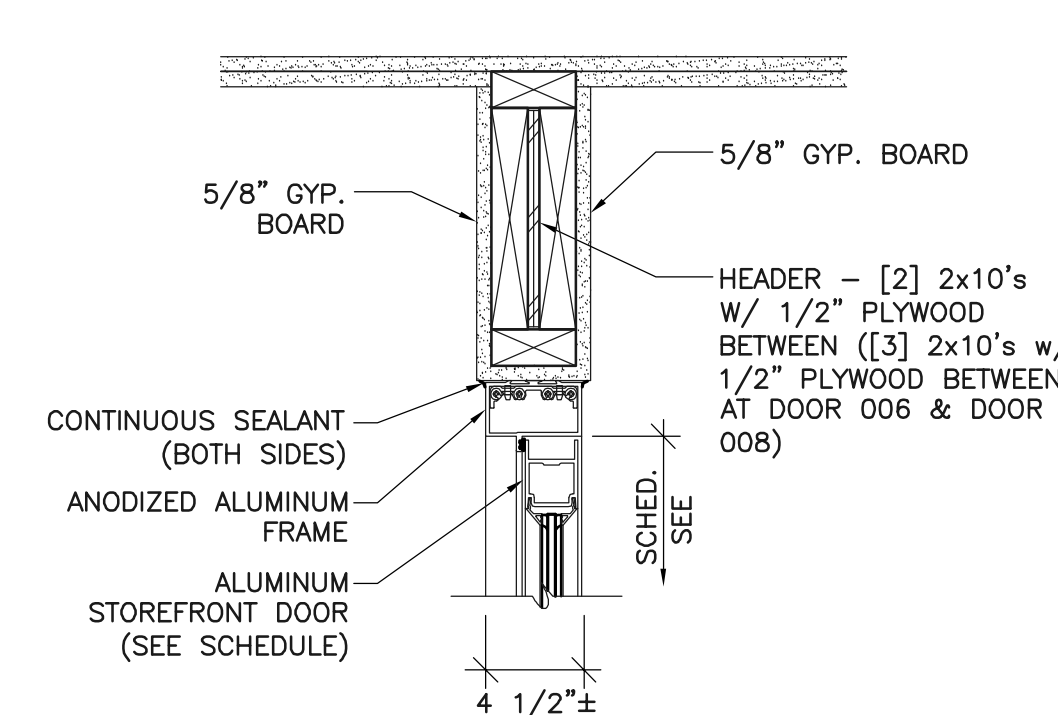
7 HEAD: INTERIOR

A9.01 SCALE: 1-1/2"=1'-0"



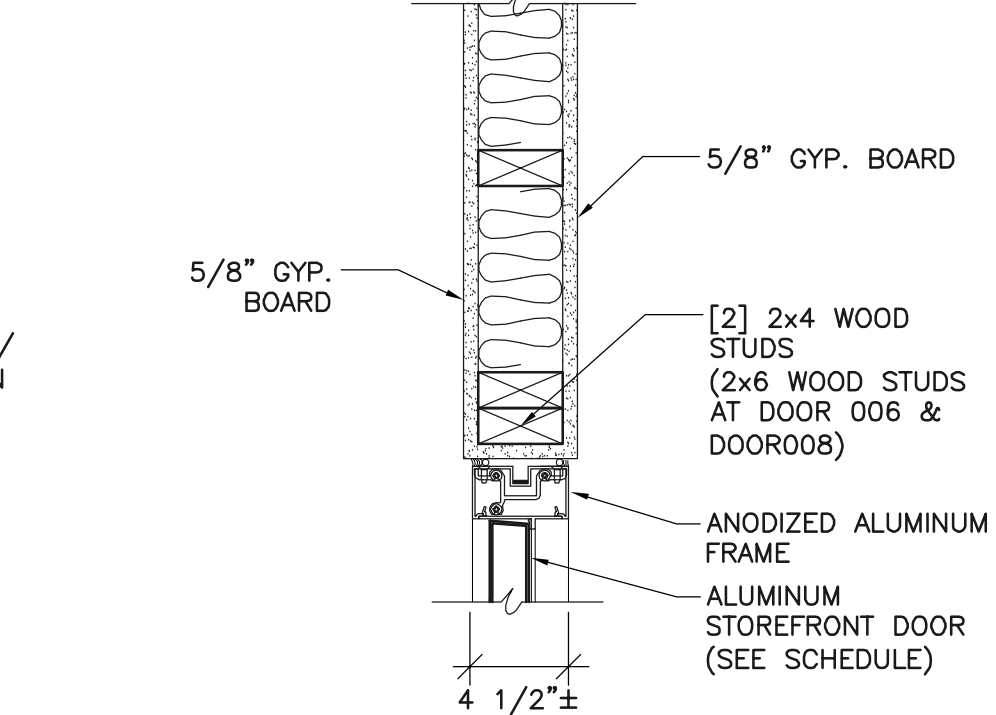
8 JAMB: INTERIOR

A9.01 SCALE: 1-1/2"=1'-0"



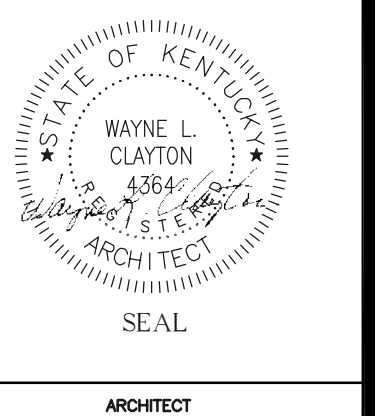
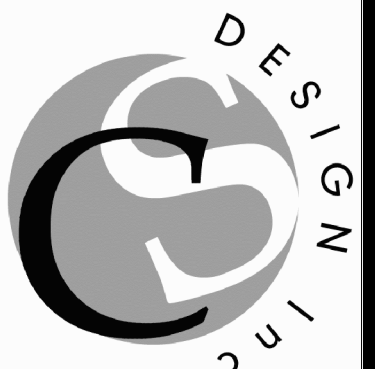
9 HEAD: INT. STOREFRONT

A9.01 SCALE: 1-1/2"=1'-0"



10 JAMB: INT. STOREFRONT

A9.01 SCALE: 1-1/2"=1'-0"



ARCHITECT

ENGINEER

DOOR SCHEDULE AND DETAILS

CFP NO. KY36P003-501(22)

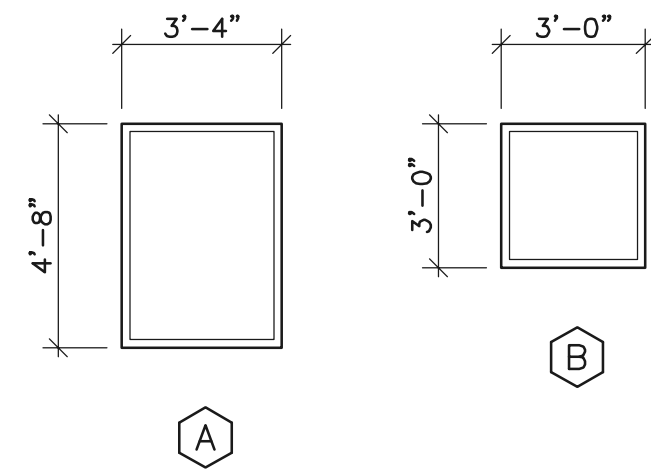
HOUSING AUTHORITY OF FRANKFORT

FRANKFORT, KENTUCKY

DR.	CHK.	DATE	DESCRIPTION
W.C.	DWS	08-15-24	PRELIMINARY DESIGN
W.C.	DWS	10-08-24	OWNER REVIEW
W.C.	DWS	11-22-24	OUT TO BID

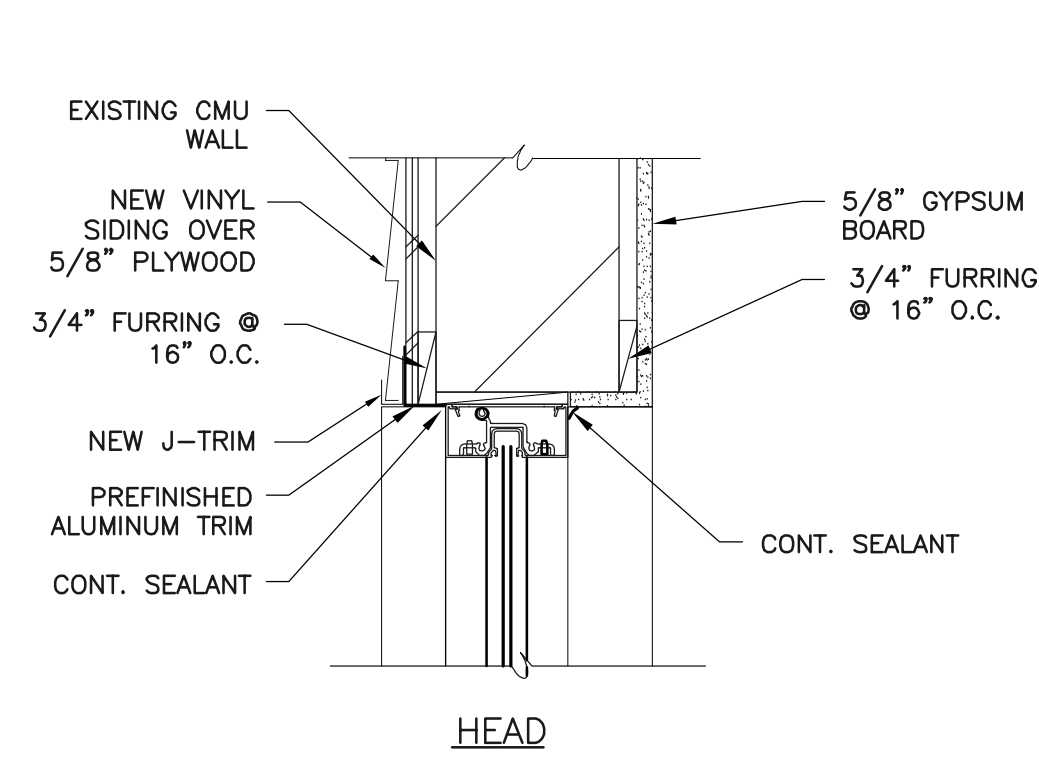
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FILE NO. 19003-22

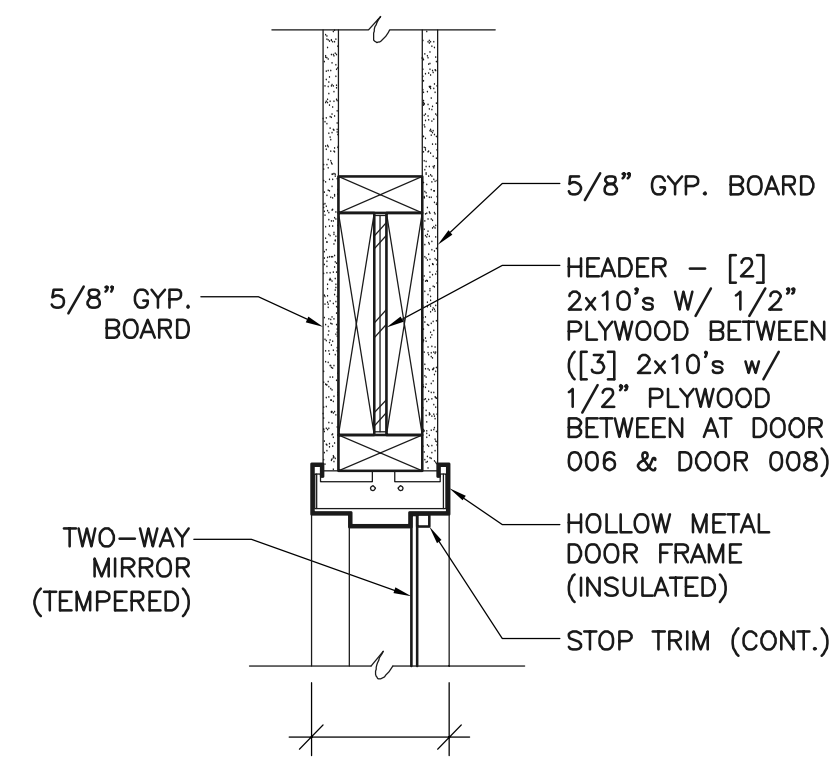


WINDOW TYPES

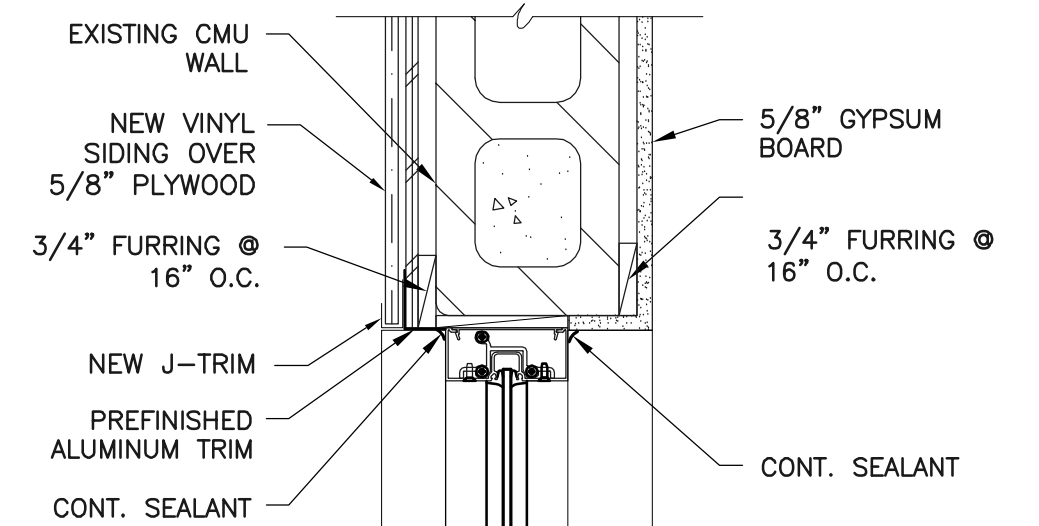
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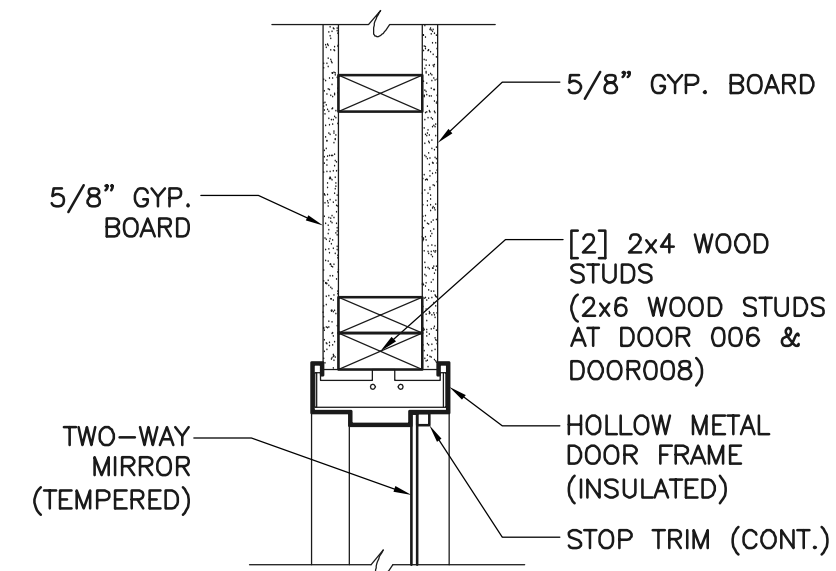
HEAD



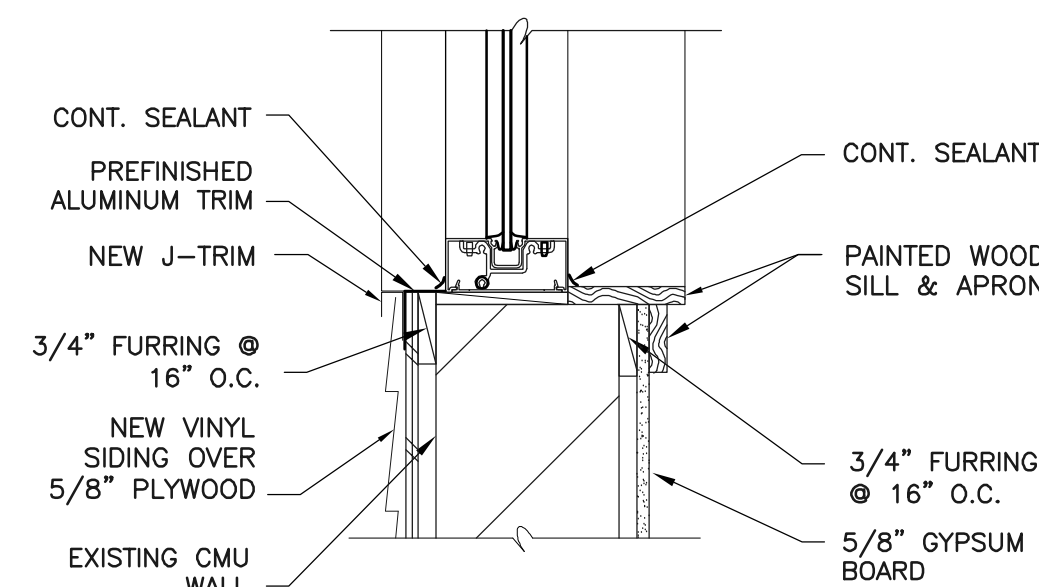
HEAD



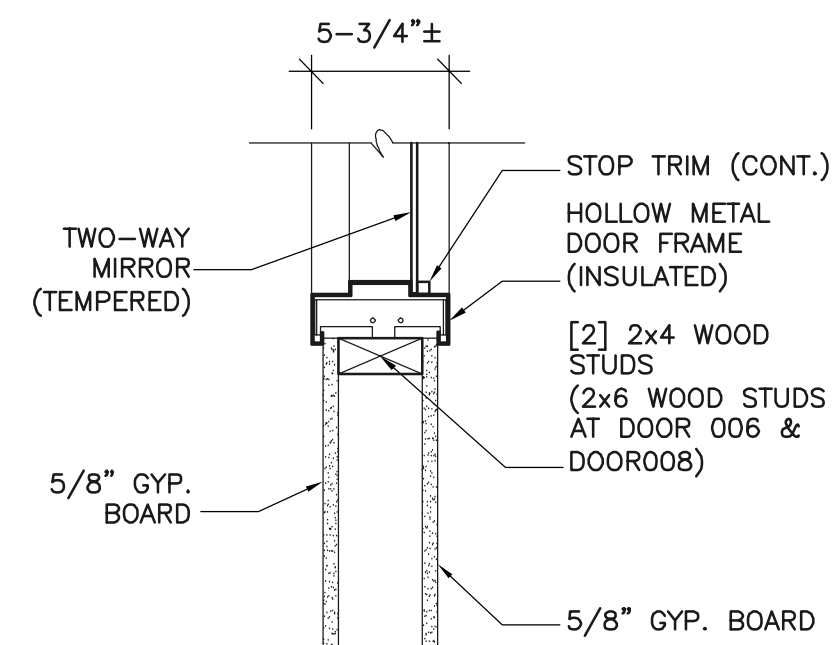
JAMB



JAMB

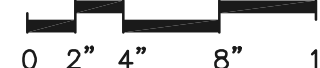


SILL

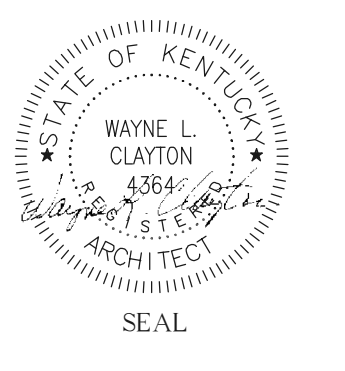
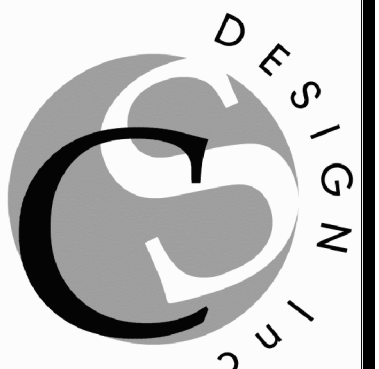


SILL

1 EXTERIOR WINDOW DETAILS
A9.02 SCALE: 1-1/2"=1'-0"



2 OBSERVATION WINDOW
A9.02 SCALE: 1-1/2"=1'-0"



ARCHITECT

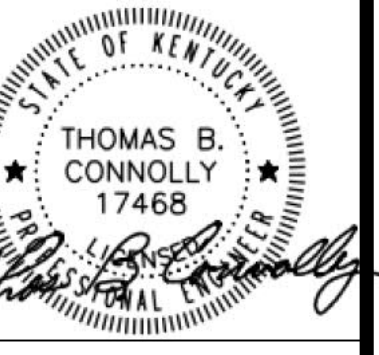
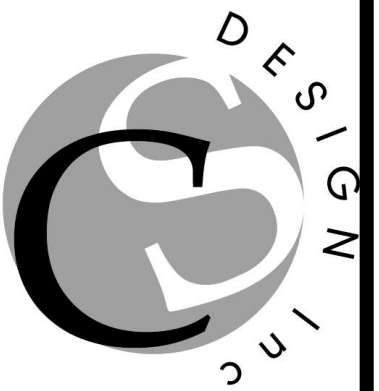
ENGINEER

WINDOW TYPES AND DETAILS
CFP NO. KY36P003-501(22)
HOUSING AUTHORITY OF FRANKFORT
FRANKFORT, KENTUCKY

DR.	CHK.	DATE	DESCRIPTION
WLC	DWS	08-15-24	PRELIMINARY DESIGN
WLC	DWS	10-08-24	OWNER REVIEW
WLC	DWS	11-22-24	OUT TO BID

A9.02

FILE NO. 19003-22



ENGINEER

PLUMBING DEMOLITION
CFP NO. KY36P00 - 501(22)
HOUSING AUTHORITY OF FRANKFORT
FRANKFORT, KENTUCKY

DR.	CHK.	DATE	DESCRIPTION
CAF	TBC	09/26/24	FOR CONSTRUCTION
		11/22/2024	

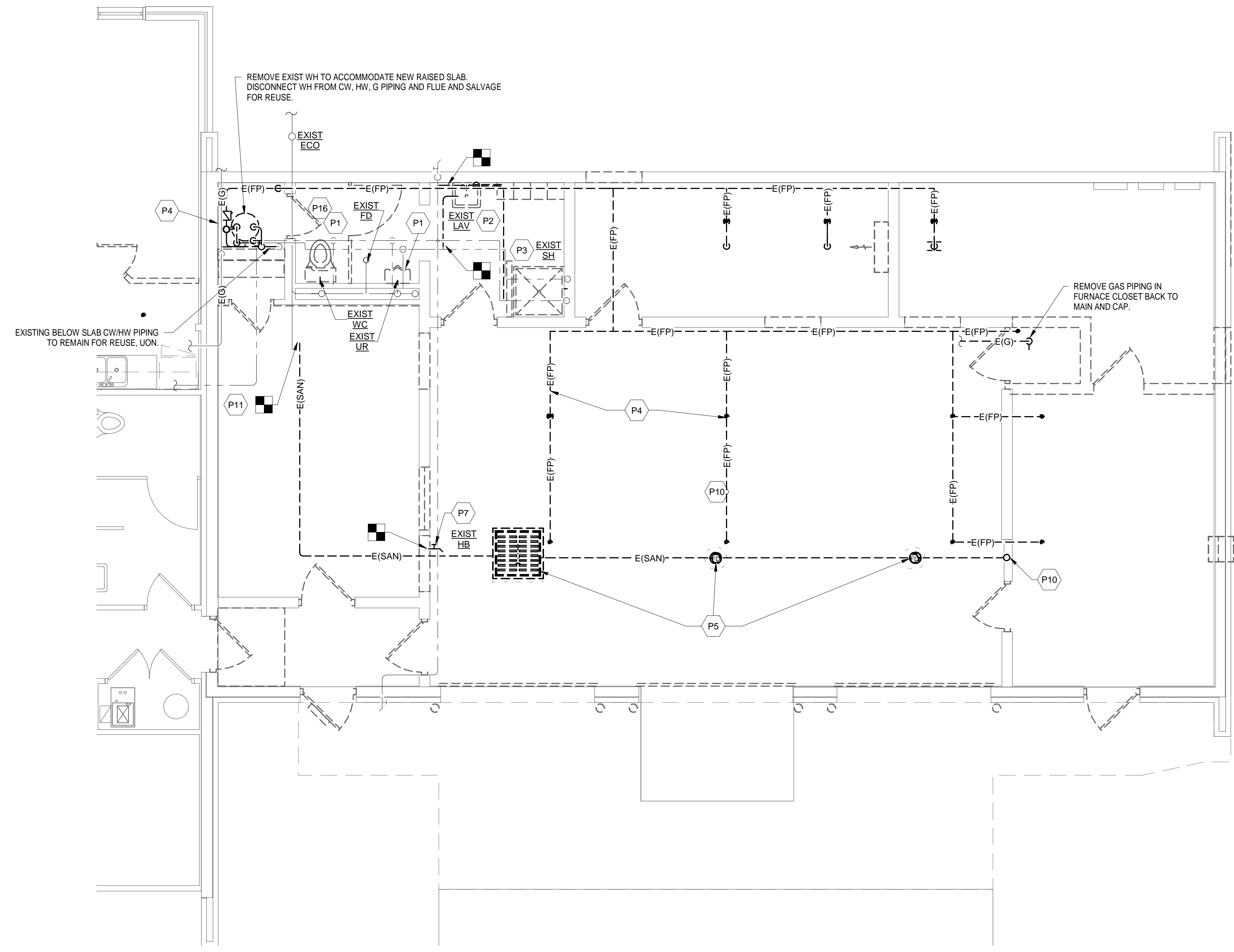
P0.01

SHEET NOTES

- P1 REMOVE EXISTING PLUMBING FIXTURE, SUPPLIES AND STOPS TO ACCOMMODATE NEW FINISHES IN THIS ROOM. ALL CW, SAN AND VENT PIPING TO REMAIN FOR REUSE. PREP TO CONNECT TO NEW FIXTURE IN SAME LOCATION, UON.
- P2 REMOVE EXISTING LAUNDRY SINK COMPLETE. REMOVE EXISTING CW, HW, SAN AND VENT PIPING TO WITHIN WALL AND CAP. PATCH WALL TO MATCH ADJOINING CONSTRUCTION AND FINISH.
- P3 REMOVE EXISTING SHOWER COMPLETE. PREP TO EXTEND CW, HW, SAN AND VENT PIPING CONCEALED TO NEW LAVATORY ON SAME WALL. PATCH WALL TO MATCH ADJOINING CONSTRUCTION AND FINISH.
- P4 REMOVE EXISTING LIMITED AREA SPRINKLER SYSTEM COMPLETE BACK TO UTILITY ROOM. REMOVE EXIST HW/CW PIPING BACK TO SLAB PENETRATIONS AND PREP TO BE EXTENDED UNDER NEW WORK.
- P5 REMOVE ALL GRATES AND FRAMES. PROVIDE CAP TO SEAL SANITARY OUTLET FROM CATCH BASIN, FILL IN TRENCH WITH CONCRETE AND ABANDON PIPES IN PLACE. PATCH FLOOR IAW ARCHITECTURAL SPECIFICATION.
- P7 REMOVE EXISTING HOSE BIB AND PIPING TO BELOW FLOOR AND CAP. PATCH FLOOR IAW ARCHITECTURAL SPECIFICATION.
- P10 REMOVE EXIST FLOOR DRAIN VENT IN ATTIC BACK TO POINT OF CONNECTION TO NEW FIXTURE VENTS.
- P11 DISCONNECT FLOOR DRAIN SYSTEM AT POINT INDICATED. PREP SAN MAIN FOR EXTENSION UNDER NEW WORK.
- P16 RAISE THE EXISTING TOILET SANITARY PIPING TO ACCOMMODATE THE NEW FINISHED FLOOR. PROVIDE NEW TOILET FLANGE & WAX RING.

GENERAL DEMOLITION NOTES

- A. RECORD DRAWINGS OF PLUMBING SYSTEMS WERE NOT AVAILABLE FOR REFERENCE ON THIS PROJECT. ALL BELOW SLAB PIPING LOCATIONS ARE UNKNOWN, AND SHOWN USING EXAMPLE PIPING ROUTES. CONTRACTOR SHALL INVESTIGATE EXISTING BELOW SLAB PIPING AND INCLUDE COST IN HIS BID FOR UNKNOWN CONDITIONS.



PLUMBING DEMOLITION

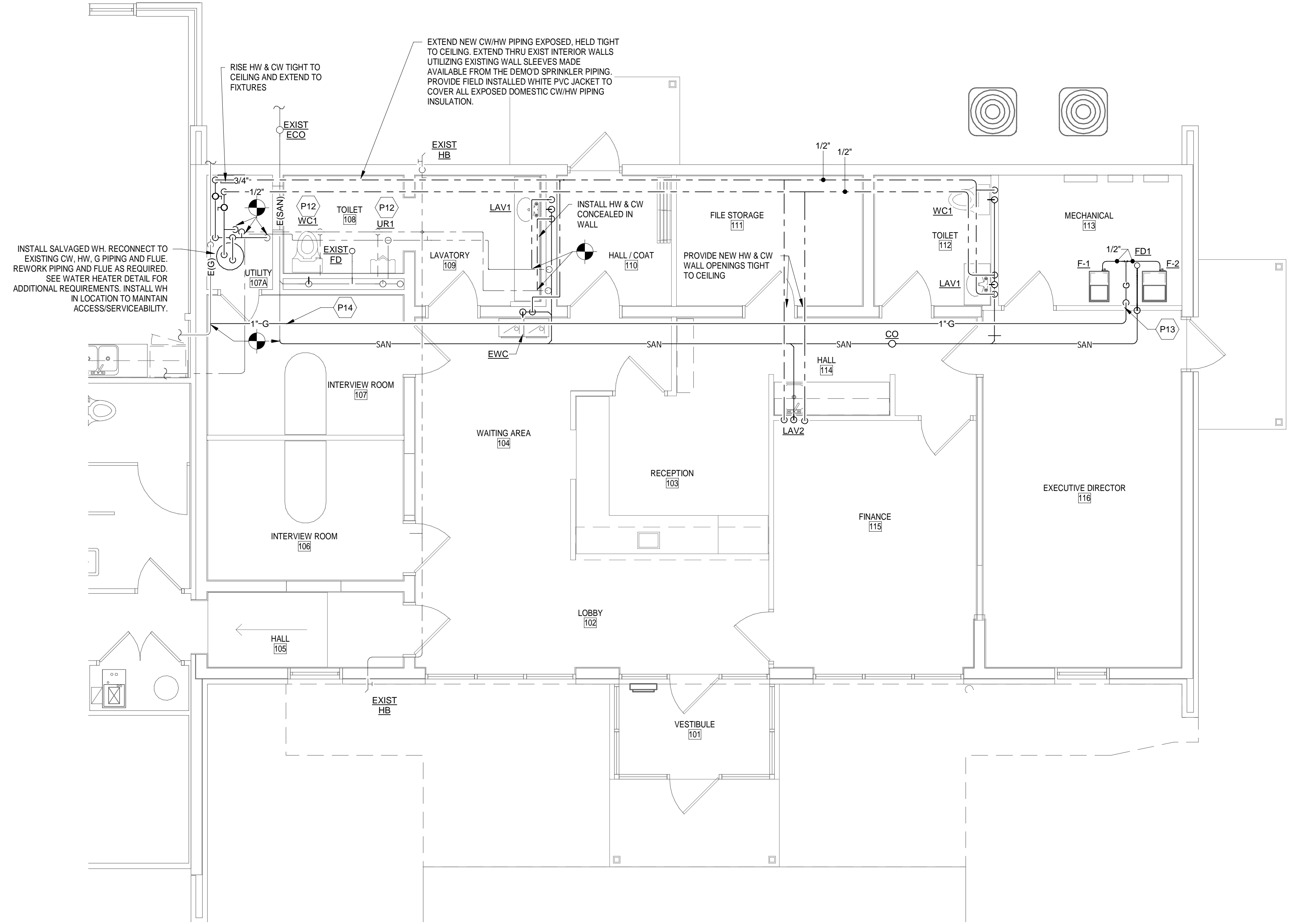
1/4" = 1'-0"

GENERAL SANITARY WASTE & VENT NOTES

- A. FIRESTOP ALL PENETRATIONS THRU RATED ASSEMBLIES BY A UL LISTED METHOD ACCEPTABLE TO AHJ.
- B. EXISTING SLAB IS BEING RAISED APPROX. 3 INCHES THROUGHOUT PROJECT AREA. REFER TO ARCHITECTURAL DRAWINGS FOR THE SCOPE, RAISE/EXTEND EXISTING PIPING THROUGH SLAB AS REQUIRED TO ACCOMMODATE THE NEW FINISHED FLOOR ELEVATION.

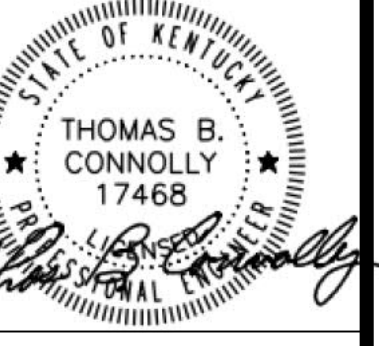
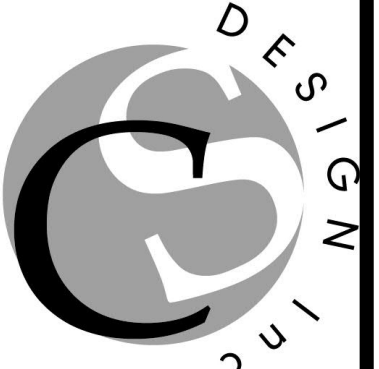
SHEET NOTES

- P12 PROVIDE NEW PLUMBING FIXTURE, SUPPLIES AND STOPS. CONNECT TO EXIST CW, HW, SAN AND VENT PIPING IN SAME LOCATION.
- P13 DROP GAS PIPING DOWN EXPOSED ON WALL. EXTEND TO FURNACES. REFER TO TYPICAL GAS DROP DETAIL FOR ADDITIONAL REQUIREMENTS.
- P14 EXTEND NEW GAS BRANCH PIPING THRU ATTIC. BRANCH PIPING SHALL PROVIDE AT TOTAL OF 80 MBH AT 7" WC.



PLUMBING PLAN

1/4" = 1'-0"



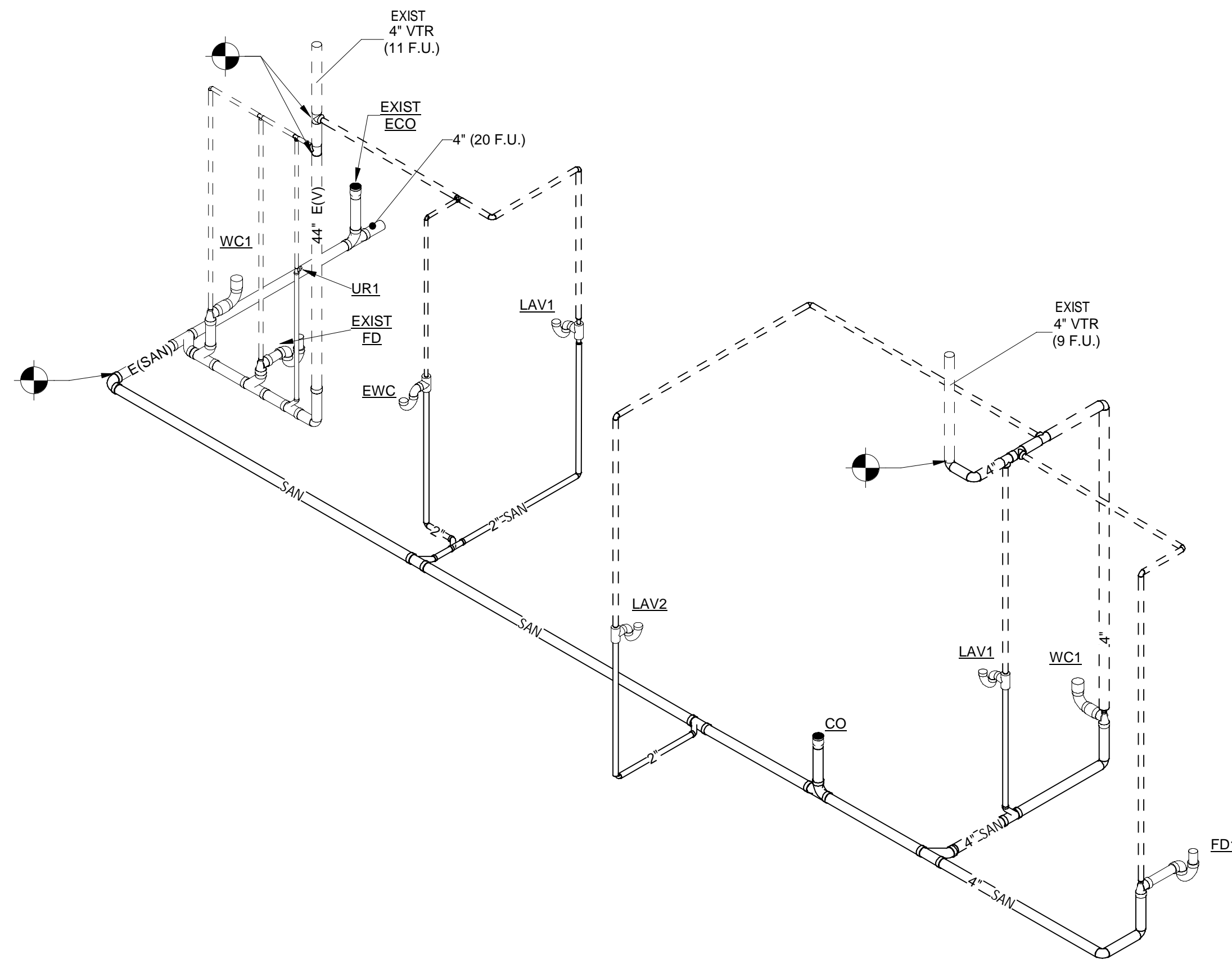
ENGINEER

PLUMBING PLAN

CFP NO. KY36P00 - 501(22)
HOUSING AUTHORITY OF FRANKFORT
 FRANKFORT, KENTUCKY

DR.	CHK.	DATE	DESCRIPTION
CAF	TBC	09/26/24	FOR CONSTRUCTION
		11/22/2024	

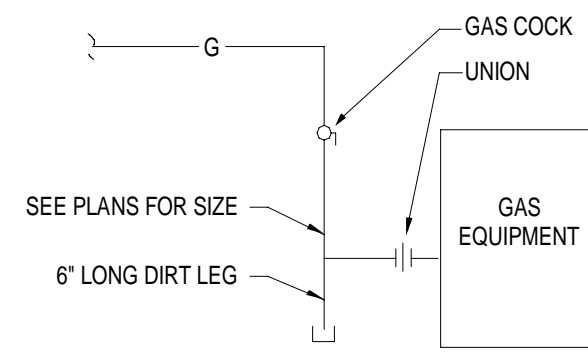
P1.01



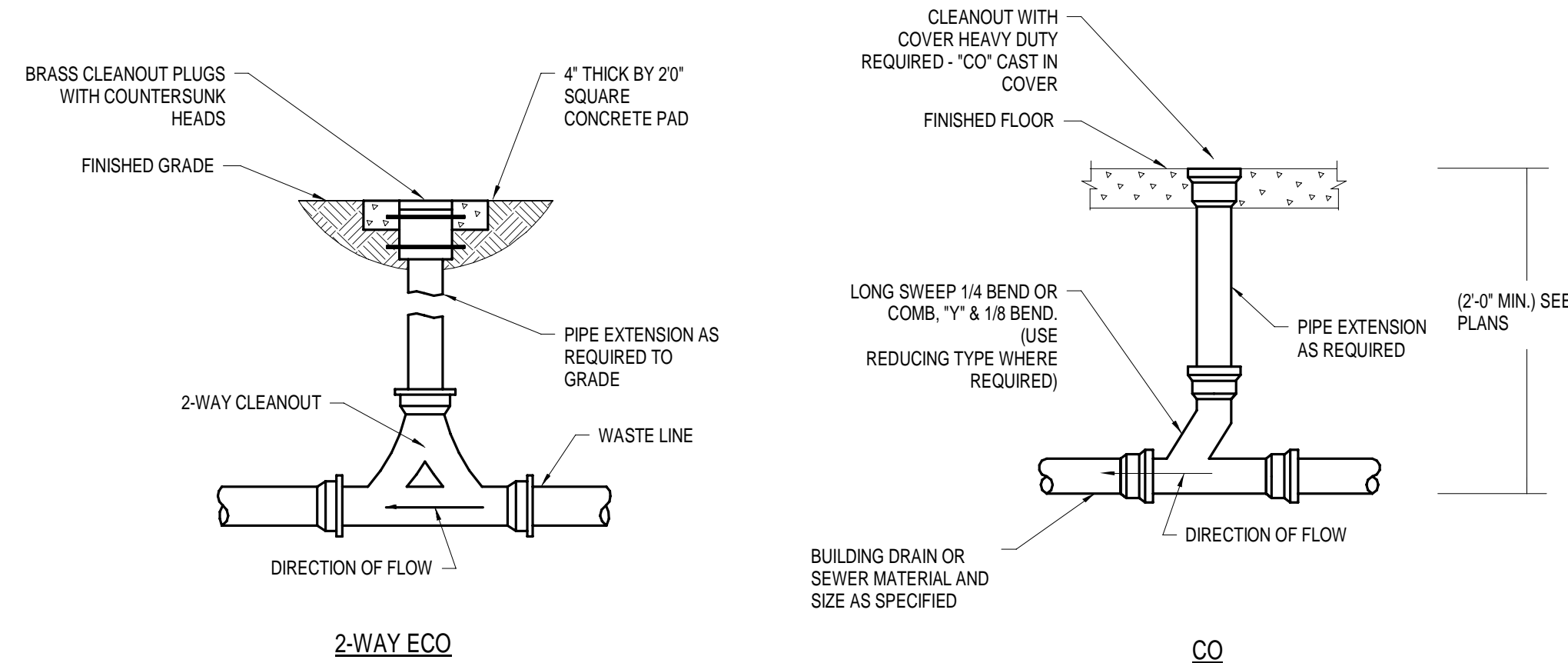
NOTE: ALL VENT PIPING SHALL BE 2" SIZE, UON.

1 SANITARY WASTE AND VENT RISER DIAGRAM

NOT TO SCALE



2 TYPICAL GAS DROP TO EQUIPMENT



NOTES:
 1. ALL CLEANOUT LOCATIONS SHALL BE VERIFIED WITH ARCHITECT PRIOR TO INSTALLATION.
 2. WRAP CAST IRON PIPE & FITTINGS WITH 2 LAYERS 8-MIL POLYETHYLENE SHEET.

3 SANITARY SEWER CLEANOUT DETAILS

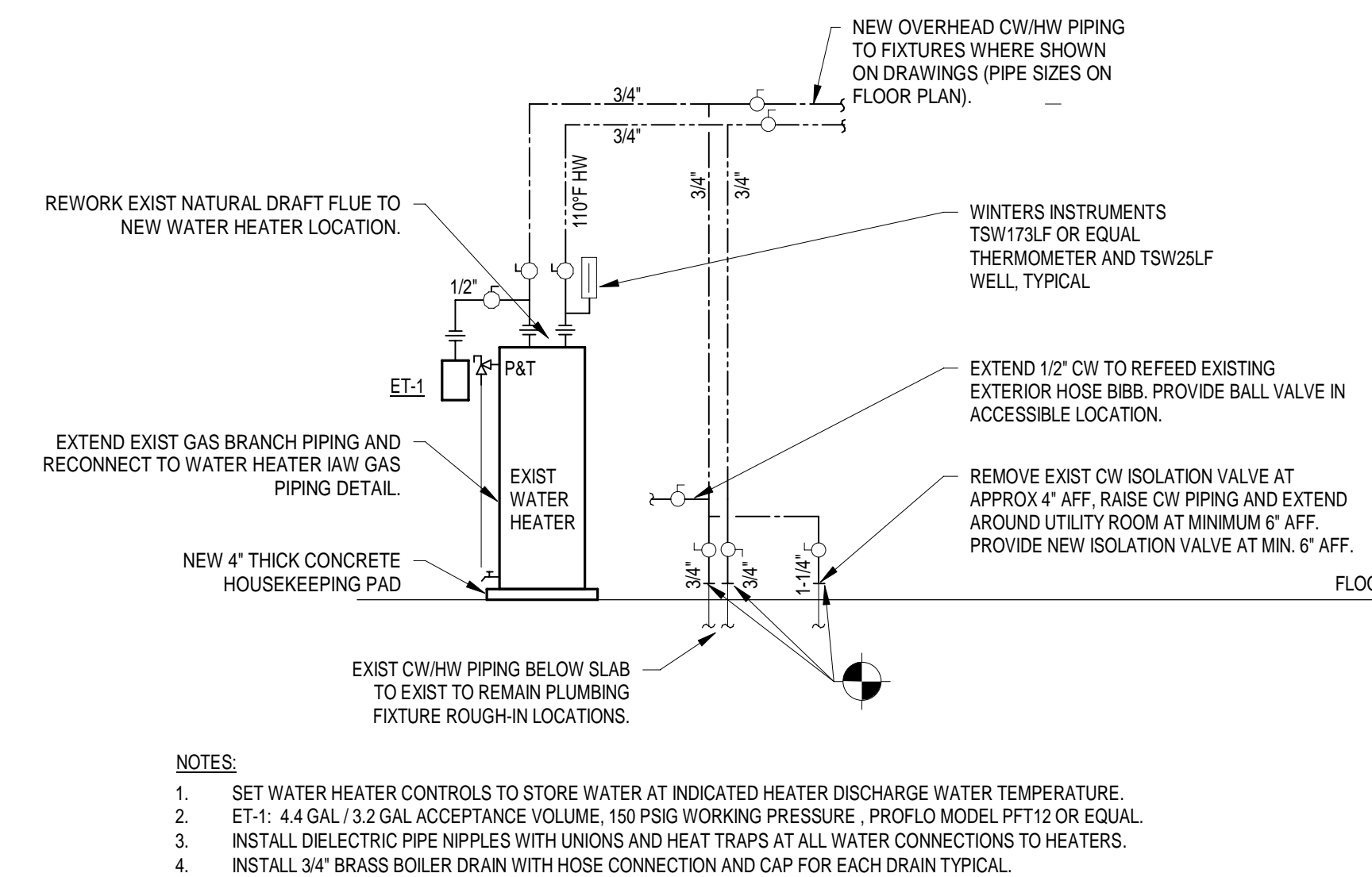
PLUMBING FIXTURE SCHEDULE

MARK	TYPE	CW	HW	WASTE	VENT	DESCRIPTION	IMAGE
CO	CLEAN OUT, ADJUSTABLE			4"		ADJUSTABLE INTERIOR FLOOR CLEANOUT. ZURN MODEL C01 WITH NICKEL BRONZE ROUND SCORIED COVER ADJUSTABLE TO FINISHED FLOOR. CLEANOUT BODY MATERIAL TO MATCH PIPING TYPE.	
EWC	ELECTRIC WATER COOLER WITH BOTTLE FILLER	1/2"		1 1/2"	1 1/4"	BARRIER-FREE DUAL LEVEL WATER COOLER WITH BOTTLE FILLING STATION, ADA-COMPLIANT, STAINLESS STEEL FINISH. ELKAY MODEL LZ2718WISSP OR APPROVED EQUAL. DELIVERS 80PH AT 50 DEG F CW AND 90 DEG AMBIENT AIR. 115V, 5 FLA, RATED AT 370 WATTS.	
FD1	FLOOR DRAIN, ADJUSTABLE			4"	1 1/2"	ZURN #Z415 ADJUSTABLE FLOOR DRAIN, NICKEL PLATED CAST BRASS SLOTTED TOP. DRAIN BODY MATERIAL TO MATCH PIPING TYPE.	
LAV1	LAVATORY, ROUND DROP-IN ADA-COMPLIANT TYPE WITH SINGLE LEVER FAUCET	1/2"	1/2"	1 1/2"	1 1/4"	AMERICAN STANDARD RONDALYN VITREOUS CHINA LAVATORY, 15" DIA BOWL. REAR-BOTTOM DRAIN OUTLET, 4" CENTERS. ADA COMPLIANT DELTA 520 OR APPROVED EQUAL SINGLE LEVER CAST BRASS FAUCET WITH 0.5 GPM AERATOR AND METAL POP UP DRAIN. PROVIDE TRAP AND WATER SUPPLY/STOP ADA COMPLIANT INSULATION KIT FOR EXPOSED PIPING.	
LAV2	LAVATORY, SINGLE BOWL DROP-IN TYPE WITH GOOSENECK AND WRISTBLADES	1/2"	1/2"	1 1/2"	1 1/4"	ONE BOWL, STAINLESS STEEL DROP-IN SINK WITH UNDERCOATING, CENTER DRAIN PLACEMENT, 17"W X 20"L X 7-5/8"D, 14"X14" BOWL SIZE. ELKAY MODEL LR1720 OR EQUAL. PROVIDE WITH HOLES TO MATCH FAUCET. PROVIDE CHROME PLATED CAST BRASS FAUCET 8" RIGID SPOUT, 8" CENTERS, 0.5 GPM AERATOR, 4" WRIST BLADE HANDLES EQUAL TO DELTA27C4652.	
UR1	URINAL, ADA-COMPLIANT WALL HUNG TYPE WITH MANUAL FLUSH VALVE	3/4"		1 1/2"	1 1/4"	AMERICAN STANDARD BARRIER-FREE ALLBROOK FLOWISE WHITE VITREOUS CHINA, LOW-CONSUMPTION URINAL WITH INTEGRAL TRAP, 0.5 GPF, FLUSHING RIM, SIPHON JET FLUSH ACTION, 3/4" INLET SPUD. PROVIDE WITH ZURN MODEL ZB003AV-LULF CHROME PLATED MANUALLY OPERATED, 0.125 GPF, URINAL FLUSH VALVE. PROVIDE WITH WALL CARRIER.	
WC1	WATER CLOSET, ADA-COMPLIANT FLOOR-SET TANK TYPE	1/2"		4"	1 1/2"	AMERICAN STANDARD CADET SERIES OR EQUAL ADA TANK TYPE, FLOOR SET, FLOOR OUTLET WHITE VITREOUS CHINA, LOW CONSUMPTION 1.28 GPF, ELONGATED BOWL. OPEN FRONT ALL PLASTIC SEAT, NO COVER, WHITE COLOR, STOP AND SUPPLY. PROVIDE FLUSH VALVE WITH HANDLE ON ACCESSIBLE SIDE OF STALL.	

MINIMUM PIPE INSULATION THICKNESS

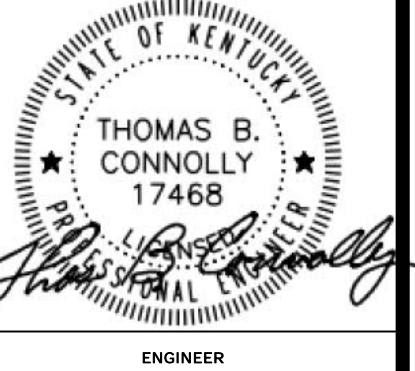
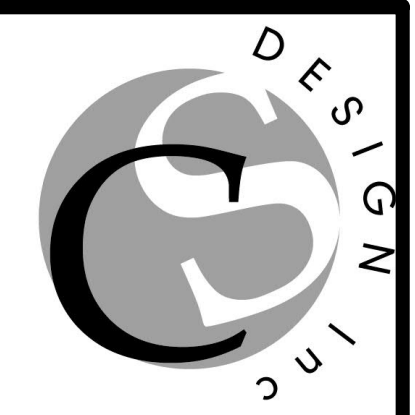
FLUID OPERATING TEMPERATURE RANGE AND USAGE (°F)	INSULATION CONDUCTIVITY		NOMINAL PIPE OR TUBE SIZE (INCHES)				
	CONDUCTIVITY BTU/IN(HxFT²x°F)	MEAN RATING TEMP, °F	<1	1 - <1-1/2	1-1/2 - <4	4 - <8	>=8
>350	0.32-0.34	250	4.5	5.0	5.0	5.0	5.0
251-350	0.29-0.32	200	3.0	4.0	4.5	4.5	4.5
201-250	0.27-0.30	150	2.5	2.5	2.5	3.0	3.0
141-200	0.25-0.29	125	1.5	1.5	2.0	2.0	2.0
105-140	0.21-0.28	100	1.0	1.0	1.5	1.5	1.5
40-60	0.21-0.27	75	0.5	0.5	1.0	1.0	1.0
<40	0.20-0.26	75	0.5	1.0	1.0	1.0	1.5

NOTES:
 1. FOR PIPING SMALLER THAN 1-1/2 INCH AND LOCATED IN PARTITIONS WITHIN CONDITIONED SPACES, REDUCTION OF THESE THICKNESSES BY 1 INCH SHALL BE PERMITTED (BEFORE THICKNESS ADJUSTMENT REQUIRED IN... BUT NOT TO A THICKNESS LESS THAN 1 INCH).
 2. FOR INSULATION OUTSIDE THE STATED CONDUCTIVITY RANGE, THE MINIMUM THICKNESS (T) SHALL BE... AS FOLLOWS:
 $T = r((1 + \frac{v}{k})Kk - 1)$
 WHERE:
 T = MINIMUM INSULATION THICKNESS
 r = ACTUAL OUTSIDE RADIUS OF PIPE
 v = INSULATION THICKNESS LISTED IN THE TABLE FOR APPLICABLE FLUID TEMPERATURE AND PIPE SIZE
 K = CONDUCTIVITY OF ALTERNATE MATERIAL AT MEAN RATING TEMP. INDICATED FOR THE APPLICABLE FLUID TEMPERATURE (BTU/IN(HxFT²x°F)), AND
 k = THE UPPER VALUE OF THE CONDUCTIVITY RANGE LISTED IN THE TABLE FOR THE APPLICABLE FLUID...
 3. FOR DIRECT-BURIED HEATING AND HOT WATER SYSTEM PIPING, REDUCTION OF THESE THICKNESSES BY 1-1/2 INCHES SHALL BE PERMITTED (BEFORE THICKNESS ADJUSTMENT REQUIRED IN NOTE 2 BUT NOT TO THICKNESS LESS THAN 1 INCH).
 4. THIS TABLE REPLICATES TABLE C403.2.8 FROM 2012 IECC.



NOTES:
 1. SET WATER HEATER CONTROLS TO STORE WATER AT INDICATED HEATER DISCHARGE WATER TEMPERATURE.
 2. ET-1: 4.4 GAL / 3.2 GAL ACCEPTANCE VOLUME, 150 PSIG WORKING PRESSURE - PROFLO MODEL PFT12 OR EQUAL.
 3. INSTALL DIELECTRIC PIPE NIPPLES WITH UNIONS AND HEAT TRAPS AT ALL WATER CONNECTIONS TO HEATERS.
 4. INSTALL 3/4" BRASS BOILER DRAIN WITH HOSE CONNECTION AND CAP FOR EACH DRAIN TYPICAL.

4 WATER HEATER PIPING DETAIL

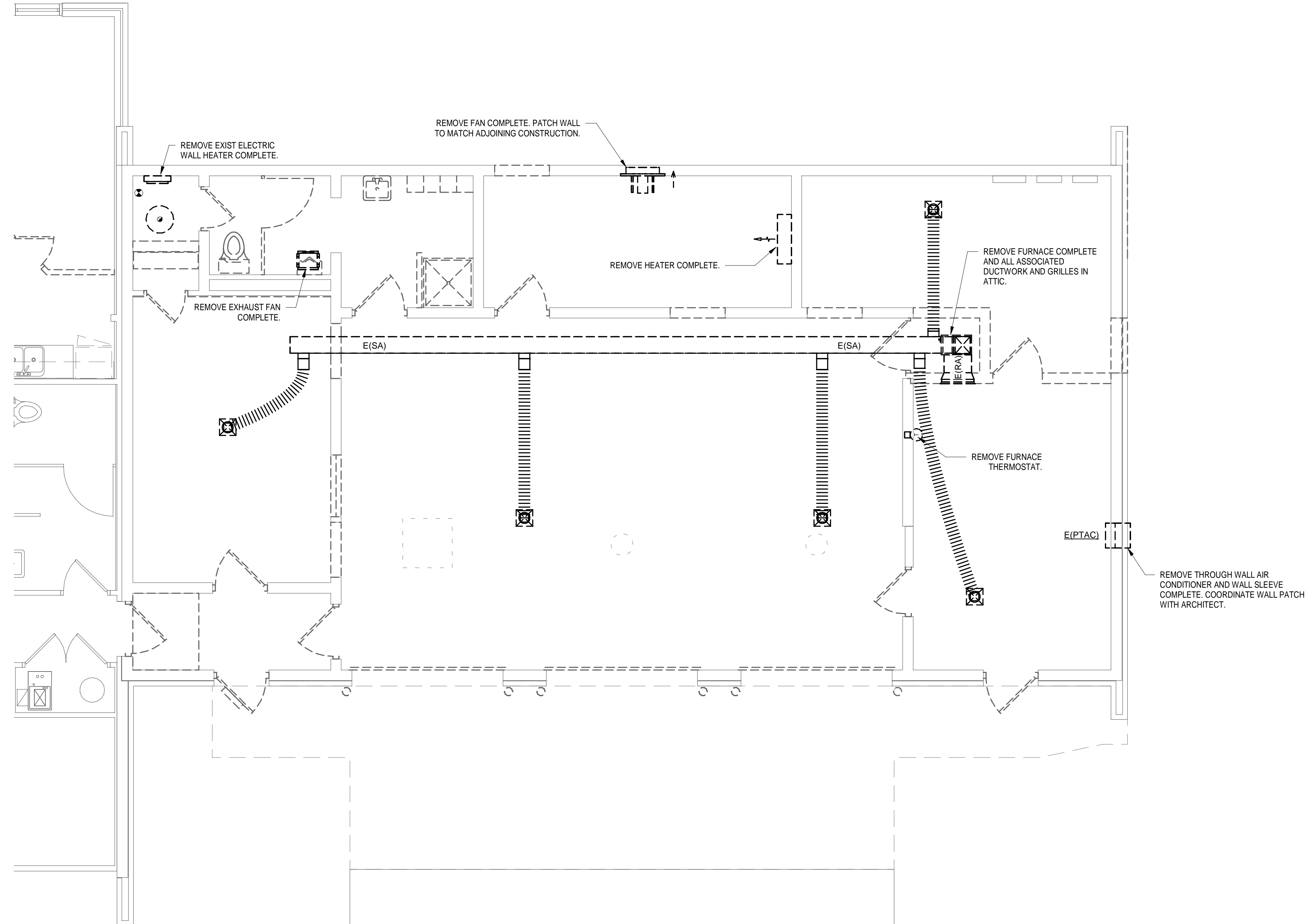


PLUMBING SCHEDULES AND DETAILS
 CFP NO. KY36P00 - 501(22)
 HOUSING AUTHORITY OF FRANKFORT
 FRANKFORT, KENTUCKY

DR.	CHK.	DATE	DESCRIPTION
CAF <td>TBC <td>09/26/24 <td>FOR CONSTRUCTION</td> </td></td>	TBC <td>09/26/24 <td>FOR CONSTRUCTION</td> </td>	09/26/24 <td>FOR CONSTRUCTION</td>	FOR CONSTRUCTION
		11/22/2024	

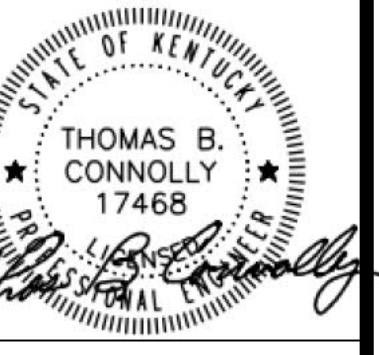
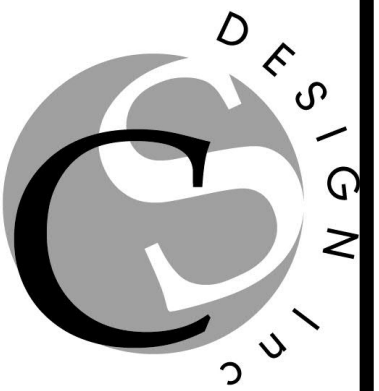
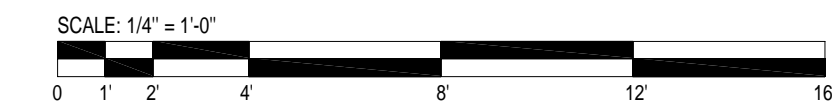
GENERAL NOTES

- A. UNLESS OTHERWISE NOTED, PATCH SURFACE(S) TO MATCH ADJOINING CONSTRUCTION AND FINISH FOR ANY ITEMS REMOVED BY THIS CONTRACTOR IN EXISTING TO REMAIN WALLS, CEILINGS, FLOORS, ETC.



MECHANICAL DEMOLITION

1/4" = 1'-0"

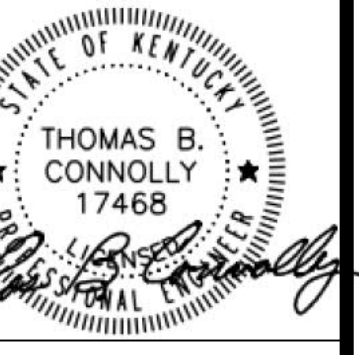
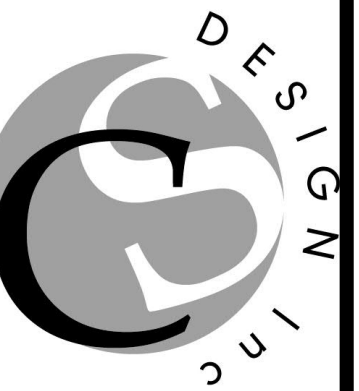


ENGINEER

MECHANICAL DEMOLITION
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 FRANKFORT, KENTUCKY

DR.	CHK.	DATE	DESCRIPTION
TRC	TBC	09/26/24	FOR CONSTRUCTION
		11/22/2024	FOR CONSTRUCTION

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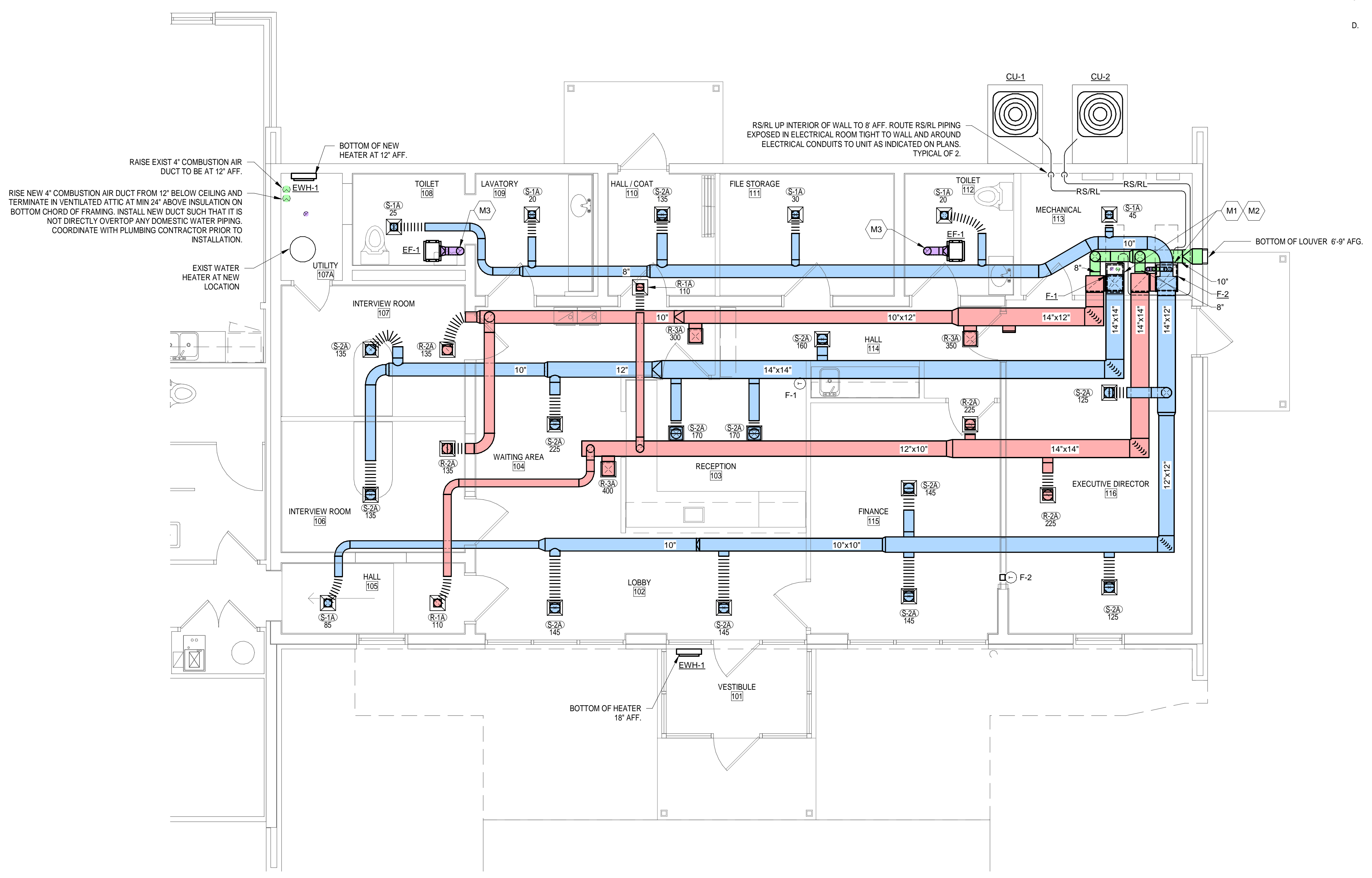


SHEET NOTES

- M1 PROVIDE 3" FLUE AND VENT THROUGH ROOF. TERMINATE WITH MANUFACTURER'S CONCENTRIC VENT KIT THROUGH ROOF. TYPICAL OF 2.
- M2 SPILL CD INTO FLOOR DRAIN. REFER TO CONDENSATE PIPING SCHEDULE FOR SIZING. TYPICAL OF 2.
- M3 PROVIDE 6" Ø EA DUCT UP THROUGH ROOF. PROVIDE MANUFACTURER'S PITCHED ROOF CAP EQUAL TO GREENHECK RJ-4 WITH INTEGRAL BIRD SCREEN AND BACKDRAFT DAMPER.

GENERAL NOTES

- A. ALL PIPING SHALL BE TESTED BEFORE INSULATED OR CONCEALED IN ANY MANNER. WHERE LEAKS OR DEFECTS DEVELOP, REQUIRED CORRECTIONS SHALL BE MADE AND TESTS REPEATED UNTIL SYSTEMS ARE PROVEN SATISFACTORY.
- B. ALL CONDENSATE DRAIN PIPING SHALL BE 3/4" SIZE UON AND INSULATED WITH 3/4" ARMAFLEX.
- C. ALL RADIUS DUCT ELBOWS SHALL BE LONG RADIUS TYPE (INSIDE ELBOW RADIUS EQUAL TO DUCT WIDTH/DIAMETER). ALL SQUARE ELBOWS SHALL HAVE TURNING VANES. SQUARE NECK RADIUS BACK ELBOWS ARE UNACCEPTABLE. REFER TO DETAILS.
- D. REFER TO ARCHITECTURAL DRAWINGS FOR RATED ASSEMBLY LOCATIONS AND CLASSIFICATIONS. PROVIDE FIRE STOPPING EQUIPMENT FOR ALL DUCT PENETRATIONS THRU RATED ASSEMBLIES AS REQUIRED BY CODE.



RAISE EXIST 4" COMBUSTION AIR DUCT TO BE AT 12" AFF.

RISE NEW 4" COMBUSTION AIR DUCT FROM 12" BELOW CEILING AND TERMINATE IN VENTILATED ATTIC AT MIN 24" ABOVE INSULATION ON BOTTOM CHORD OF FRAMING. INSTALL NEW DUCT SUCH THAT IT IS NOT DIRECTLY OVERTOP ANY DOMESTIC WATER PIPING. COORDINATE WITH PLUMBING CONTRACTOR PRIOR TO INSTALLATION.

EXIST WATER HEATER AT NEW LOCATION

UTILITY 107A

INTERVIEW ROOM 107

INTERVIEW ROOM 106

HALL 105

LOBBY 102

VESTIBULE 101

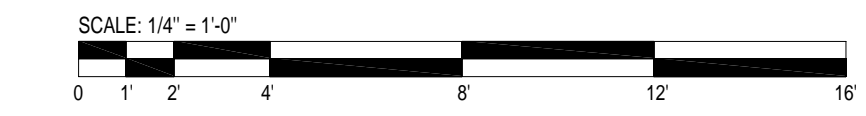
BOTTOM OF HEATER 16" AFF.

RS/RL UP INTERIOR OF WALL TO 8" AFF. ROUTE RS/RL PIPING EXPOSED IN ELECTRICAL ROOM TIGHT TO WALL AND AROUND ELECTRICAL CONDUITS TO UNIT AS INDICATED ON PLANS. TYPICAL OF 2.

BOTTOM OF LOUVER 6'-9" AFG.

MECHANICAL PLAN

1/4" = 1'-0"

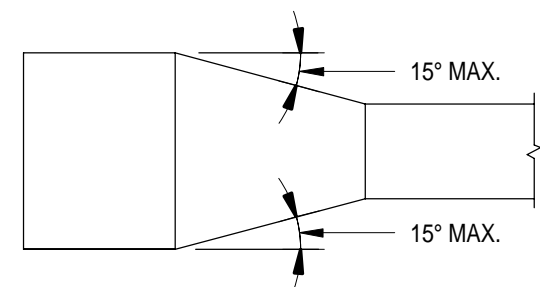


MECHANICAL PLAN

CFP NO. KY36P00 - 501(22)
HOUSING AUTHORITY OF FRANKFORT
 FRANKFORT, KENTUCKY

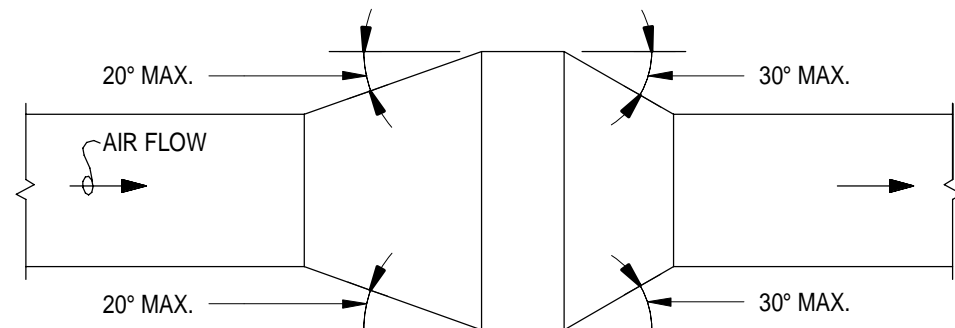
DR.	CHK.	DATE	DESCRIPTION
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PLAN SIDE VIEW

TYPICAL DUCTWORK TRANSITION



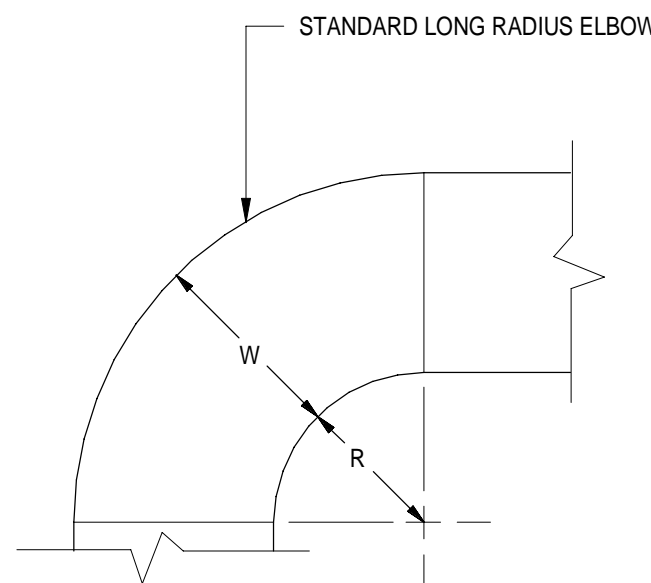
PLAN OR SIDE VIEW

NOTE: UNLESS OTHERWISE INDICATED ON PLANS, MAXIMUM ANGLES SHOWN SHALL APPLY.

TYPICAL DUCTWORK TRANSITION WITH EQUIPMENT MOUNTED IN DUCT

8 DUCTWORK TRANSITION DETAILS

NOT TO SCALE



STANDARD LONG RADIUS ELBOW

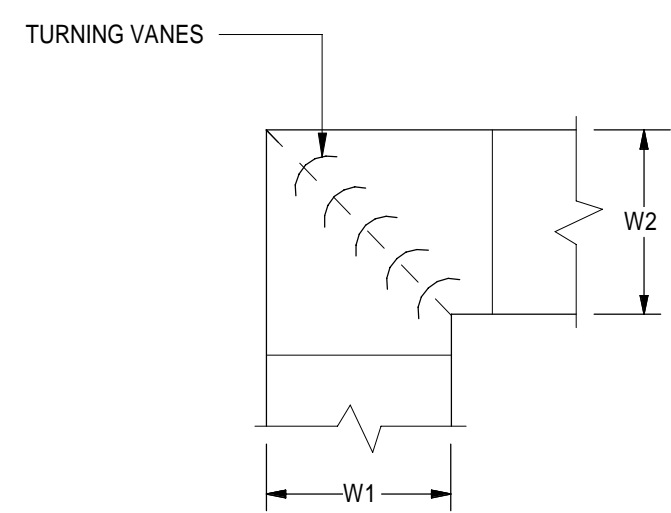
NOTES:

- SMOOTH RADIUS, DIE STAMPED ROUND ELBOWS ARE PREFERRED BUT NOT REQUIRED.
- ALL RECTANGULAR AND ROUND RADIUS ELBOWS SHALL BE LONG RADIUS TYPE (INSIDE ELBOW RADIUS EQUAL TO DUCT WIDTH/DIAMETER).
- 3 PIECE ROUND ELBOWS ARE UNACCEPTABLE. MITERED ROUND ELBOWS WITHOUT TURNING VANES ARE UNACCEPTABLE.
- SQUARE THROAT RADIUS BACK ELBOWS WITHOUT TURNING VANES AND SHORT RADIUS ELBOWS ARE UNACCEPTABLE.

R SHALL BE EQUAL TO W

9 LONG RADIUS ELBOWS DETAIL

NOT TO SCALE

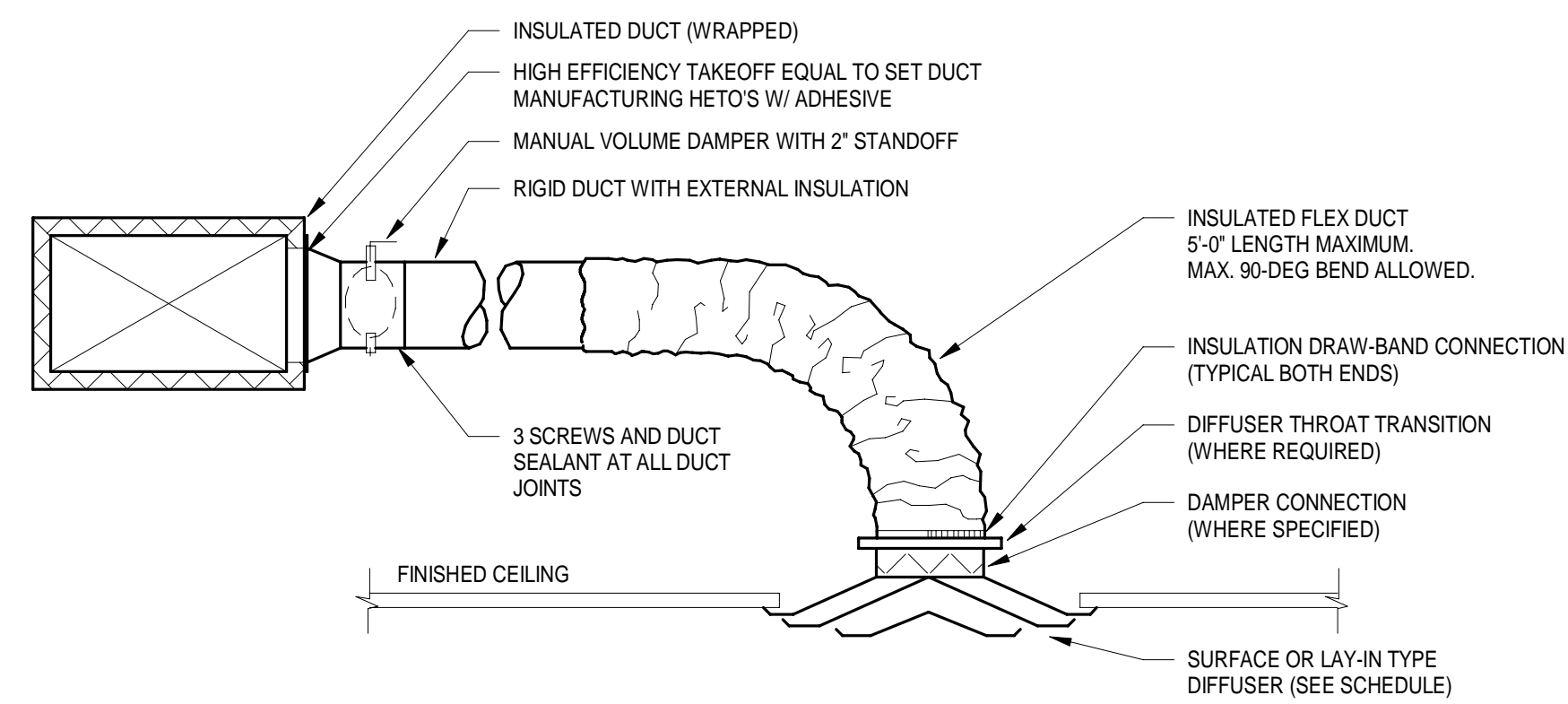


NOTES:

- MITERED ELBOWS ARE PREFERRED OVER RADIUS ELBOWS IN ALL RECTANGULAR DUCTS TO MAXIMIZE DUCT SYSTEM PERFORMANCE.
- ALL VANED ELBOWS SHALL BE CONSTRUCTED AND INSTALLED AS DETAILED BY SMACNA.
- WHEN W1 DOES NOT EQUAL W2, VANE SHALL BE SINGLE VANE TYPE, REGARDLESS OF W DIMENSION.
- ALL SINGLE VANES SHALL HAVE A 2 INCH RADIUS, 1 INCH MAXIMUM SPACE BETWEEN VANES AND A 3/4 INCH TRAILING EDGE.
- WHEN W1 EQUALS W2 AND W1 IS GREATER THAN 20 INCHES, VANES SHALL BE DOUBLE VANE TYPE.

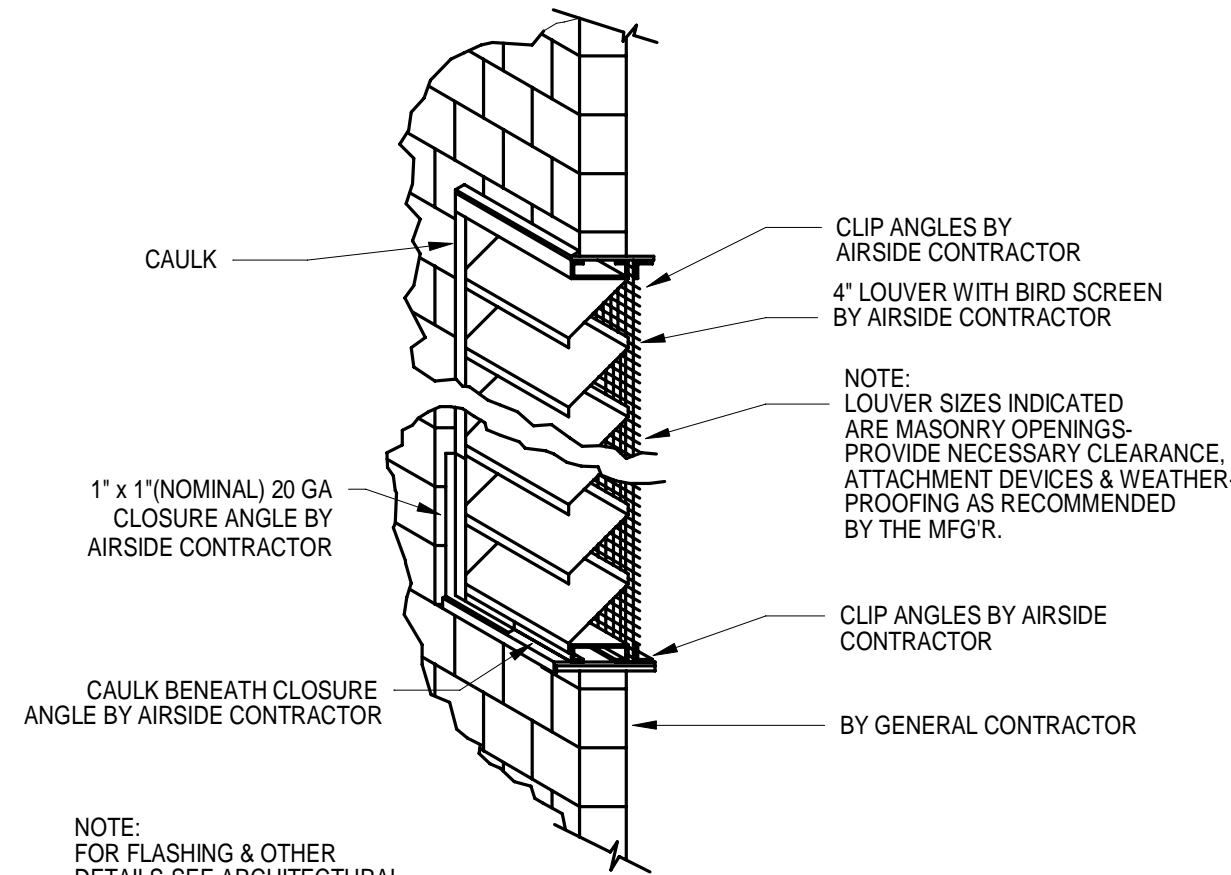
10 RECTANGULAR MITERED DUCT ELBOW DETAIL

NOT TO SCALE



11 TYPICAL DUCT RUNOUT DETAIL

NOT TO SCALE



4 LOUVER DETAIL

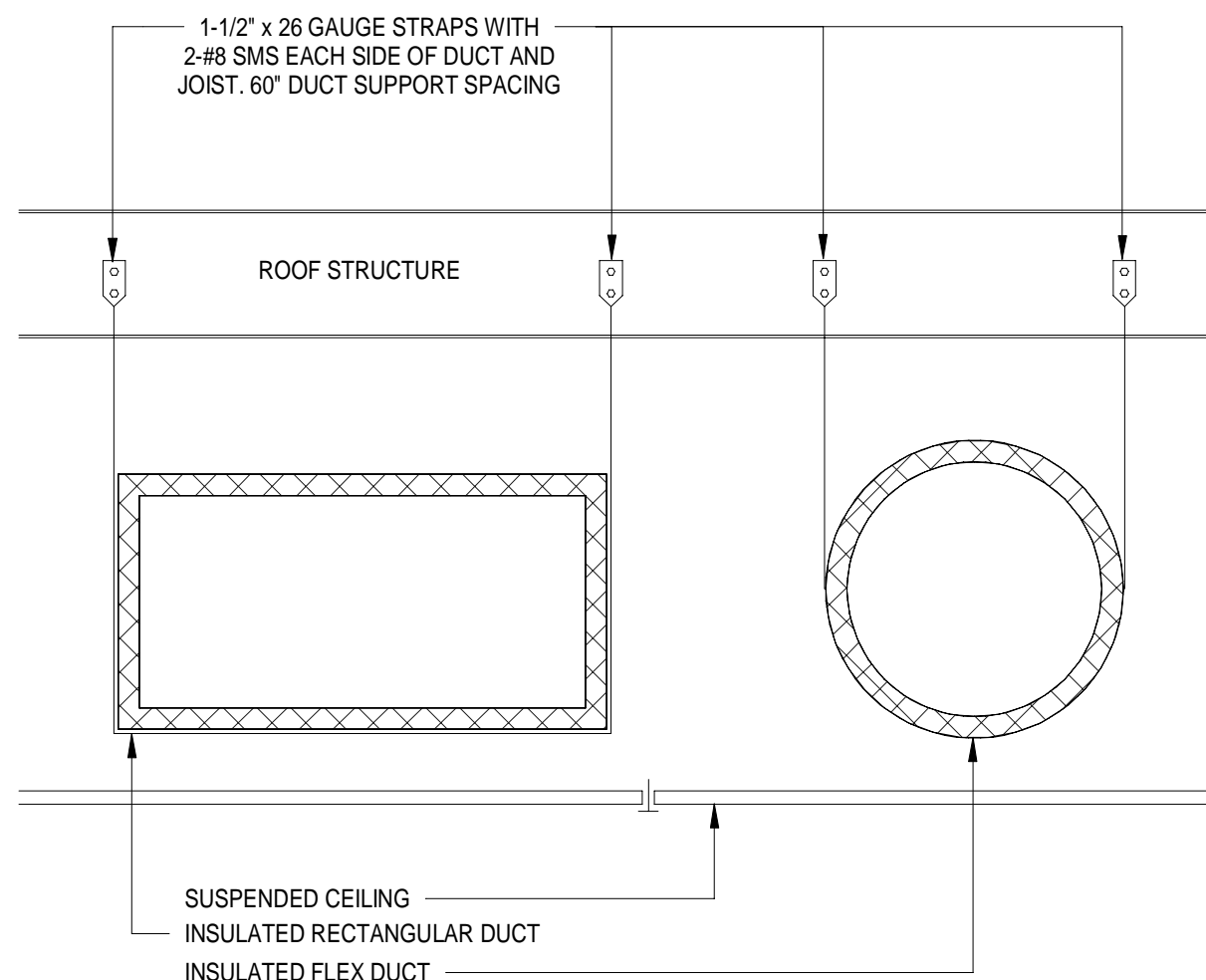
NOT TO SCALE

DIMENSION OF LONGEST SIDE, INCHES	SHEET METAL GAUGE (ALL FOUR SIDES)	TRANSVERSE REINFORCING (1)					
		MINIMUM REINFORCING ANGLE SIZE AND MAXIMUM LONGITUDINAL SPACING BETWEEN TRANSVERSE JOINT & FOR INTERMEDIATE REINFORCING	AT JOINTS				
			DRIVE SLIP PLAIN S SLIP	HEMMED S SLIP	ALTERN'T BAR SLIP	REINFORCED BAR SLIP	
UP THRU 12	26	NONE REQUIRED	1	26	26	24	24
13 - 18	24	NONE REQUIRED	1	24	24	24	24
19 - 30	24	1" X 1" X 1/8" @ 60 IN	1	24	24	24	24
31 - 42	22	1" X 1" X 1/8" @ 60 IN	1		22	22	22

(1) TRANSVERSE REINFORCING SIZE IS DETERMINED BY DIMENSION OF SIDE TO WHICH ANGLE IS APPLIED.

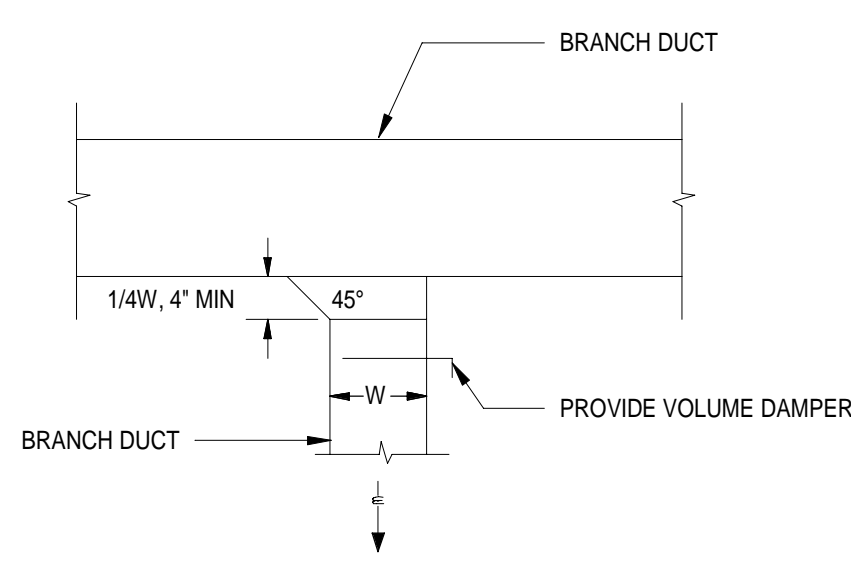
5 DUCT CONSTRUCTION DETAIL

NOT TO SCALE



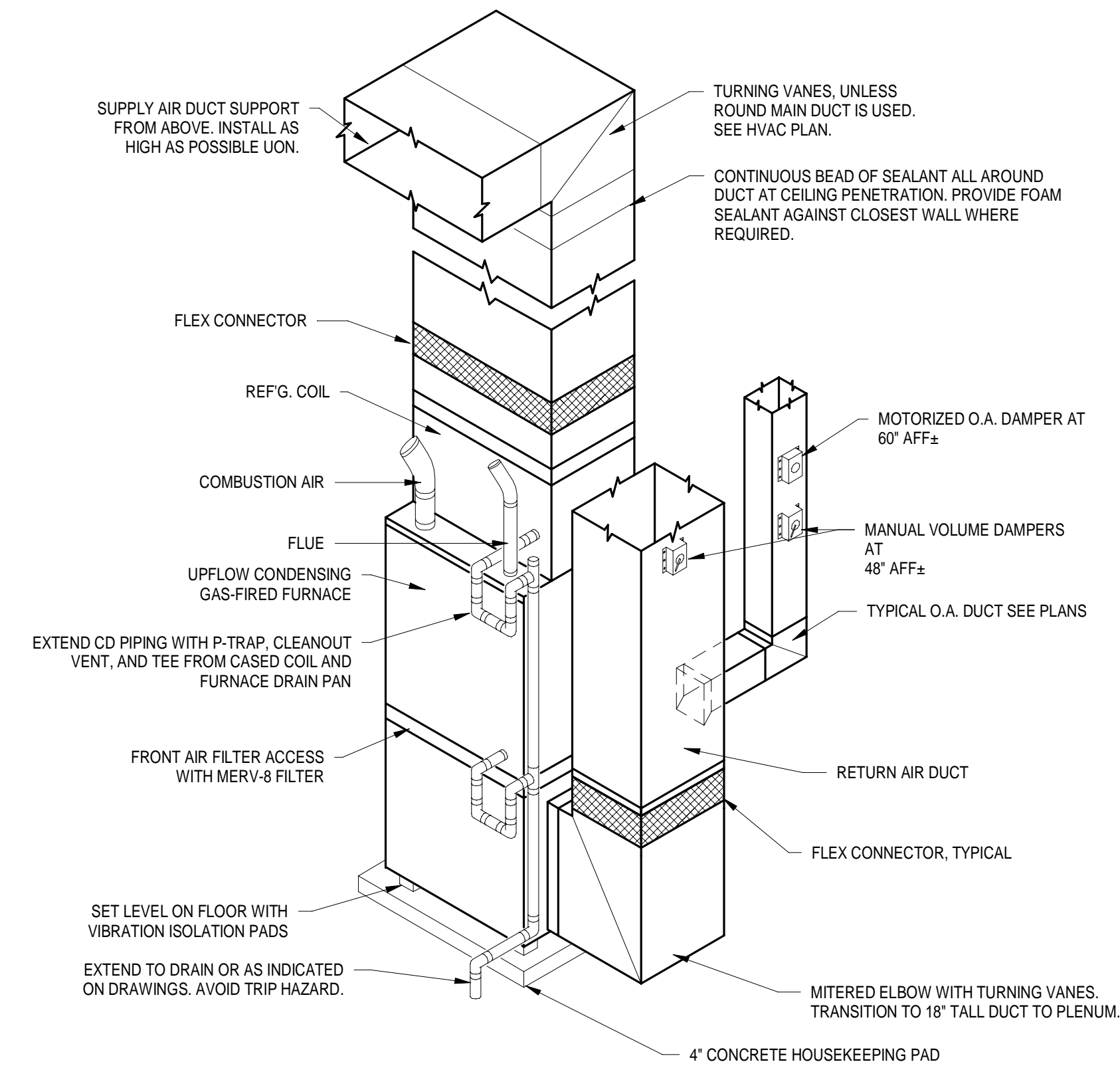
6 DUCT SUPPORT DETAIL

NOT TO SCALE



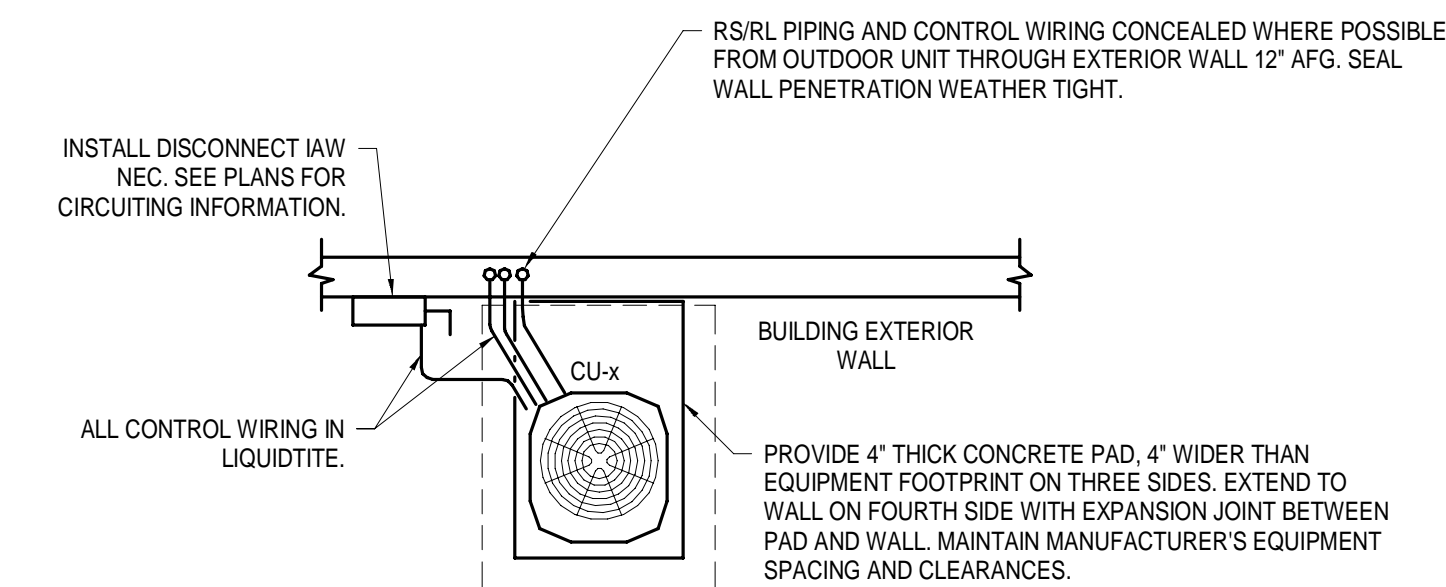
7 DUCT TAKE-OFFS DETAIL

NOT TO SCALE



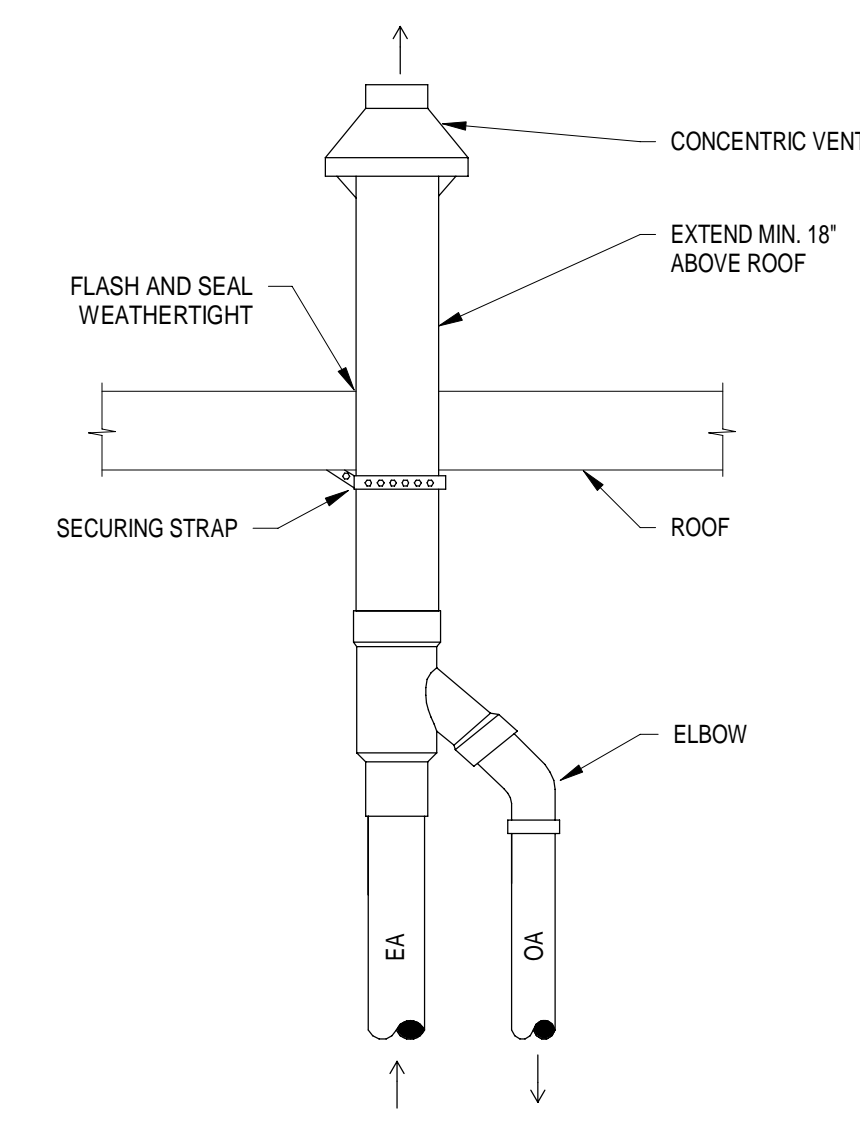
1 TYPICAL UPFLOW NATURAL GAS CONDENSING FURNACE

NOT TO SCALE



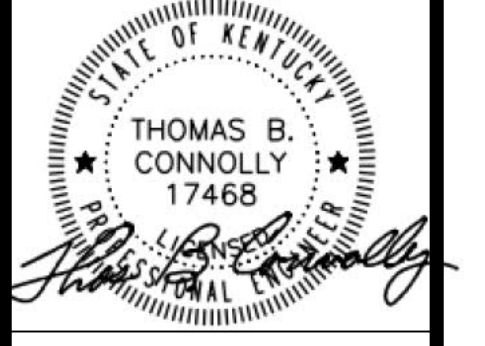
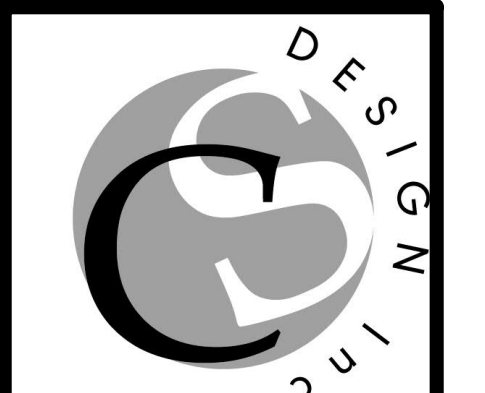
2 SPLIT SYSTEM OUTDOOR UNIT DETAIL

NOT TO SCALE



3 CONCENTRIC VENT DETAIL

NOT TO SCALE



MECHANICAL DETAILS
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 FRANKFORT, KENTUCKY

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		11/22/2024	

M5.01

AIR TERMINAL SCHEDULE

1. FINISH TO BE SELECTED BY ARCHITECT/OWNER. COORDINATE MOUNTING WITH CEILING TYPES. - i.e. WIDE GRID, NARROW GRID, DRY WALL, PLASTER, ETC.
2. MAXIMUM DIFFUSER NC = 35
3. PROVIDE DUCT TO DIFFUSER/GRILLE THROAT TRANSITION AS REQUIRED.
4. PROVIDE LAY-IN MODULE PANEL FOR ALL DEVICES NOT INDICATED AS SURFACE MOUNTED.
5. SUFFIX "A" INDICATED SURFACE MOUNTED DEVICE.
6. PROVIDE INTEGRAL OPPOSED BLADE FACE DAMPER FOR SURFACE MOUNTED DEVICES.

MARK	MANUFACTURER	MODEL	DESCRIPTION	GRILLE SIZE	RUNOUT	CFM	AIR PATTERN	REMARKS
R-1A	PRICE	530	STEEL 35° FIXED BLADE PARALLEL TO LONG DIM.	1' - 0" x 1' - 0"	6 @ U.O.N.	0 - 110	--	1,2,3,5,6
R-2A	PRICE	530	STEEL 35° FIXED BLADE PARALLEL TO LONG DIM.	1' - 0" x 1' - 0"	8 @ U.O.N.	0 - 225	--	1,2,3,5,6
R-3A	PRICE	530	STEEL 35° FIXED BLADE PARALLEL TO LONG DIM.	1' - 0" x 1' - 0"	10x10 U.O.N.	0 - 400	--	1,2,3,5,6
S-1A	PRICE	ASCD	ALUM. ADJUSTABLE LOUVER FACE	1' - 0" x 1' - 0"	6 @ U.O.N.	0 - 110	4-WAY ADJUSTABLE	1,2,3,5,6
S-2A	PRICE	ASCD	ALUM. ADJUSTABLE LOUVER FACE	1' - 0" x 1' - 0"	8 @ U.O.N.	0 - 225	4-WAY ADJUSTABLE	1,2,3,5,6

SPLIT SYSTEM FURNACE SCHEDULE

1. PROVIDE MANUFACTURER'S VERTICAL CONCENTRIC VENT KIT.
2. PROVIDE WITH 7-DAY PROGRAMMABLE THERMOSTAT EQUAL TO HONEYWELL VISION PRO 8000 WITH TIME OF DAY TERMINALS TO OPEN MOTORIZED OUTSIDE AIR DAMPER.
3. PROVIDE WITH EXTERNAL 30% FILTER AND FILTER RACK KIT
4. PROVIDE 92% AFUE CONDENSING FURNACE.
5. PROVIDE CP-1, LITTLE GIANT MODEL VCMX-20ULS-C CONDENSATE PUMP. CONNECT PUMP TO CONDENSATE LINE USING A MAXIMUM FLEX HOSE RUN OF 12 INCHES.
6. CONNECT CONDENSATE DRAIN TO FURNACE AND COIL PER MANUFACTURER'S RECOMMENDATION.
7. PROVIDE DRAIN PAN WATER SENSOR ON COOLING COIL TO STOP UNIT IN CASE OF CONDENSATE OVERFLOW.
8. PROVIDE UNIT WITH CONTROLS TO OPEN AND CLOSE OA DAMPER VIA CO2 SENSOR SIGNAL.
9. UNLESS OTHERWISE NOTED IN SPECIFICATIONS, ACCEPTABLE ALTERNATE MANUFACTURERS ARE TRANE, LENNOX. EQUIPMENT BY OTHER MANUFACTURERS NOT LISTED MUST BE SUBMITTED FOR ENGINEER'S WRITTEN APPROVAL PRIOR TO BIDDING.

MARK	MANUFACTURER	MODEL	AREA SERVED	CFM	ESP	MCA	MAOP	VOLT/PH	OA CFM	FURNACE INPUT (MBH)	FURNACE OUTPUT (MBH)	OPERATING PRESSURE (IN W.C.)	REMARKS
F-1	CARRIER	59SP6C040	BUILDING INTERIOR	1000	0.50 in-wg	10 A	15 A	120 V/1 PH	125	40	39	4.5 - 13.6	1,2,3,4,6,7,9
F-2	CARRIER	59SP6C040	BUILDING EXTERIOR	1100	0.50 in-wg	10 A	15 A	120 V/1 PH	90	40	39	4.5 - 13.6	1,2,3,4,6,7,9

SPLIT SYSTEM CONDENSING UNIT SCHEDULE

1. INSTALL ALL EXTERIOR CONTROL WIRING IN A FLEXIBLE WATERPROOF CONDUIT.
2. INSULATE ALL REFRIGERATION SUCTION LINES. PROVIDE OIL TRAPS IN REFRIGERANT LINE AS REQUIRED PER MANUFACTURER'S REQUIREMENTS.
3. SIZE AND INSTALL REFRIGERANT LINES PER MANUFACTURER'S REQUIREMENTS.
4. ALTERNATIVE MANUFACTURERS ARE ACCEPTABLE, WITH APPROVAL FROM OWNER/ENGINEER.
5. PROVIDE UNIT WITH HAIL GUARDS.
6. UNIT SHALL HAVE EVAP. DEFROST CONTROL FOR LOW AMBIENT COOLING TO 30 DEG. F.
7. UNLESS OTHERWISE NOTED IN SPECIFICATIONS, ACCEPTABLE ALTERNATE MANUFACTURERS ARE TRANE, LENNOX. EQUIPMENT BY OTHER MANUFACTURERS NOT LISTED MUST BE SUBMITTED FOR ENGINEER'S WRITTEN APPROVAL PRIOR TO BIDDING.

MARK	MANUFACTURER	MODEL	WEIGHT	SENSIBLE CAPACITY	TOTAL CAPACITY	SEER	MCA	MAOP	VOLT/PH	REMARKS
CU-1	CARRIER	24ACC624	265 lb	24000.0 Btu/h	24000.0 Btu/h	14.3	15 A	25 A	240 V/1PH	1,2,3,4,5,6,7
CU-2	CARRIER	24ACC636	265 lb	34600.0 Btu/h	36000.0 Btu/h	14.3	18 A	30 A	240 V/1PH	1,2,3,4,5,7

HVAC DESIGN CRITERIA

HVAC SYSTEM	SUMMER		WINTER
	OUTSIDE AIR		OUTSIDE AIR
	DB	WB	DB
ALL UNITS	95	78	3

DEFAULT HEAT/COOL SETPOINTS

Zone Type or Name/Number	Occupied		Unoccupied	
	Heating	Cooling	Heating	Cooling
	PROJECT AREA	70°F	73°F	65°F

CONDENSATE DRAIN PIPE SIZING SCHEDULE

TONS OF REFRIGERATION	SIZE (IN.)
THROUGH 3	3/4"
THROUGH 20	1"
THROUGH 90	1 1/4"
THROUGH 125	1 1/2"
THROUGH 250	2"

1. THE CAPACITY OF WASTE PIPES ASSUMES A ONE-EIGHT (1/8) INCH PER FOOT OR ONE PERCENT SLOPE.

EXHAUST FAN SCHEDULE

1. PROVIDE WITH 1-HR RATED CEILING RADIATION FIRE DAMPER KIT.
2. PROVIDE WITH SOLID STATE SPEED CONTROL BY FAN MANUFACTURER FOR INTERNAL MOUNTING.
3. PROVIDE FAN WITH INTEGRAL BACKDRAFT DAMPER.
4. FAN TO START AND STOP VIA LIGHTING OCCUPANCY SENSOR.
5. FAN TO START AND STOP VIA THERMOSTAT.
6. FAN TO START AND STOP VIA WALL SWITCH.
7. FAN TO RUN CONTINUOUS.
8. UNLESS OTHERWISE NOTED IN SPECIFICATIONS, ACCEPTABLE ALTERNATE MANUFACTURER IS PRICE. EQUIPMENT BY OTHER MANUFACTURERS NOT LISTED MUST BE SUBMITTED FOR ENGINEER'S WRITTEN APPROVAL PRIOR TO BIDDING.

MARK	MANUFACTURER	MODEL	AREA SERVED	EA CFM	RUNOUT SIZE	ESP	RPM	WATTS	VOLT/PH	SONES	REMARKS
EF-1	GREENHECK	SP-A110	SINGLE USER RR	75	6" RND. U.O.N.	0.28 in-wg	950	16 W	120 V/1PH	0.8	1,2,3,4,8

LOUVER SCHEDULE

1. PROVIDE WITH ALUMINUM INTERIOR BIRD SCREEN.
2. COLOR SELECTED BY ARCHITECT FROM MANUFACTURER'S FULL RANGE STANDARD COLOR PALLET.
3. DIMENSIONS ARE ROUGH OPENING DIMENSIONS. ADJUST LOUVER 3/4" EACH DIMENSION FOR FIT, CAULKING, ETC
4. WATER PENETRATION STARTS AT 992 FPM FREE AREA VELOCITY

MARK	MANUFACTURER	MODEL	APPLICATION	EQUIPMENT TYPE	WIDTH	HEIGHT	VOLUME (CFM)	FREE AREA	PRESSURE DROP	FACE VELOCITY	REMARKS
L-1	GREENHECK	EDD-401	INTAKE	RECESSED STATIONARY	1' - 0"	1' - 0"	215	0.21 ft²	0.20 in-wg	1020 FPM	1,2,3,4

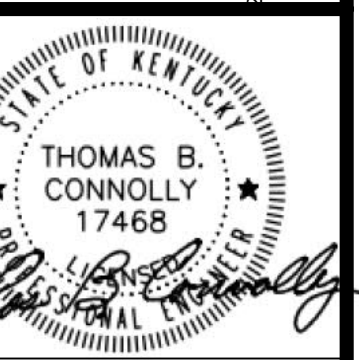
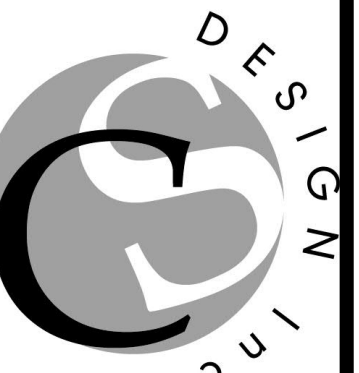
PROJECT AREA AIR BALANCE

UNIT	OUTSIDE AIR	INTERMITTENT EXHAUST	CONTINUOUS EXHAUST
F-1	125 CFM	--	--
F-2	90 CFM	--	--
SINGLE USER RR'S (X2)	--	150 CFM	--
TOTAL:	215 CFM	150 CFM	0 CFM
INTERMITTENT AIR BALANCE	65 CFM		
CONTINUOUS AIR BALANCE	215 CFM		

ELECTRIC HEATER SCHEDULE

- REMARKS:
1. FURNISH WITH INTEGRAL TAMPER OFF THERMOSTAT AND ALL REQUIRED CONTROL COMPONENTS INSIDE HEATER CABINET.
 2. UNIT SHALL BE U.L. LISTED
 3. PROVIDE WITH INTERNAL MEANS OF DISCONNECT
 4. UNLESS OTHERWISE NOTED IN SPECIFICATIONS, ACCEPTABLE ALTERNATE MANUFACTURERS ARE MODINE, TRANE, INDEECO. EQUIPMENT BY OTHER MANUFACTURERS NOT LISTED MUST BE SUBMITTED FOR ENGINEER'S WRITTEN APPROVAL PRIOR TO BIDDING.

MARK	MANUFACTURER	MODEL	MOUNTING TYPE	CFM	AMPS	KW	VOLT / PH	REMARKS
EWH-1	MARKEL	3420	SURFACE MOUNTED	245	13 A	3000 W	240 V/ 1PH	1,3,4



ENGINEER

MECHANICAL SCHEDULES
CFP NO. KY36P00 - 501(22)
HOUSING AUTHORITY OF FRANKFORT
FRANKFORT, KENTUCKY

DR.	CHK.	DATE	DESCRIPTION
TRC	TBC	09/26/24	FOR CONSTRUCTION
		11/22/2024	

M6.01

ELECTRICAL GENERAL NOTES

- 1. COORDINATION BETWEEN TRADES: REQUEST AND EXAMINE ALL DRAWINGS AND SPECS. PERTAINING TO THE CONSTRUCTION BEFORE INSTALLING ABOVE CEILING WORK AS SHOWN ON DRAWINGS AND SPECS, COOPERATE WITH ALL OTHER CONTRACTORS IN LOCATING PIPING, DUCTWORK, CONDUIT, OPENINGS, CHASES AND EQUIPMENT IN ORDER TO AVOID CONFLICT WITH OTHER CONTRACTORS WORK. PAY PARTICULAR ATTENTION TO POINTS WHERE DUCTS OR PIPING MUST CROSS OTHER DUCTS OR PIPING AND WHERE DUCTS, PIPING AND CONDUIT RUN THE WALLS, CHASES, AND COLUMN ENCLOSURES. COORDINATE WITH ALL TRADES INTENDED POSITION OF WORK AND INTENDED ORDER OF INSTALLS PRIOR TO INSTALLATION.

- 30. THE CONTRACTOR SHALL FULLY ACQUAINT HIMSELF WITH ALL EXISTING CONDITIONS AS TO INGRESS AND EGRESS, DISTANCE OF HALL FROM SUPPLY POINTS, ROUTES FOR TRANSPORTATION OF MATERIALS, FACILITIES AND SERVICES, AVAILABILITY OF UTILITIES, ETC. HIS PROPOSAL SHALL COVER ALL EXPENSES RELATED TO THESE CONDITIONS.

SYMBOLS

GENERAL DRAFTING SYMBOLS

- CONNECT TO EXISTING (VERIFY EXACT LOCATION)
LIMIT OF DEMOLITION
SHEET NOTE
REVISION NOTE - SEE REVISION LIST
DETAIL DESIGNATOR
SHEET NUMBER

LIGHTING SYMBOLS

- NOTES:
1. SYMBOLS MAY VARY SLIGHTLY IN APPEARANCE ON FLOOR PLANS.
2. LETTER DESIGNATES FIXTURE TYPE.
3. HATCH INDICATES EMERGENCY EGRESS FIXTURES.
4. REFER TO LIGHTING FIXTURE SCHEDULE OR SHEET NOTES FOR DETAILS.
LIGHT FIXTURE - RECESSED
LIGHT FIXTURE - RECESSED EMERGENCY EGRESS
LIGHT FIXTURE - SURFACE MOUNTED
LIGHT FIXTURE DESIGNATED WITH 'xx' - TYPE AND 'a' - ZONE CONTROL
PENDANT/CHAIN/SURFACE MOUNT STRIP LIGHT
CAN LIGHT FIXTURE
EXIT LIGHT FIXTURE - CEILING MOUNTED
EXIT LIGHT FIXTURE - WALL MOUNTED
EMERGENCY EGRESS LIGHT FIXTURE

SWITCHING SYMBOLS

- SINGLE, THREE WAY, FOUR WAY MANUAL WALL SWITCH
0-10 (UON) DIMMING LIGHT SWITCH
0-10 (UON) DIMMING LIGHT SWITCH WITH INTEGRAL MOTION DETECTION
COMBINATION LIGHT SWITCH & MOTION DETECTOR
HORSEPOWER RATED SNAP SWITCH DISCONNECT
ON/OFF/RAISE/LOWER LOW VOLTAGE WALL SWITCH EQUAL TO NX LIGHTING CONTROLS NXSW-ORLO
ON/OFF LOW VOLTAGE WALL SWITCH EQUAL TO NX LIGHTING CONTROLS NXSW-OO
3-WAY SWITCH DESIGNATED WITH 'a' AND 'b' TO CONTROL OUTSIDE AND INSIDE LAMPS
EMERGENCY POWER OFF PUSHBUTTON
WALL PARTITION SENSOR
ROOM CONTROLLER - 1 SPST SWITCHED OUTPUT (NO DIMMING) EQUAL TO NX LIGHTING CONTROLS NXRC-1R-UWV
ROOM CONTROLLER - 2 SPST SWITCHED OUTPUT (DIMMING) EQUAL TO NX LIGHTING CONTROLS NXRC2-2RD-UWV
LOW-VOLTAGE POWER PACK. SEE WIRING DIAGRAMS
CEILING MOUNTED DUAL TECHNOLOGY OCCUPANCY SENSOR
CEILING MOUNTED DUAL TECHNOLOGY OCCUPANCY SENSOR DESIGNATED WITH 'a' FOR ZONE CONTROL
LIGHT FIXTURE TAG DESIGNATION
SWITCH LEG DESIGNATION, IF BLANK, SINGLE SWITCH ZONE FOR ROOM
PANEL AND CIRCUIT NUMBER

POWER SYMBOLS

- SINGLE ('SIMPLEX'), DUPLEX, & DOUBLE DUPLED ('QUAD') RECEPTACLE RESPECTIVELY
GFI, GFCI RECEPTACLE
ISOLATED GROUND, EMERGENCY DUPLEX RECEPTACLE
RECEPTACLE ABOVE COUNTER
220V RECEPTACLE
120V/1P DIRECT CONNECTION
208V/1P DIRECT CONNECTION
208V/3P DIRECT CONNECTION
RECESSED FLOORBOX RECEPTACLE
RECESSED FLOOR JUNCTION BOX
CEILING MOUNTED JUNCTION BOX
WALL MOUNTED JUNCTION BOX
HEAVY DUTY DISCONNECT SWITCH (NON-FUSED)
STARTER / DISCONNECT COMBINATION SWITCH
NEW / EXISTING RECESSED PANELBOARD
NEW / EXISTING SURFACE MOUNTED PANELBOARD
MOTOR

SECURITY SYMBOLS (ROUGH-IN ONLY)

- CCTV CLOSED CIRCUIT T.V. CAMERA
IDENTIFICATION CAMERA
BAR CODE READER
INTERCOM STATION
CEILING MOUNTED INTRUSION DETECTOR
WALL MOUNTED INTRUSION DETECTOR
KEY FOB READER
KEYPAD
DURESS ALARM RECEIVER (RF SIGNAL)
PUSH BUTTON DURESS SIGNAL (HARDWIRED)
SILENT PAGING STATION
BURGLAR ALARM
SECURITY MONITOR

FIRE ALARM SYMBOLS

- AUDIO / VISUAL DEVICE
MINIMUM LIGHT OUTPUT INTENSITY - xxx CANDELAS
AUDIO ONLY DEVICE
VISUAL ONLY DEVICE
MINIMUM LIGHT OUTPUT INTENSITY - xxx CANDELAS
PULL STATION
FLOW SWITCH
TAMPER SWITCH
FIRE ALARM PHOTOELECTRIC SMOKE DETECTOR
T = THERMAL 110 U.O.N.
DS = DUCT SMOKE DETECTOR
CO = COMBINATION SMOKE AND CARBON MONOXIDE DETECTOR
FIRE ALARM HORN STROBE - CEILING MOUNTED
LOW FREQUENCY SOUNDER DEVICE INTERFACE WITH CENTRAL FIRE ALARM SYSTEM TO ALARM UPON DETECTION OF SPRINKLER WATER FLOW
NOTE: IN SLEEPING UNITS, PROVIDE DETECTOR(S) WITH LOW FREQUENCY SOUNDER DEVICE IAW NFPA 72.
MAGNETIC DOOR HOLDERS
CONTROL RELAY
FIRE ALARM CONTROL PANEL
REMOTE ANNUNCIATION PANEL
AMPLIFIER CABINET
SMOKE DETECTOR TEST/RESET STATION

TECHNOLOGY SYSTEMS SYMBOLS (ROUGH-IN ONLY, UON)

- TELEVISION - PROVIDE DUPLEX RECEPTACLE AND COMMUNICATION OUTLET AT 84" AFF (UON)
COMMUNICATIONS OUTLET - 2 DATA UON
WIRELESS ACCESS POINT ROUGH-IN WITH 1" C TO ACCESSIBLE CEILING SPACE
KEY PAD STATION
PUSH PLATE DOOR OPENER
CARD READER STATION
SPEAKER DEVICE

ABBREVIATIONS

- AFB ABOVE FINISHED FLOOR
AFG ABOVE FINISHED GRADE
AFR ABOVE FINISHED ROOF
AHJ AUTHORITY HAVING JURISDICTION
AHU AIR HANDLING UNIT
AP ACCESS PANEL
C CONDUIT
DN DOWN
EC ELECTRICAL CONTRACTOR
EBB ELECTRIC BASEBOARD HEATER
ETR EXISTING TO REMAIN
EVH ELECTRIC WALL HEATER
EXIST EXISTING
FRP FIRE RESISTANT PLYWOOD
IAW IN ACCORDANCE WITH
IE INVERT ELEVATION
JB JUNCTION BOX
MFR MANUFACTURER
MH MANHOLE
NC NORMALLY CLOSED
NEC NATIONAL ELECTRICAL CODE
NO NORMALLY OPENED
OE OVERHEAD ELECTRIC
OFCI OWNER FURNISHED, CONTRACTOR INSTALLED
OFOI OWNER FURNISHED, OWNER INSTALLED
PP POWER POLE
RH RADIANT HEATING PANEL
SM SHEET METAL
SS STAINLESS STEEL
TE TOP ELEVATION
TYP TYPICAL
UE UNDERGROUND ELECTRIC
UT UNDERGROUND TELEPHONE
UH UNIT HEATER
UON UNLESS OTHERWISE NOTED
VFD VARIABLE FREQUENCY DRIVE
WF WEATHERPROOF

MOUNTING HEIGHTS TO CENTERLINE (UON)

- COMMUNICATIONS OUTLET.....1'-6"
CONVENIENCE OUTLET.....1'-6"
FIRE ALARM MANUAL PULL STATION.....3'-10"
INTERCOM.....3'-10"
THERMOSTATS.....3'-10"
WALL SWITCHES.....3'-10"

HAZARDOUS MATERIALS NOTE

THE CONTRACTOR IS HEREBY ADVISED THAT IT IS POSSIBLE THAT ASBESTOS, LEAD-BASED PAINT, AND/OR OTHER HAZARDOUS MATERIALS ARE OR WERE PRESENT IN THIS BUILDING(S). ANY PERSON WHO ENCOUNTERS ANY MATERIAL OF WHICH CONTENT IS UNKNOWN MUST IMMEDIATELY REPORT THE LOCATION OF THAT MATERIAL TO THE OWNER. INSURE THAT NO PERSON COMES NEAR TO OR IN CONTACT WITH ANY SUCH MATERIAL OR RELATED FUMES.
CONNOLLY CONSULTING ENGINEERS (CCE) HAS NO EXPERTISE IN THE DETERMINATION OF THE PRESENCE OF ANY HAZARDOUS MATERIAL. THEREFORE, NO ATTEMPT HAS BEEN MADE BY CCE TO IDENTIFY THE EXISTENCE OR LOCATION OF ANY SUCH HAZARDOUS MATERIAL. CCE NOR ANY OF ITS AFFILIATES WILL NOT OFFER ANY RECOMMENDATIONS RELATIVE TO THE REMOVAL, HANDLING OR DISPOSAL OF SUCH MATERIAL.
IF THE WORK WHICH IS TO BE PERFORMED INTERFACES, CONNECTS OR RELATES IN ANY PHYSICAL WAY WITH OR TO EXIST. COMPONENTS WHICH CONTAIN OR BEAR ANY HAZARDOUS MATERIAL, ASBESTOS BEING ONE, THEN IT SHALL BE THE CONTRACTOR'S SOLE RESPONSIBILITY TO CONTACT THE OWNER AND SO ADVISE HIM IMMEDIATELY.
THE CONTRACTOR(S) BY EXECUTION OF THE CONTRACT FOR ANY WORK AND/OR BY THE PERFORMANCE OF ANY WORK AGREE TO BRING NO CLAIM WHATSOEVER RELATIVE TO HAZARDOUS MATERIALS AGAINST CCE, ITS PRINCIPALS, EMPLOYEES, AGENTS, AFFILIATES OR CONSULTANTS. ALSO, THE CONTRACTOR FURTHER AGREES TO DEFEND, INDEMNIFY AND HOLD HARMLESS CCE, ITS PRINCIPALS, EMPLOYEES, AGENTS AND CONSULTANTS FROM ANY CLAIMS WHICH MAY BE BROUGHT BY ANY SUBCONTRACTORS, SUPPLIERS OR ANY OTHER THIRD PARTIES. REFER TO THE SPECIFICATIONS FOR FURTHER INFORMATION.

PHASING NOTE

THIS PROJECT INTERFACES EXTENSIVELY WITH EXISTING BUILDING SERVICES. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE AND PHASE ALL TIE-INS AND INTERRUPTIONS OF EXISTING SERVICES TO MINIMIZE OR ELIMINATE DOWNTIME. AS AN EXAMPLE, GAS, WATER, ELECTRICAL, PLUMBING, HVAC, AND/OR FIRE PROTECTION SYSTEMS WILL BE AFFECTED AND REPLACED OR MOVED DURING THIS PROJECT. THE CONTRACTOR SHALL INSTALL ALL NEW SERVICES AND EQUIPMENT UON AND HAVE THEM TESTED AND FULLY AND RELIABLY FUNCTIONAL PRIOR TO INTERRUPTING, RELOCATING OR REMOVING ANY EXISTING SERVICES.
IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO BEAR ANY AND ALL COSTS ASSOCIATED WITH THIS PHASING, INCLUDING TEMPORARY SERVICES, TEMPORARY RELOCATION, PREMIUM TIME WORK, ETC. CONTRACTOR SHALL COORDINATE ALL SAID WORK WITH THE OWNER AND APPLICABLE UTILITIES PER THE CONTRACT DOCUMENTS.

WIRING SYMBOLS

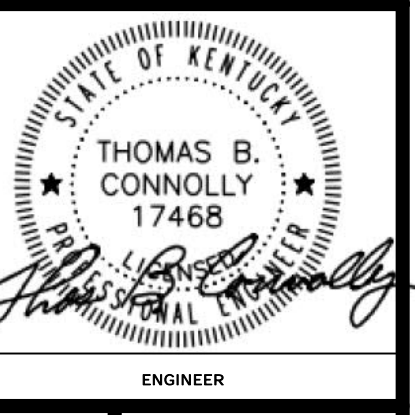
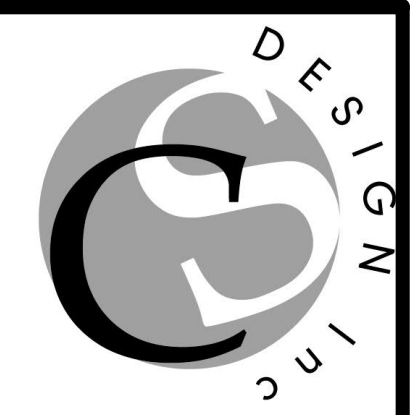
- HOMERUN TO PANEL BOARD
HOME RUN TO PANEL 'A' BREAKER NO. 1 INCLUDES THE FOLLOWING IN 3/4" CONDUIT:
#12 GREEN GROUND WIRE
#12 WHITE NEUTRAL WIRE
#12 PHASE ('HOT') WIRE

DESIGN
CONNOLLY CONSULTING ENGINEERS, P.L.C.
2808 Harrodsburg Road, Suite 402 • Lexington, KY 40503
Office: 606-492-0221 • www.connolly.com

STATE OF KENTUCKY
THOMAS B. CONNOLLY
17468
ENGINEER

ELECTRICAL LEGEND AND NOTES
CFP NO. KY36P00 - 501(22)
HOUSING AUTHORITY OF FRANKFORT
FRANKFORT, KENTUCKY

Table with columns: DR, CHK, DATE, DESCRIPTION, FOR CONSTRUCTION. Includes entries for 09/26/24 and 11/22/2024.

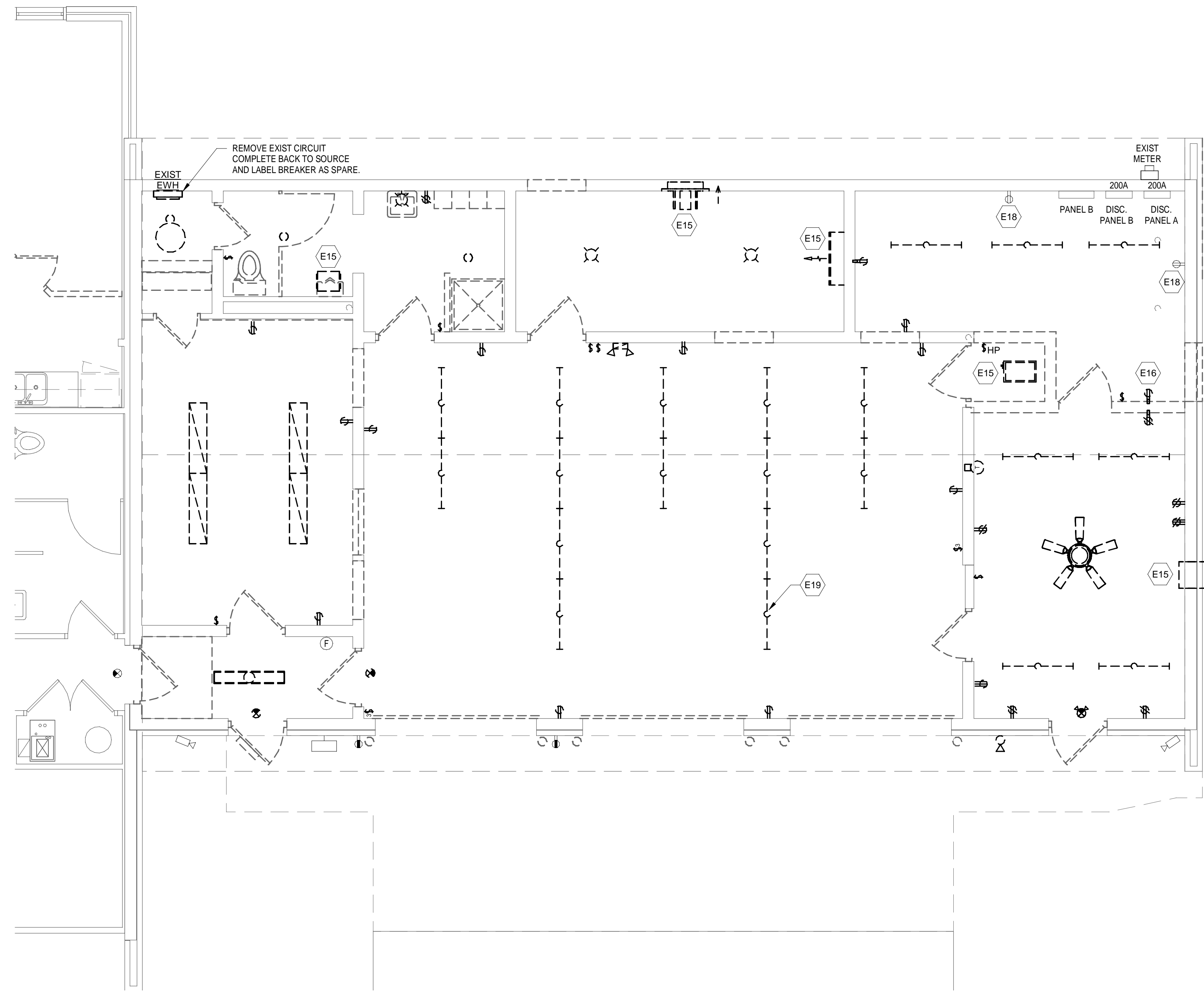


SHEET NOTES

- E15 REMOVE EXISTING POWER CIRCUIT COMPLETE BACK TO SOURCE PANEL AND LABEL BREAKER AS SPARE.
- E16 REMOVE EXISTING POWER CIRCUITS FROM RECEPTACLES BACK TO SOURCE PANEL AND LABEL BREAKER AS SPARE. TYPICAL OF ALL RECEPTACLES UON.
- E18 REMOVE EXIST DEVICE AND FACE PLATE. REUSE BACKBOX, AND CONDUIT.
- E19 REMOVE ALL LIGHTS WITHIN PROJECT AREA. REMOVE ASSOCIATED LIGHTING CIRCUIT BACK TO SOURCE PANEL AND LABEL BREAKER AS SPARE.

DEMOLITION GENERAL NOTES

- A. THICK DASHED LINES INDICATE ITEMS FOR REMOVAL (UON) AND THIN SOLID LINES INDICATE EXISTING ITEMS TO REMAIN.
- B. MAINTAIN THE CONTINUITY OF EXISTING CIRCUITS THAT CONTAIN DEVICES OR EQUIPMENT THAT ARE TO REMAIN. WHEN DEMOLITION OF AN ELECTRICAL DEVICE (OR CIRCUIT) IS INDICATED ON THE DRAWINGS, ENSURE THAT OTHER DEVICES OR EQUIPMENT 'UPSTREAM' OR 'DOWNSTREAM' ON THE CIRCUITS SHALL REMAIN IN 'PRE-DEMOLITION' WORKING ORDER. 'LEFT-OVER' CIRCUIT BREAKERS SHALL REMAIN, BE SWITCHED TO OFF POSITION, AND BE LABELED AS SPARES IN THEIR PANELS BY CONTRACTOR. PROVIDE NEW TYPEWRITTEN DIRECTORIES FOR ALL PANELS AFFECTED BY WORK ON THIS PROJECT.
- C. LOCATION OF DEVICES, CONNECTIONS, ETC., INDICATED ON THIS DRAWING WERE TAKEN FROM VARIOUS SOURCES. THEY ARE DIAGRAMMATIC ONLY AND ARE SUBJECT TO VARIATION FROM EXISTING CONDITIONS. CERTAIN EXISTING ELEMENTS MAY NOT BE INDICATED AT ALL. THE CONTRACTOR PROPOSING TO DO ANY PART OF THE WORK INDICATED HEREON SHALL VISIT THIS SITE AND DETERMINE TO HIS SATISFACTION THAT HE MAY COMPLETE ALL WORK REQUIRED FOR THE BID WHICH HE PROPOSES.
- D. REMOVE ALL ASSOCIATED BACKBOXES, CONDUIT AND CONDUCTORS FOR DEVICES AND EQUIPMENT BEING REMOVED BACK TO SOURCE, WHETHER INDICATED OR NOT (UON).
- E. COORDINATE WITH OWNER DISPOSAL OF ALL EQUIPMENT, FIXTURES, DEVICES, ETC., WHICH ARE INDICATED FOR DEMOLITION, SALVAGE AND TURN OVER REMOVED ITEMS TO OWNER AT THEIR OPTION.
- F. COORDINATE WITH OTHER TRADES FOR THE REMOVAL AND/OR RELOCATION OF ELECTRICAL DEVICES AND CONNECTIONS ASSOCIATED WITH THEIR EQUIPMENT.
- G. REMOVE ABANDONED CONDUCTORS DISCOVERED ABOVE ACCESSIBLE CEILINGS IN ACCORDANCE WITH NEC REQUIREMENTS.
- H. RELOCATE EXISTING ELECTRICAL SYSTEMS IN CONFLICT WITH EXISTING OR NEW WORK OF OTHER TRADES TO PERMIT INSTALLATION OF DEVICES AND EQUIPMENT SHOWN ON PLANS.
- I. UNLESS OTHERWISE NOTED, PATCH SURFACE(S) TO MATCH ADJOINING CONSTRUCTION AND FINISH FOR ANY ITEMS REMOVED BY THIS CONTRACTOR IN EXISTING TO REMAIN WALLS, CEILINGS, FLOORS, ETC.



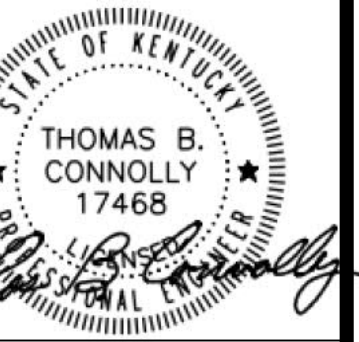
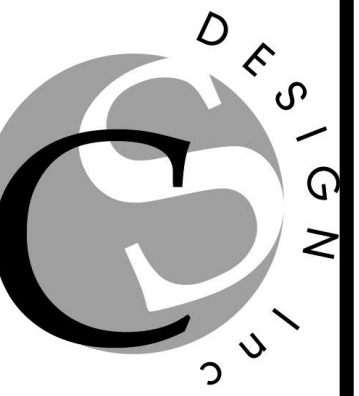
ELECTRICAL DEMOLITION
1/4" = 1'-0"

ELECTRICAL DEMOLITION

CFP NO. KY36P00 - 501(22)
HOUSING AUTHORITY OF FRANKFORT
FRANKFORT, KENTUCKY

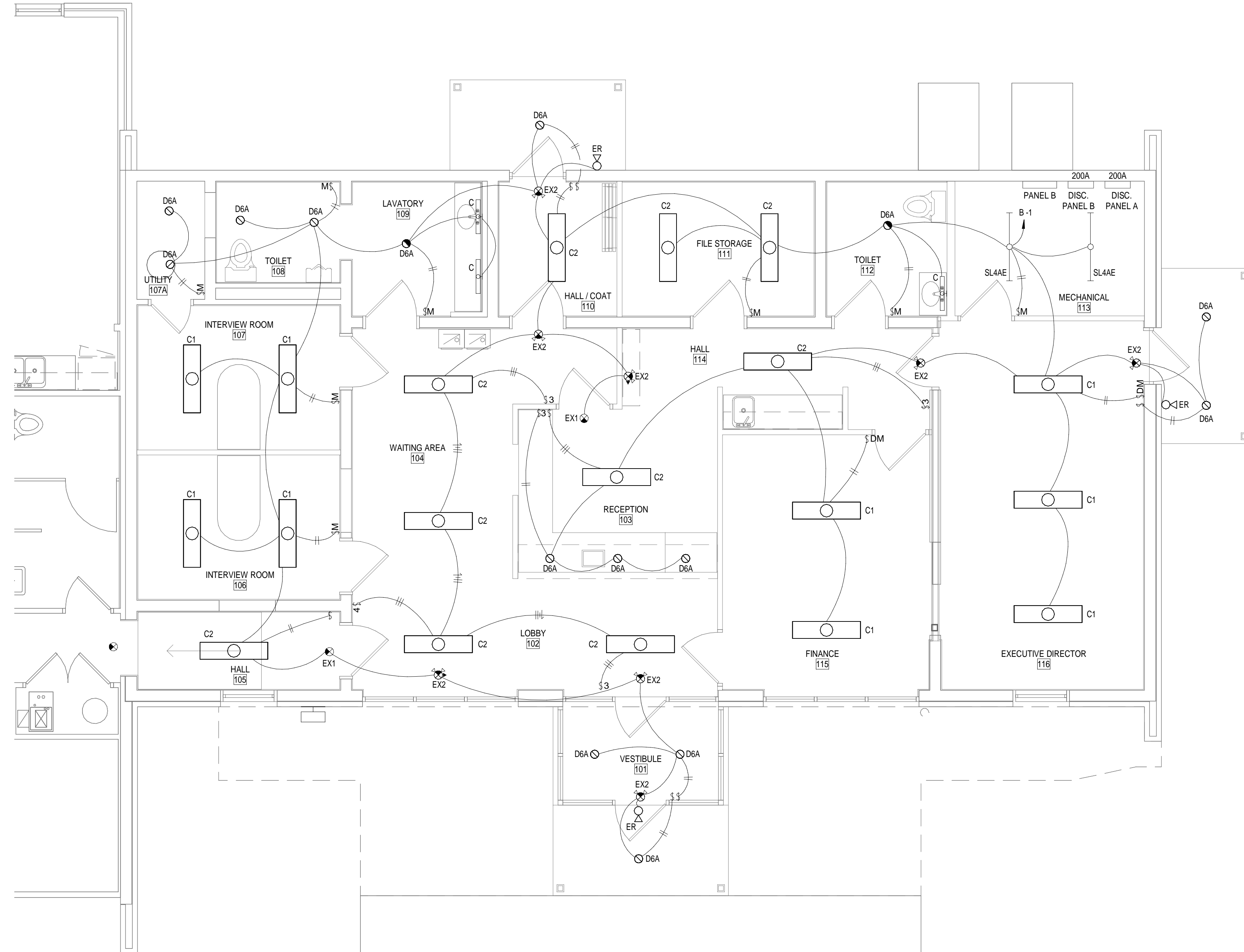
DR.	CHK.	DATE	DESCRIPTION
CAF	TBC	09/26/24	FOR CONSTRUCTION
		11/22/2024	FOR CONSTRUCTION

E0.01



ENGINEER

LIGHTING PLAN
 CFP NO. KY36P00 - 501(22)
 HOUSING AUTHORITY OF FRANKFORT
 FRANKFORT, KENTUCKY

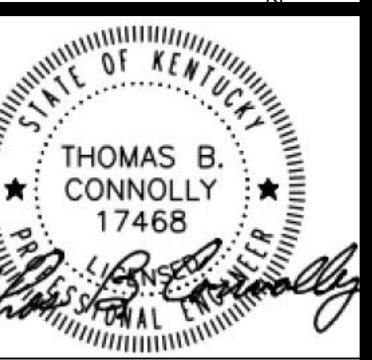
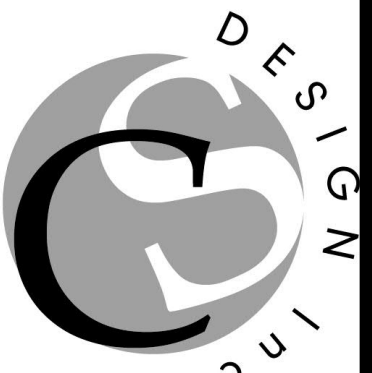


LIGHTING PLAN

1/4" = 1'-0"

DR.	CHK.	DATE	DESCRIPTION
CAF	TBC	09/26/24	FOR CONSTRUCTION
		11/22/2024	FOR CONSTRUCTION

E1.01



ENGINEER

POWER AND SYSTEMS PLAN
CFP NO. KY36P00 - 501(22)
HOUSING AUTHORITY OF FRANKFORT
FRANKFORT, KENTUCKY

DR.	CHK.	DATE	DESCRIPTION
CAF	TBC	09/26/24	FOR CONSTRUCTION
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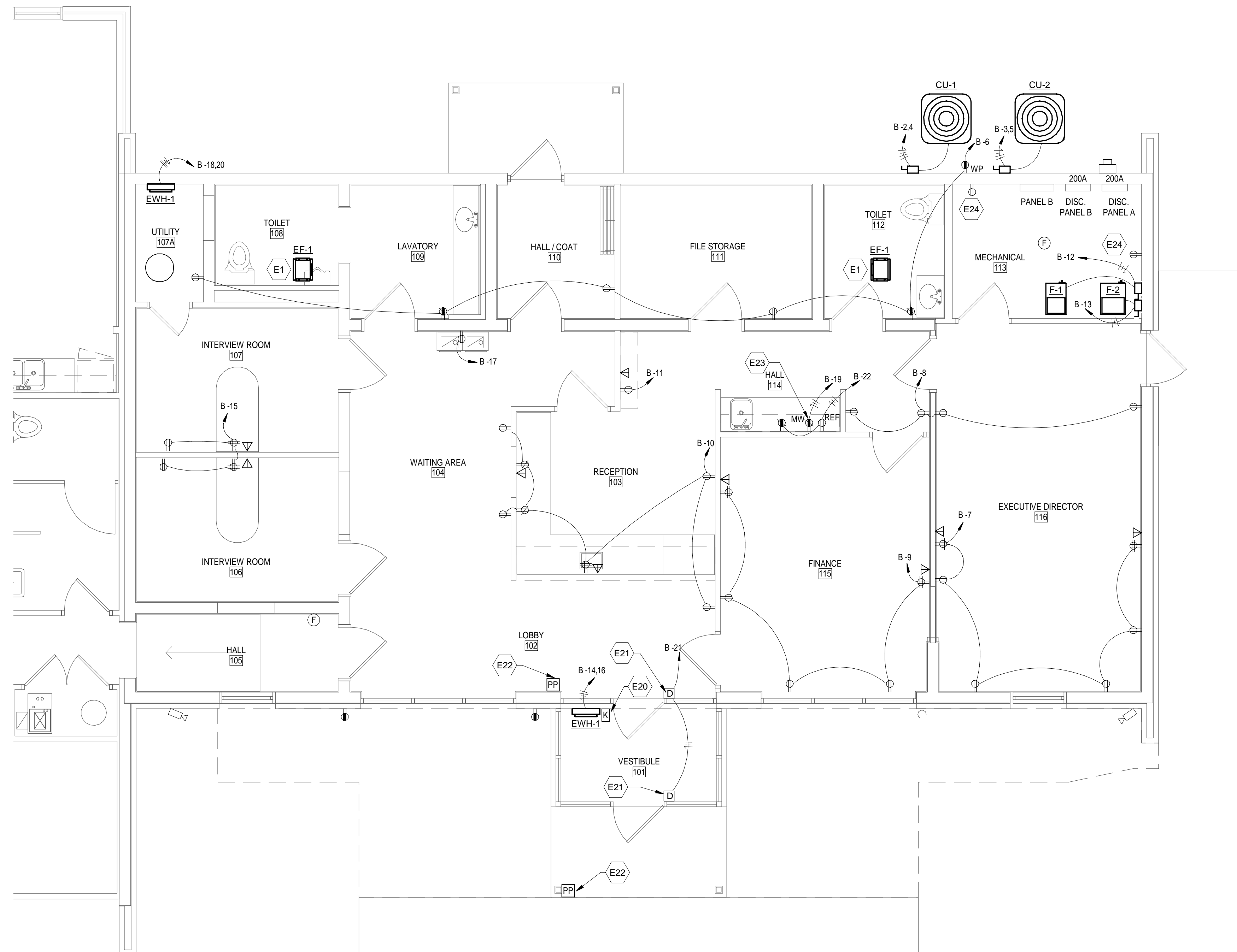
E1.02

SHEET NOTES

- E1 FEED EXHAUST FAN FROM LIGHTING CIRCUIT THIS ROOM. CONTROL VIA LIGHT SWITCH OCCUPANCY SENSOR.
- E20 COORDINATE FINAL LOCATION AND ALL ROUGH-IN REQUIREMENTS WITH OWNER PRIOR TO ROUGH-IN.
- E21 PROVIDE POWER FOR AUTOMATIC DOOR SWING OPERATOR.
- E22 PROVIDE PUSH PLATE AT ACCEPTABLE LOCATION TO ARCHITECT AND OWNER. FIELD COORDINATE PRIOR TO ROUGH-IN. PUSH PLATES SHALL ACTIVATE BOTH DOOR ACTUATORS.
- E23 COORDINATE WITH ARCHITECT TO CONCEAL RECEPTACLE BEHIND MICROWAVE.
- E24 PROVIDE NEW RECEPTACLE AND COVERPLATE AT EXISTING ROUGH-IN LOCATION.

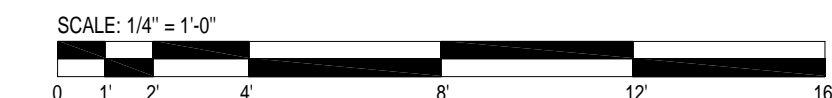
NEW WORK GENERAL NOTES

- A. REFER TO ARCHITECTURAL ELEVATIONS AND CASEWORK DRAWINGS FOR COORDINATION OF DEVICE LOCATIONS PRIOR TO ROUGH-IN.
- B. PROVIDE HEAVY DUTY, NON-FUSED (UON), EQUIPMENT DISCONNECT FOR ALL POWERED HVAC, PLUMBING, AND ELECTRICAL EQUIPMENT. DISCONNECT SHALL HAVE AMPACITY AND VOLTAGE CHARACTERISTICS TO MEET EQUIPMENT ELECTRICAL REQUIREMENTS. PROVIDE NEMA 3R OUTDOORS. UON.
- C. PROVIDE ROUGH-IN FOR ALL OF OWNER'S SECURITY SYSTEM DEVICES, ACCESS CONTROL SYSTEMS, DATA/INTERNET SYSTEMS. COORDINATE ALL DEVICE LOCATIONS AND REQUIREMENTS WITH OWNER IT REPRESENTATIVE PRIOR TO ROUGH-IN.
- D. COORDINATE ALL DATA CONDUIT ROUTES WITH OWNER'S IT REPRESENTATIVE PRIOR TO ROUGH-IN.
- E. PROVIDE VINYL LABEL ON COVER PLATE OF EACH RECEPTACLE IN PROJECT AREA INDICATING PANEL AND PANEL SPACE NUMBER FEEDING RECEPTACLE.
- F. LOCATIONS OF ELECTRICAL CONNECTIONS AND LOCAL DISCONNECTS SHALL BE COORDINATED WITH MECHANICAL AND PLUMBING CONTRACTORS TO ENSURE ACCESS AND WORKING CLEARANCE IS MAINTAINED PER NEC. NOTIFY OTHER TRADES OF REQUIRED CLEARANCE AREAS TO AVOID ROUTING OF OTHER SYSTEMS IN THESE AREAS. DO NOT INSTALL ELECTRICAL EQUIPMENT OVER EQUIPMENT NAMEPLATES OR ACCESS PANELS OR THROUGH ACCESS/MAINTENANCE CLEARANCES OF EQUIPMENT BY OTHER TRADES.



POWER AND SYSTEMS PLAN

1/4" = 1'-0"

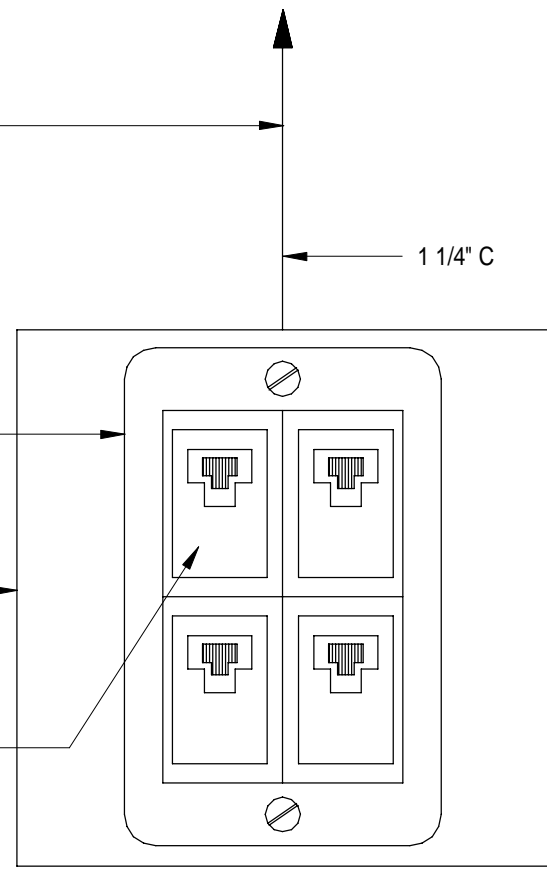


DR.	CHK.	DATE	DESCRIPTION
CAF <td>TBC <td>09/26/24 <td>FOR CONSTRUCTION</td> </td></td>	TBC <td>09/26/24 <td>FOR CONSTRUCTION</td> </td>	09/26/24 <td>FOR CONSTRUCTION</td>	FOR CONSTRUCTION
		11/22/2024	

LIGHT FIXTURE SCHEDULE

MARK	MANUFACTURER	MODEL	FIXTURE DESCRIPTION	MOUNTING	LAMPS	LUMENS	COLOR TEMP	CRI	INPUT WATTS	FIXTURE VOLTAGE RATING	CIRCUIT VOLTS	IMAGE (IF AVAILABLE)
C	LITHONIA LIGHTING	FMVSTL-24IN-MVOLT-30K-90CRI-BN-M4	TRADITIONAL SQUARE VANITY 2FT LINEAR WALL MOUNTED FIXTURE, BRUSHED NICKEL FINISH COLOR.	WALL	LED	1300 lm	3000 K	90	10 W	UNV	120 V	
C1	LITHONIA LIGHTING	FMLL-14IN-40K-80CRI	1x4 CONTEMPORARY ARCHITECTURAL TROFFER, HIGH EFFICIENCY ACRYLIC CURVED LENS, 0-10V 1% DIMMABLE.	SURFACE	LED	4800 lm	4000 K	>80	45 W	UNV	120 V	
C2	LITHONIA LIGHTING	FMLL-14IN-40K-80CRI	1x4 CONTEMPORARY ARCHITECTURAL TROFFER, HIGH EFFICIENCY ACRYLIC CURVED LENS, 0-10V 1% DIMMABLE.	SURFACE	LED	3900 lm	4000 K	>80	45 W	UNV	120 V	
D6A	ELITE LIGHTING	HH6-LED-900L-DIM10-MVOLT-WD-40K-90-HH6-501	6 INCH DOWNLIGHT, 0-10V 1% DIMMABLE. CLEAR ALZAK REFLECTOR. WHITE TRIM. SUITABLE FOR WET LOCATIONS. PROVIDE WITH 90-MINUTE EMERGENCY BATTERY PACK WHERE INDICATED WITH SOLID HATCH ON PLANS.	RECESSED	LED	1065 lm	4000 K	90	9 W	UNV	120 V	
ER	COMPASS	CORD	EGRESS REMOTE LIGHT, DUAL HEADS. POWERED BY ADJACENT EXIT SIGN. FINISH TO BE SELECTED BY ARCHITECT.	RECESSED	LED	88 lm	0 K	--	2 W	UNV	120 V	
EX1	COMPASS	CER	EXIT LIGHT (SINGLE FACE) - WHITE THERMOPLASTIC HOUSING WITH UNIVERSAL EXIT FACE AND WITH LED RED LETTERING. PROVIDE WITH SELF-TEST/SELF-DIAGNOSTICS TO MONITOR BATTERY/CHARGER FAILURE, BATTERY DISCONNECT AND LAMP FAILURE.	CEILING	LED	0 lm	0 K	--	2 W	UNV	120 V	
EX2	COMPASS	CCRRC	COMBINATION EXIT / EGRESS LIGHT - WHITE THERMOPLASTIC HOUSING WITH UNIVERSAL EXIT FACE AND WITH LED RED LETTERING AND TWO (2) INTEGRAL LED EGRESS LIGHTS, BATTERY - NIMH BATTERY WITH LONG-LIFE NICKEL CADMIUM (NICAD) OR NICKEL METAL HYDRIDE (NIMH) FOR UL RECOGNIZED 90 MINUTE EMERGENCY LIGHTING AND CAPACITY TO RUN 4 CIR/CDR SINGLE REMOTE LAMP HEADS OR 2 DOUBLE CIR/CDR REMOTE HEAD FIXTURES. PROVIDE WITH SELF-TEST/SELF-DIAGNOSTICS TO MONITOR BATTERY/CHARGER FAILURE, BATTERY DISCONNECT AND LAMP FAILURE.	CEILING	LED	0 lm	0 K	--	4 W	UNV	120 V	
SL4AE	COLUMBIA	LCL4-40-LW-EU-ELL14	4 FOOT, LENSED STRIP LIGHT, FIXED OUTPUT DRIVER. PROVIDE WITH INTEGRAL EMERGENCY BATTERY PACK.	SURFACE	LED	2616 lm	4000 K	>80	19 W	UNV	120 V	

ROUTE CONDUIT(S) TO 1' ABOVE THE CEILING LINE OR DOWN BELOW SLAB IF NECESSARY TO OTHER ACCESSIBLE CEILING (EXP STRUCTURE) AREA AS REQUIRED. ELL OUT OF WALL AND INSTALL AN INSULATED THROAT BUSHING.



ALL VOICE/DATA OUTLETS ARE TO BE MOUNTED ON 1-GANG SQUARE CUT RACO 700 SERIES EXTENSION RING, DEPTH TO MATCH WALL CONSTRUCTION

PROVIDE 4-11/16" SQUARE X 2-1/2" DEEP OUTLET BOX FOR EACH WALL-MTD. OUTLET

PROVIDE CONNECTORS FOR ETHERNET, VOICE, ETC. IN FACEPLATES. FACEPLATES SHALL BE PANDUIT, AVAYA WIREMOLD OR APPROVED EQUIVALENT. VERIFY ROUGH-IN REQUIREMENTS WITH ALL SUPPLIERS PRIOR TO INSTALLING ANY ROUGH-IN WORK

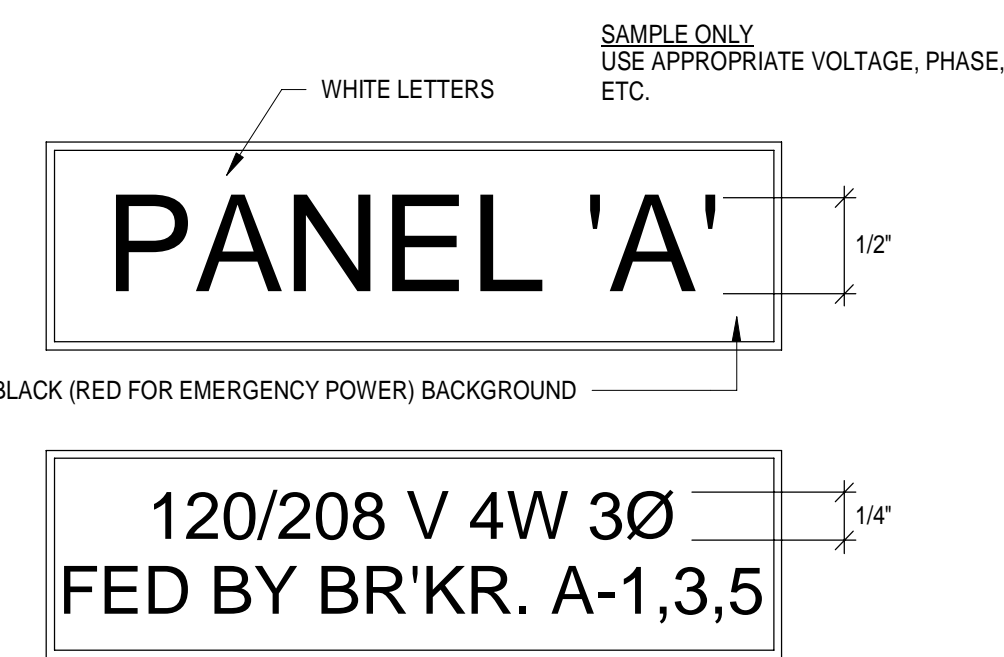
SHOWN ON PLANS AS:

GENERAL NOTES TO TYPICAL COMMUNICATIONS SYSTEM OUTLETS:

- DATA JACK TO BE RJ-45 BLUE, CAT 6, CABLE TO BE BLUE.
- VOICE JACK TO BE RJ-45 WHITE, CAT 6, CABLE TO BE WHITE.
- COLOR OF BLANK TO MATCH BEZEL, TO BE SELECTED BY OWNER.
- PROVIDE LONG SWEEP ELL'S IN ALL COMMUNICATIONS CONDUITS.
- ALL CABLING NOT COMPLETELY ENCLOSED IN CONDUIT SHALL BE PLENUM-RATED WHEN INSTALLED IN A RETURN PLENUM.
- OWNER'S VENDOR TO PROVIDE ALL VOICE AND DATA WIRING.
- VERIFY JACK AND CABLE COLORS ABOVE WITH OWNER'S IT REPRESENTATIVE PRIOR TO ORDERING.

3 TYPICAL COMMUNICATIONS OUTLET (ROUGH-IN) DETAIL

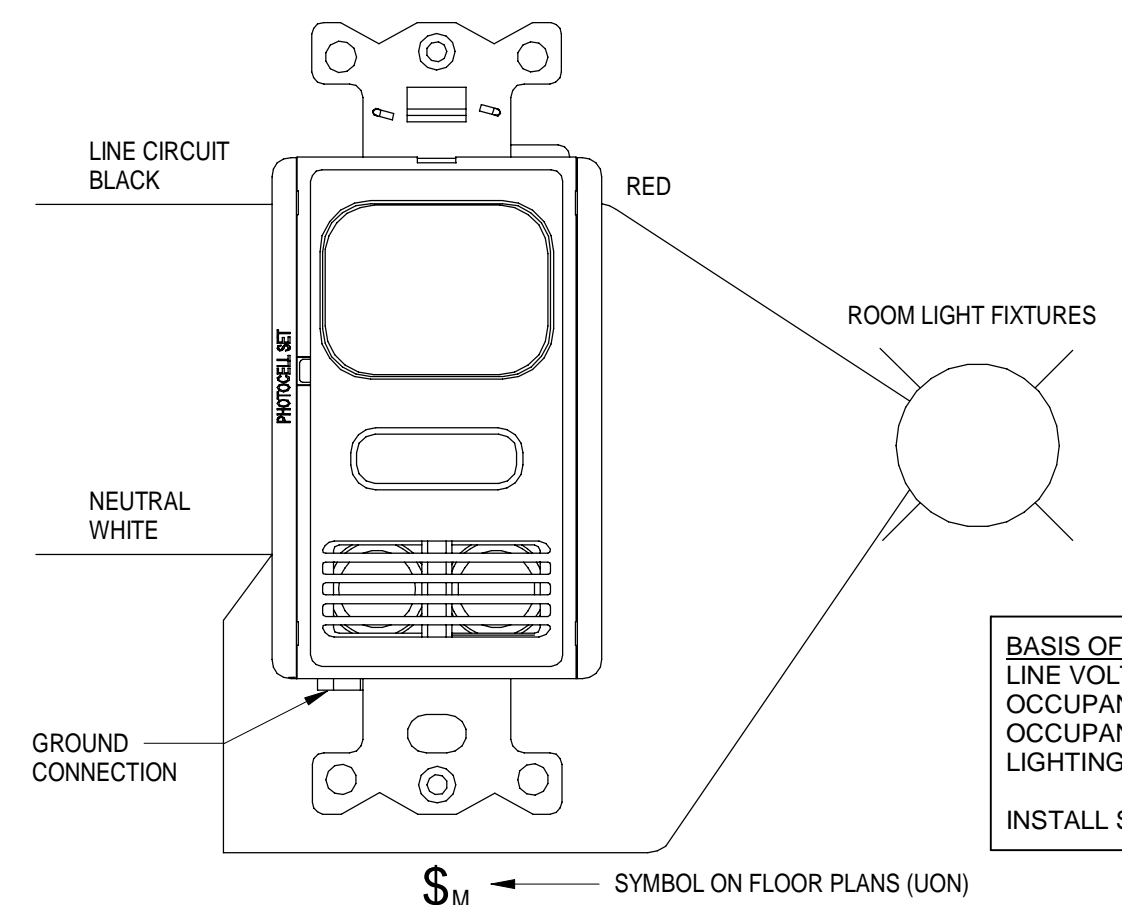
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- NOTES:
- ALL PANELS, SWITCHGEAR, CABINETS, AND OTHER LARGE EQUIPMENT TO BE MARKED WITH PANEL DESIGNATION (1/2") AND FEEDING CIRCUIT/VOLTAGE (1/4"). USE LAMACOID PLATES CENTERED ABOVE DOOR ON EXTERIOR TRIM.
 - MARK ROOF MOUNTED EXHAUST FANS, ROOFTOP UNITS, AND ALL SIMILAR HVAC EQUIPMENT DISCONNECTS WITH EQUIPMENT TAG, FEEDING PANEL & BREAKER, AND CIRCUIT/VOLTAGE (1/4").
 - PROPER VOLTAGE AND PHASE TO BE SHOWN ON ALL EQUIPMENT.
 - PANEL INDEXES TO BE TYPED AND SHALL INDICATE EQUIPMENT SERVED AND LOCATION OF EQUIPMENT.
 - NORMAL POWER PANELS SHALL HAVE BLACK BACKGROUND AND WHITE LETTERS, EMERGENCY POWER PANELS SHALL HAVE RED BACKGROUND AND WHITE LETTERS.
 - PROVIDE ARC FLASH LABELS FOR ALL NEW PANELS AND ANY PANEL WITH CIRCUITS MODIFIED ON THIS PROJECT. LABEL SHALL BE PHENOLIC PLASTIC WITH WHITE LETTERS AND BLACK BACKGROUND. LABEL SHALL BE PERMANENTLY FIXED TO THE EQUIPMENT.

4 PANEL AND DISCONNECT LABEL DETAIL

NTS

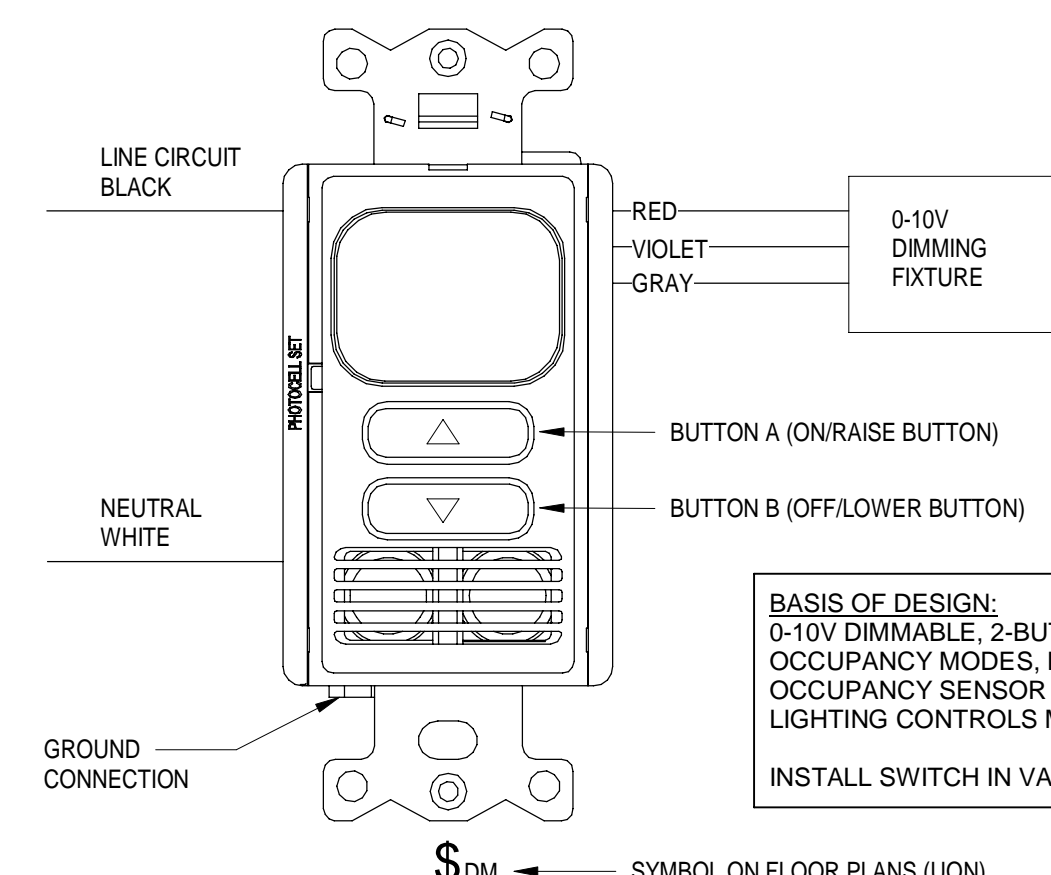


BASIS OF DESIGN:
LINE VOLTAGE, 1-BUTTON, VACANCY OR OCCUPANCY MODES, DUAL TECHNOLOGY OCCUPANCY SENSOR WALL SWITCH EQUAL TO NX LIGHTING CONTROLS MODEL LHRMMS2-G-WH
INSTALL SWITCH IN VACANCY MODE, UON.

2 WALL SWITCH OCCUPANCY SENSOR (NON-DIMMING) WIRING DIAGRAM

NTS

Branch Panel: B												
Location: Space 123				Volts: 120/240 Single				Feeder: EXISTING				
Supply From:				Phases: 1				Mains Type: MLO				
Mounting: Surface				Wires: 3				Mains Rating: 225 A				
Enclosure: NEMA 1 Indoor								kAIC Rating: EXISTING				
CKT	Circuit Description	Trip	Poles	Wire Size	A	B	Wire Size	Poles	Trip	Circuit Description	CKT	
1	LIGHTS	20 A	1	1-#12, 1-#12, 1-#12	1.1	1.74			25 A	(2) CU-1	2	
3											4	
5	(2) CU-2	30 A	2	2-#10, 1-#10, 1-#10	2.18	1.08	2.18	1.74	1	20 A	RCPTS - WP, TOILETS, FILE, HALL....	6
7	RCPTS - EXECUTIVE DIRECTOR	20 A	1	1-#12, 1-#12, 1-#12			1.44	0.72	1	20 A	RCPTS - EXE. DIRECTOR, HALL	8
9	RCPTS - FINANCE	20 A	1	1-#12, 1-#12, 1-#12	1.26	1.44			1	20 A	RCPTS - RECEPTION, LOBBY, W. AREA	10
11	RCPT COPIER - HALL	20 A	1	1-#12, 1-#12, 1-#12			0.18	1.18	1	15 A	F-1	12
13	F-2	15 A	1	1-#12, 1-#12, 1-#14	1.2	1.5			2	20 A	(2) EWH-1	14
15	RCPTS - INTERVIEW ROOMS	20 A	1	1-#12, 1-#12, 1-#12			1.08	1.5	2	20 A	(2) EWH-1	16
17	DRINKING FOUNTAIN (3)	20 A	1	1-#12, 1-#12, 1-#12	0.54	1.5			2	20 A	(2) EWH-1	18
19	RCPT MICROWAVE	20 A	1	1-#12, 1-#12, 1-#12			1.2	1.5	2	20 A	(2) EWH-1	20
21	Door Opener	20 A	1	1-#12, 1-#12, 1-#12	0.36	1.02			1	20 A	Receptacle Space 137	22
23											24	
25											26	
27											28	
29											30	
Total Load:					15 kVA		13 kVA					
Total Amps:					124 A		106 A					
Load Classification				Connected Load	Demand Factor	Estimated Demand	Panel Totals					
Heating				6000 VA	100.00%	6000 VA						
Cooling				0 VA	0.00%	0 VA	Total Conn. Load: 27640 VA					
HVAC				10224 VA	80.00%	8179 VA	Total Est. Demand: 25435 VA					
Lighting				1095 VA	100.00%	1095 VA	Total Conn. Current: 115 A					
Water Heating				0 VA	0.00%	0 VA	Total Est. Demand Current: 106 A					
Kitchen Equipment - Non-Dwelling Unit				0 VA	0.00%	0 VA	25% Additional Capacity: 26 A					
Receptacle				10320 VA	98.45%	10160 VA	Total Panel Current: 132 A					
Motor				0 VA	0.00%	0 VA						
Other				0 VA	0.00%	0 VA						
Notes:												
1. SPD SHALL BE IN THE INTERIOR OF THE PANEL WHERE: 1) PANEL IS INSTALLED IN OCCUPIED ROOM, OR VISIBLE TO THE PUBLIC, OR 2) THERE IS NOT ENOUGH SPACE BESIDE THE PANEL FOR THE SPD.												
2. OMIT NEUTRAL CONDUCTOR WHERE NOT REQUIRED BY MNFR. REFER TO MNFR'S EOPT WIRING DIAGRAMS FOR ADDITIONAL INFORMATION.												
3. GFCI BREAKER.												



BASIS OF DESIGN:
0-10V DIMMABLE, 2-BUTTON, VACANCY OR OCCUPANCY MODES, DUAL TECHNOLOGY OCCUPANCY SENSOR WALL SWITCH EQUAL TO NX LIGHTING CONTROLS MODEL LHRMMS2-N-WH
INSTALL SWITCH IN VACANCY MODE, UON.

1 WALL SWITCH OCCUPANCY SENSOR (0-10V DIMMING) WIRING DIAGRAM

NTS