

PROJECT MANUAL

for

SUSQUEHANNA COURT & FRANKLIN TERRACE
REMEDiations

for the

LANCASTER CITY HOUSING AUTHORITY

325 Church Street
Lancaster, PA 17602-4201

Architect

HAMMEL ASSOCIATES ARCHITECTS, LLC

25 East Grant Street, Suite 102
Lancaster, PA 17602

Mechanical, Electrical & Plumbing Engineer

Moore Engineering Company

3637 Columbia Avenue
Lancaster, PA 17603

December 2024
Architect's Project Number 2429

PROJECT MANUAL

LANCASTER CITY HOUSING AUTHORITY
 SUSQUEHANNA COURT & FRANKLIN TERRACE REMEDIATIONS

TABLE OF CONTENTS

NON-TECHNICAL SPECIFICATIONS	Pages
Signature Page.....	1
*Invitation to Bid	2
Instructions to Bidders, HUD-5369	5
FORMS REQUIRED TO BE SUBMITTED WITH BID	
* Bid Form	3
Bid Bond (10% Required)	2
Representations, Certifications, and Other Statement of Bidders, HUD-5369-A	4
Non-Collusion Affidavit of Prime Bidder	1
Section 3 Overview	4
Hourly Rate Schedule	1
*General Conditions of the Contract for Construction, HUD-5370.....	19
*Owner/Contractor Agreement.....	2
*Performance and Maintenance Bond.....	2
*Labor and Material Payment Bond.....	2
Release of Lien.....	2
Special Conditions	2
Additional Provisions for Pennsylvania Authorities	1
Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion	2
*Federal Wage Rate Determination PA20240123 11/01/2024 (Residential)	7
Change Order Procedures	1

DIVISION 1 - GENERAL REQUIREMENTS

011000	SUMMARY	011000-01 – 011000-04
012300	MULTIPLE CONTRACT SUMMARY	011200-01 – 012300-06
012100	ALLOWANCES	012100-01 – 012100-03
012200	UNIT PRICES.....	012200-01 – 012200-03
012300	ALTERNATES	012300-01 – 012300-01
012500	SUBSTITUTION PROCEDURES	012500-01 – 012500-04
	SUBSTITUTION SUBMITTAL REQUEST FORM	2 PAGES
012600	CONTRACT MODIFICATION PROCEDURES	012600-01 – 012600-03
012900	PAYMENT PROCEDURES.....	012900-01 – 012900-04
013100	PROJECT MANAGEMENT AND COORDINATION	013100-01 – 013100-07
013200	CONSTRUCTION SCHEDULES.....	013200-01 – 013200-07

013300	SUBMITTAL PROCEDURES	013300-01 – 013300-06
014000	QUALITY REQUIREMENTS	014000-01 – 014000-07
014200	REFERENCES	014200-01 – 014200-08
015000	TEMPORARY FACILITIES AND CONTROLS	015000-01 – 015000-05
	SITE LOGISTICS PLAN – SUSQUEHANNA COURT	1 PAGE
	SITE LOGISTICS PLAN – FRANKLIN TERRACE	1 PAGE
016000	PRODUCT REQUIREMENTS	016000-01 – 016000-05
017300	EXECUTION	017300-01 – 017300-09
017700	CLOSEOUT PROCEDURES	017700-01 – 017700-05
017823	OPERATION AND MAINTENANCE DATA	017823-01 – 017823-06
017839	PROJECT RECORD DOCUMENTS	017839-01 – 017839-03

DIVISION 2 – EXISTING CONDITIONS

020900	– MOLD REMEDIATION	020900-01 – 020900-09
024119	– SELECTIVE DEMOLITION	024119-01 – 024119-05

DIVISION 6 – WOODS, PLASTICS, AND COMPOSITES

061000	– ROUGH CARPENTRY	061000-01 – 061000-03
062023	– INTERIOR FINISH CARPENTRY	062023-01 – 062023-02
064116	– PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS	064116-01 – 064116-05

DIVISION 7 – THERMAL AND MOISTURE

072100	– THERMAL INSULATION	072100-01 – 072100-02
079200	– JOINT SEALANTS	079200-01 – 079200-05

DIVISION 8 – OPENINGS

085413	– VINYL WINDOWS	085413-01 – 085413-06
--------	-----------------------	-----------------------

DIVISION 9 – FINISHES

092900	– GYPSUM BOARD	092900-01 – 092900-03
096519	– RESILIENT BASE AND ACCESSORIES	096519-01 – 096519-03
096519	– RESILIENT TILE FLOORING	096519-01 – 096519-03
099123	– INTERIOR PAINTING	099123-01 – 099123-05

DIVISION 10 - SPECIALTIES

102800	TOILET, BATH, AND LAUNDRY ACCESSORIES	102800-01 – 102800-03
--------	---	-----------------------

DIVISION 22 - PLUMBING

220250	INSULATION.....	220250-01 – 220250-03
220410	PLUMBING PIPING & SPECIALTIES	220410-01 – 220410-05
220440	PLUMBING FIXTURES & EQUIPMENT.....	220440-01 – 220440-04

DIVISION 23 – MECHANICAL

230010	MECHANICAL GENERAL PROVISIONS	230010-01 – 230010-19
230100	MECHANICAL GENREAL EQUIPMENT.....	230100-01 – 230100-10
230250	MECHANICAL INSULATION	230250-01 – 230250-03
230800	HVAC SYSTEMS COMMISSIONING	230800-01 – 230800-07
230860	VENTILATION EQUIPMENT	230860-01 – 230860-03
230890	DUCTWORK SYSTEMS.....	230890-01 – 230890-07
230990	TESTING, ADJUSTING, AND BALANCING	230990-01 – 230990-04

DIVISION 26 - ELECTRICAL

260010	ELECTRICAL GENERAL REQUIREMENTS	260010-01 – 260010-13
260060	ELECTRICAL DEMOLITION	260060-01 – 260060-05
260180	ELECTRICAL WIRING SYSTEMS.....	260180-01 – 260180-05
260518	RESIDENTIAL POWER CONDUCTORS AND CABLES	260518-01 – 260518-05
260519	ELECTRICAL POWER CONDUCTORS & CABLES	260519-01 – 260519-06
260526	GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS....	260526-01 – 260526-05
260529	HANGERS AND SUPPORTS.....	260529-01 – 260529-03
260533	RACEWAYS AND BOXES.....	260533-01 – 260533-10
260553	IDENTIFICATION.....	206553-01 – 260553-05
260620	SCHEDULES FOR ELECTRICAL DIST EQUIP.....	260620-01 – 260620-05
260650	LUMINAIRE SCHEDULE.....	260650-01 – 260650-03
262415	EXISTING PANELBOARDS	262415-01 – 262415-04
262430	LOAD CENTERS	262430-01 – 262430-05
262727	RESIDENTIAL GRADE WIRING DEVICES	262727-01 – 262727-06
262813	FUSES	262813-01 – 262813-02
262816	ENCLOSED SWITCHES AND CIRCUIT BREAKERS.....	262816-01 – 262816-05

END OF TABLE OF CONTENTS

SIGNATURE PAGE

GENERAL CONTRACTOR

Company Name

Authorized Signature

Title

Date

HOUSING AUTHORITY OF THE CITY OF LANCASTER

Barbara J. Wilson
Executive Director

Date

INVITATION TO BID

The Housing Authority of the City of Lancaster (LCHA) will receive bids for Remediations and Renovations at LCHA's Susquehanna Court & Franklin Terrace, Lancaster, PA until **2:00 pm** prevailing time on **January 8, 2025**, online via the PennBid System - <https://pennbid.bonfirehub.com/>. There will be no public bid opening, but bids will be promptly released on PennBid.

Bids are invited on a lump sum basis for multiple prime contracts.

All Bid Documents and solicitation details are available at no cost at PennBid at <https://pennbid.bonfirehub.com/>. Please note that the awarded bidder(s) are responsible for a fee to PennBid.

A responsive bid must include the (1) a bid bond, and (2) a HUD-5369A *Representations, Certifications, and Other Statements of Bidders*.

The work shall be in strict accordance with the drawings and specifications prepared by: Hammel Associates Architects.

A voluntary prebid meeting will be held at the project site (Franklin Terrace, 630 Almanac Ave, Lancaster, Pa 17602) on **Thursday, December 19th, 2024 at 10:00 AM**. Please register to attend the bid event through the "Ask a Question" feature in PennBid. Site visits to view the work area must be scheduled in advance by contacting LCHA Facilities and Maintenance Manager Jay Ortiz at jortiz@lchapa.com or 717-475-3144.

During the bidding period, please submit all questions and substitution requests via the "Ask a Question" feature on PennBid. Do not call or email the architect or owner. Substitution requests will only be accepted during the bidding period, subject to the requirements outlined in the contract documents. Optional material substitution requests will not be considered after the date and time stated below or during the construction phase. Questions and substitution requests will not be accepted after **12:00 Noon on Monday, December 30, 2024**.

A certified check or bank draft payable to the Housing Authority of the City of Lancaster, U.S. Government Bonds, or a satisfactory Bid Bond executed by the bidder and acceptable sureties in an amount equal to ten percent (10%) of base bid shall be submitted with each bid.

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 and that the contractor must ensure that employees and applicants for employment are not discriminated against because of race, color, age, religion, sex, national origin, familial status or disability.

Contracts under this project are subject to the requirements of Section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. 1701u. 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.

The LCHA is an equal opportunity agency which does not discriminate against any person because of race, color, age, religion, sex, national origin, handicap or familial status. The LCHA solicits and encourages Minority Business Enterprise (MBE) and Women Business Enterprise (WBE) participation in all of its contracts.

The successful bidder will be required to furnish and pay for satisfactory performance and payment bonds.

The LCHA reserves the right to reject any or all bids or to waive any informalities in the bidding. No bid shall be withdrawn for a period of sixty (60) days subsequent to the opening of the bids without written consent of the LCHA.

HOUSING AUTHORITY OF THE CITY OF LANCASTER

**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

Table of Contents

Clause	Page
1. Bid Preparation and Submission	1
2. Explanations and Interpretations to Prospective Bidders	1
3. Amendments to Invitations for Bids	1
4. Responsibility of Prospective Contractor	1
5. Late Submissions, Modifications, and Withdrawal of Bids	1
6. Bid Opening	2
7. Service of Protest	2
8. Contract Award	2
9. Bid Guarantee	3
10. Assurance of Completion	3
11. Preconstruction Conference	3
12. Indian Preference Requirements	3

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, accept other than the lowest bid (e.g., the apparent low bid is unreasonably low), and waive informalities or minor irregularities in bids received, in accordance with the PHA's/IHA's written policy and procedures.

(e) Unless precluded elsewhere in the solicitation, the PHA/IHA may accept any item or combination of items bid.

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

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

9. Bid Guarantee

All bids must be accompanied by a negotiable bid guarantee which shall not be less than ten percent (10%) 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.

BID FORM

NOTE: The Bid Form is included with the Bidding Documents for Reference. Bidders shall complete the electronic bid from within PennBid (“Prepare Your Submission” tab), inclusive of all pricing items and required supporting documents as identified.

TO: Barbara J. Wilson, Executive Director
Lancaster City Housing Authority
325 Church Street
Lancaster, PA 17602-4201

Gentlemen:

1. The undersigned, having familiarized ourselves with the local conditions affecting the cost of the work, drawings and with the Project Manual (including all documents contained therein) and Addenda, if any thereto, as prepared by Hammel Associates Architects and posted on PennBid, hereby proposes to furnish all labor, materials, equipment and services required to construct and complete:

General Construction Contract	
Mechanical Construction Contract	
Electrical Construction Contract	
Plumbing Construction Contract	

All in accordance with the contract documents within the time set forth therein and at the prices set forth below.

2. Base Proposal: We agree to furnish all labor, materials, equipment and services required to provide the services as described and required by the herein above stated documents, in accordance therewith for the sum of _____ (\$_____).

ADD Alternate #EC-1: electrical work only

ADD _____ (\$_____)

a. This proposal is based upon the receipt of the following addenda issued by the Authority during the bidding period: _____.
(Insert the addenda number(s), or the word "none" as the case may be).

b. Should our firm be awarded the contract, we will complete the contract to substantial completion within 240 days of the issuance of the Notice to Proceed.

3. Allowances: We agree to furnish all labor, materials, equipment and services required to provide the services as described in specification section 012100 to provide the flowing

Allowance #GC-01: replacement of deteriorated 2x4 wood wall studs and 2x10 wood floor joists

4. Unit Prices: We agree to furnish all labor, materials, equipment and services required to provide the services as described in specification section 012200, in accordance with the following Unit Price:

Unit Price #GC-01: Replace 8 linear feet of 2x4 wood wall stud:
_____ (\$_____ per LF).

Unit Price #GC-02: Replace 8 linear feet of 2x10 wood floor joist:
_____ (\$_____ per LF).

Unit Price #EC-1: Tamper Resistant GFCI Receptacle & Wiring – max distance: 30 feet; 5 assemblies:
_____ (\$_____ per assembly).

Unit Price #EC-2: Tamper Resistant Combination AFCI/GFCI Duplex Receptacle & Wiring – max distance: 30 feet; 5 assemblies:
_____ (\$_____ per assembly).

Unit Price #EC-3: Light Fixture & Wiring – max distance 30 feet; 5 assemblies:
_____ (\$_____ per assembly).

Unit Price #EC-4: Light Fixture & Wiring – max distance 30 feet; 5 assemblies:
_____ (\$_____ per assembly).

Unit Price #EC-5: Light Fixture & Wiring – max distance: 30 feet; 5 assemblies:
_____ (\$_____ per assembly).

Unit Price #EC-6: Humidity Sensor Switch & Wiring – max distance 30 feet; 5 assemblies:
_____ (\$_____ per assembly).

Unit Price #EC-7: Add Alt No. 1 – Service Entrance Cable – max distance: 100 feet; 5 assemblies:
_____ (\$_____ per assembly).

5. In submitting this bid, it is understood that the right is reserved by the Housing Authority of the City of Lancaster to reject any and all bids, consistent with language set forth in paragraph No. 8 of HUD5369.

4. 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 bonds within ten (10) days after the contract is presented to him for signature.

5. Security in the sum of _____ Dollars (\$_____), in the form of _____ is submitted herewith in accordance with the Specifications.

The contract amount stated above includes all sales taxes, excise taxes, and any other taxes for all materials and appliances subject to and upon which taxes are levied.

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

Date _____, 2025

(Signature)

By: _____

(Print or type name of person signing above)

Official address

Title: _____

TYPE OF BUSINESS: - INDIVIDUAL
 - PARTNERSHIP
 - CORPORATION

* _____ is a corporation organized and existing under the laws of the
State/Commonwealth of _____.

BID BOND

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

_____ as PRINCIPAL,

and _____ as SURETY

are held and firmly bound unto the ***HOUSING AUTHORITY OF THE CITY OF LANCASTER*** hereinafter called the "Housing Authority", in the penal sum of _____ Dollars, (\$_____) lawful money of the United States, for the payment of which sum will 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 _____, 2025, for:

General Construction Contract	
Mechanical Construction Contract	
Electrical Construction Contract	
Plumbing Construction Contract	

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 sixty (60) 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 Housing 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 Housing Authority the difference between the amount specified in said bid and the amount for which the Housing 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-bound parties have executed this instrument under their several seals this _____ day of _____, 2025, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representatives, pursuant to authority of its governing body.

Bid Bond -- Page 2

(If Principal is an Individual)

(Witness) _____ (Signature of Individual) (SEAL)

(If Principal is a Partnership) (Each Partner Must Sign)

(Witness) _____ (Signature of Partner) (SEAL)

(Witness) _____ (Signature of Partner) (SEAL)

(Witness) _____ (Signature of Partner) (SEAL)

(If Principal is a Corporation)

ATTEST:

(Name of Corporation)

(Secretary or Asst. Secretary)

(President or Vice President)

(Corporate Seal)

(Name of Surety)

(SEAL)

(Attorney-in-Fact)

IMPORTANT NOTE: Surety Companies executing bonds must appear on the Treasury Department's most current list (Circular 570) and be authorized to transact business in the State where the project is located.

**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

Table of Contents

Clause	Page
1. Certificate of Independent Price Determination	1
2. Contingent Fee Representation and Agreement	1
3. Certification and Disclosure Regarding Payments to Influence Certain Federal Transactions	1
4. Organizational Conflicts of Interest Certification	2
5. Bidder's Certification of Eligibility	2
6. Minimum Bid Acceptance Period	2
7. Small, Minority, Women-Owned Business Concern Representation	2
8. Indian-Owned Economic Enterprise and Indian Organization Representation	2
9. Certification of Eligibility Under the Davis-Bacon Act	3
10. Certification of Nonsegregated Facilities	3
11. Clean Air and Water Certification	3
12. Previous Participation Certificate	3
13. Bidder's Signature	3

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. **THIS IS NOT REQUIRED - LCHA.**

(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)

NONCOLLUSION AFFIDAVIT OF PRIME BIDDER

State of)

ss.

County of)

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

1. S/He is _____ of _____, the Bidder that has submitted the attached Bid;
2. S/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 lose element of the Bid price or the Bid price of any other Bidder, or to secure through any collusion, conspiracy, connivance or unlawful agreement any advantage against the Housing Authority of the City of Lancaster (Local Public Agency) or any person interested in the proposed contract; and
5. The price or prices quoted in the attached Bid are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Bidder or any of its agents, representatives, owners, employees, or parties in interest, including this affiant.

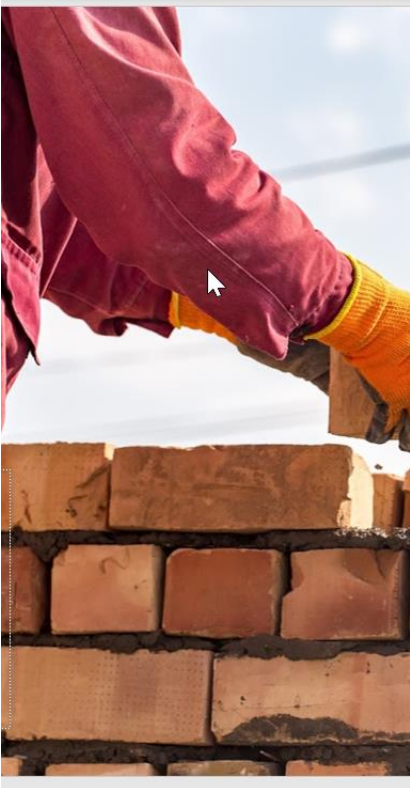
Signed: _____ Title: _____

Subscribed and sworn to this _____ day of _____, 2025

Signed: _____

My Commission expires: _____

Section 3 Business Concern Certification for Contracting



Description: Businesses seeking a preference in contracting on applicable Section 3 projects may qualify as a Section 3 business concern if they meet the following criteria: At least 51 percent of the business is owned and controlled by low- or very low-income persons, or 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, or over 75 percent of the labor hours performed for the business over the prior three-month period are performed by Section 3 workers.

Section 3 Business Certification for Contracting

Instructions: Enter the following information and select the criteria 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 if any apply:

At least 51 percent of the business is owned and controlled by low- or very low-income persons (Refer to income guidelines on page 4).

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 definition on page 4).

Business Concern Affirmation

I affirm that these statements 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 Lancaster City Housing Authority 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.

Lancaster City Housing Authority

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 for City of Lancaster, PA

Income Limits Category	FY 2024 Income Limits
Extremely Low Income Limits (30%)	\$ 22,050
Very Low Income Limits (50%)	\$ 36,750
Low Income Limits (80%)	\$ 58,800

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.

Note: YouthBuild is a community-based pre-apprenticeship program, administered by the Office of Workforce Investment's Division of Youth service, that provides job training and educational services for opportunity youth ages 16-24 who left school without a secondary diploma.

HOURLY RATE SCHEDULE

1. Contractor is required to submit an Hourly Rate Schedule (inclusive of all rates and fringes) to be used to determine the rates used for calculation of all change order work.
2. Rate schedule is to be submitted on Contractor's letterhead, and is to correlate to worker classifications provided in the Federal Wage Rate Determination contained elsewhere in this Project Manual.
3. The contractor may simply state that the hourly rates will be billed in accordance with the Federal Wage Rate Determination, and no further information is needed.
4. If the contractor does not submit an Hourly Rate Schedule, the hourly rates may not exceed the Federal Wage Rate Determination.
5. The Hourly Rate Schedule will be considered as one means of evaluation of proposals and award of contract.

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 \$250,000.**

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 75. 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.

Clause		Page	Clause		Page
1.	Definitions	2	Administrative Requirements		
2.	Contractor's Responsibility for Work	2	25.	Contract Period	9
3.	Architect's Duties, Responsibilities and Authority	2	26.	Order of Precedence	9
4.	Other Contracts	3	27.	Payments	9
Construction Requirements			28.	Contract Modifications	10
5.	Preconstruction Conference and Notice to Proceed	3	29.	Changes	10
6.	Construction Progress Schedule	3	30.	Suspension of Work	11
7.	Site Investigation and Conditions Affecting the Work	3	31.	Disputes	11
8.	Differing Site Conditions	4	32.	Default	11
9.	Specifications and Drawings for Construction	4	33.	Liquidated	12
10.	As-Built Drawings	5	34.	Termination of Convenience	12
11.	Material and Workmanship	5	35.	Assignment of Contract	12
12.	Permits and Codes	5	36.	Insurance	12
13.	Health, Safety, and Accident Prevention	6	37.	Subcontracts	13
14.	Temporary Buildings and Transportation Materials	6	38.	Subcontracting with Small and Minority Firms, Women's Business Enterprise, and Labor Surplus Area Firms	13
15.	Availability and Use of Utility Services	6	39.	Equal Employment Opportunity	13
16.	Protection of Existing Vegetation, Structures, Equipment, Utilities, and Improvements	6	40.	Employment, Training, and Contracting Opportunities for Low-Income Persons, Section 3 of the Housing and Urban Development Act of 1968	14
17.	Temporary Buildings and Transportation Materials	7	41.	Interest of Members of Congress	15
18.	Clean Air and Water	7	42.	Interest of Members, Officers, or Employees and Former Members, Officers, or Employees	15
19.	Energy Efficiency	7	43.	Limitations on Payments Made to Influence	15
20.	Inspection and Acceptance of Construction	7	44.	Royalties and Patents	15
21.	Use and Possession Prior to	8	45.	Examination and Retention of Contractor's Records	15
22.	Warranty of Title	8	46.	Labor Standards-Davis-Bacon and Related Acts	15
23.	Warranty of	8	47.	Non-Federal Prevailing Wage Rates	19
24.	Prohibition Against Liens	9	48.	Procurement of Recovered Materials	19

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.
- (j) "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, **Schedule** 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

of the work, and that it has investigated and satisfied itself

- (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

- (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 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 **Construction** 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

- (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 **Construction 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

- (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

accordance with the terms and conditions of the

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

retain ten (10) percent of the amount of progress

- (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 subcontract.

Name:

Title:

Date:

- (f) Except as otherwise provided in State law, the PHA shall 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 nowise 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 **Convenience** 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

- (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 noncompliance 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 75, 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 75 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 prioritization requirements and shall state the minimum percentages of labor hour requirements established in the Benchmark Notice (FR-6085-N-04).

(d) The contractor agrees to include this section 3 clause in every subcontract subject to compliance with regulations in 24 CFR Part 75, 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 75. 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 75.

(e) Noncompliance with HUD's regulations in 24 CFR Part 75 may result in sanctions, termination of this contract for default, and debarment or suspension from future HUD assisted contracts.

(f) Contracts, subcontracts, grants, or subgrants subject to Section 7(b) of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 5307(b)) or subject to tribal preference requirements as authorized under 101(k) of the Native American Housing Assistance and Self-Determination Act (25 U.S.C. 4111(k)) must provide preferences in employment, training, and business opportunities to Indians and Indian organizations, and are therefore not subject to the requirements of 24 CFR Part 75.

41. Interest of Members of Congress

No member of 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 **Acts** 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

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 \$27 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. DOL posts current fines at: <https://www.dol.gov/whd/govcontracts/cwhssa.htm#cmp>
 - (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.

() 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.

OWNER/CONTRACTOR AGREEMENT

THIS AGREEMENT made this _____ day of _____ in the year Two Thousand Twenty Five (2025) by and between:

a corporation organized and existing under laws of the State of Pennsylvania; hereinafter called the 'Contractor', and

**Housing Authority of the City of Lancaster
325 Church Street
Lancaster, PA 17602-4201**

hereinafter called the 'LCHA',

WITNESSETH, That the contractor and the LCHA for the consideration stated herein mutually agree as follows:

ARTICLE 1. Statement of Work. The contractor shall furnish all labor, material, equipment and services, and perform and complete all work required for Remediation and Renovations at Susquehanna Court & Franklin Terrace in strict accordance with the Specifications and Addendum thereto numbered:

all as prepared by Hammel Associates, 25 E. Grant St., #102, Lancaster, PA 17602 and Moore Engineering 3637 Columbia Avenue, Lancaster, PA 17603, which said Specifications and Addenda are incorporated herein by reference and made a part hereof.

ARTICLE 2. The Contract Price. The LCHA shall pay the contractor for the performance of the contract, in current funds, subject to additions and deductions as provided in the Specifications, the sum of _____ (\$_____).

ARTICLE 3. Contract Documents. The contract shall consist of the following component parts:

- a. This Instrument
- b. General Conditions
- c. Special Conditions
- d. Project Manual and Technical Specifications
- e. Drawings

Article 4. Section 3.

All contractors claiming a preference in contracting by meeting any of the three qualifications including; a Resident Owned Business, Hiring 30% of New Hires and/or Sub-contracting at least 25% of total award to a Section 3 Concern shall maintain that status throughout the life of the contract. Failure to meet this requirement will result in penalties up to and including contract termination.

Article 5. Davis Bacon Wages

The applicable wage rates were included in the specification book and are posted onsite. They are Decision number PA20240092 issued July 19, 2024 (Building).

This instrument, together with the other documents enumerated in this Article 3, which said other documents are as fully a part of the contract as if hereto attached or herein repeated, form the contract. In the event that any provision in any component part of this contract conflicts with any provision of any other component part, the provision of the component part first enumerated in this Article 3 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 three (2) original counterparts as of the day and year first above written.

ATTEST:

(Contractor)

By: _____

Title: _____

Business Address:

ATTEST:

HOUSING AUTHORITY
OF THE CITY OF LANCASTER

Beth Detz, Deputy Director

Barbara J. Wilson
Executive Director

325 Church Street
Lancaster, PA 17602-4201

PERFORMANCE AND MAINTENANCE BOND

KNOW ALL MEN, that _____ (hereinafter called Principal) and _____ a _____ Corporation (hereinafter called Surety) are held and firmly bound unto the **HOUSING AUTHORITY OF THE CITY OF LANCASTER** (hereinafter called the obligee) in the sums of _____ Dollars (\$ _____) for faithful performance of the contract, and _____ Dollars (\$ _____) for maintenance (both sums in lawful money of the United States of America) to be paid to the Obligee, or its successors or assigns: To the payment of which sums truly to be made, we bind ourselves and each of our respective heirs, legal representatives, successors and assigns, jointly and severally, firmly by these presents, this _____ day of _____, 2025.

WHEREAS, THE PRINCIPAL has entered into a written agreement with the Obligee dated _____, 2025, for:

Contract No. - _____

which, agreement, together with the documents therein described as the contract documents, shall be deemed a part hereof as fully as if set out herein, and shall together be hereinafter referred to as the "Contract".

AND WHEREAS, it is one of the conditions of the award of said contract by the Obligee that this bond be executed.

THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH that if the Principal shall faithfully perform the contract (including any alterations or additions thereto) at the time and in the manner therein provided, and shall indemnify and save harmless the Obligee from any expenses incurred through the Principal's failure to complete the work specified and for any damages growing out of the manner of performance of the contract by the Principal and all subcontractors and his or their servants, then this obligation for faithful performance to be void; but otherwise it shall remain in full force and effect.

And if the Principal shall remedy without cost to the owner any defects which may develop during the period of one (1) year from the date of completion and acceptance of the work performed under said contract, provided, in the judgment of the owner or its successor having jurisdiction in the premises, such defects are caused by defective or inferior materials or workmanship, then this obligation for maintenance shall be void; but otherwise, it shall remain in full force and effect.

The surety, for value received, agrees that no change, extension of time, alteration or addition to the terms of the contract to the work to be performed thereunder or specifications accompanying the same or any other forbearance on the part of either the Obligee or of the Principal to the other shall in any way effect its obligation on this bond; and it hereby waives notice of any such changes, extension of time, alteration, addition, or forbearance.

LABOR AND MATERIAL PAYMENT BOND

KNOW ALL MEN, that _____ (hereinafter called Principal) and _____ a _____ Corporation (hereinafter called Surety) are held and firmly bound unto the **HOUSING AUTHORITY OF THE CITY OF LANCASTER** (hereinafter called the Obligee) in the sums of _____ Dollars (\$_____) for payment of which we do bind ourselves, our heirs, legal representative, successors and assigns, jointly and severally, firmly by these presents this _____ day of _____, 2025.

WHEREAS, THE PRINCIPAL has entered into a written agreement with the Obligee dated _____, 2025, for:

Contract No. _____

which, agreement, together with the documents therein described as the contract documents, shall be deemed a part hereof as fully as if set forth herein, and shall together be hereinafter referred to as the "Contract".

AND WHEREAS, it is one of the conditions of the award of said contract by the Obligee that this bond be executed.

THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH that if the Principal and all of the Principal's subcontractors to who any portion of the work provided for in said contract is sublet, and all assignees of the Principal, and all assignees of such subcontractors, promptly shall pay, or shall cause to be paid, all monies which may be due for material furnished, labor supplied or performed and equipment rented in the prosecution of the work provided for in said contract in any amendment, extension or addition to said contract, whether or not the same entered into and became component parts of the work or improvements contemplated by said contract, or any amendment, extension or addition or said contract, then this obligation shall be void; but otherwise, this obligation shall remain in full force and effect.

The Surety, for value received, agrees that no change, extension of time, alteration or addition to the terms of the contract or to the work to be performed thereunder or the specifications accompanying the same or any other forbearance on the part of either the Obligee or of the Principal to the other shall in any way affect its obligation on this bond; and it hereby waives notice of any such changes, extension of time, alteration, addition or forbearance.

The Principal and the Surety hereby jointly and severally agree with the Obligee that every person, co-partnership, association or corporation, who whether as subcontractor or otherwise, has furnished material, or has supplies or performed labor, or has furnished equipment, in the prosecution of the work, as above provided, and who has not been paid therefor, may sue in assumpsit on this bond, as though such person, co-partnership, association or corporation were named herein, and may prosecute the same to final judgment for such sum or sums as may be justly due, and may have execution thereon; provided, however, that the Obligee shall not be liable for payment of any costs or expenses of such suit; but any such action or proceeding shall be brought within one (1) year after the time the cause of action accrued, all as provided in Section 10A of the Municipality Authorities Act of 1945, approved May 2, 1945, P.L. 382, as amended, of the Commonwealth of Pennsylvania.

RELEASE OF LIENS

Project:

Location:

Contract Description:

Contract Date:

Contract Number (if applicable):

Contractor:

Commonwealth of Pennsylvania :
: ss
County of Lancaster :

The undersigned, _____ being duly sworn on oath deposes and says that (he/she) is _____ (*title*) of _____ (*name of contractor, supplier or materialman*); that (he/she) is duly authorized to and does make this Release of Liens on its behalf for certain work performed by _____ (*name of contractor, supplier or materialman*) at the Project described above.

The sworn statement is being made pursuant to the contract (the “Contract”) dated between _____ (*name of contractor, supplier or materialman*) and the Housing Authority of the City of Lancaster. This payment is for the amount of \$ _____.

_____ (*name of contractor, supplier or materialman*) hereby certifies that all payments, including retention (which payments made to _____ (*name of contractor, supplier or materialman*) have been made under the Contract. This Release is conditioned only upon receipt of payment set forth above.

This also acknowledges that the undersigned has paid all of its subcontractors and materialmen in full for all work performed or materials furnished in connection with the Project in strict compliance with the Contractor and Subcontractor Payment Act and any other applicable laws and regulations.

Furthermore, in consideration of the payment(s) received, _____
(*name of contractor, supplier or materialman*) does hereby waive, release and relinquish all mechanics’ lien claims, right of lien (if any), and all manner of actions, suits, debts, judgments, claims and demands whatsoever in law or in equity, which _____
(*name of contractor, supplier or materialman*) ever had or may now have upon the Project for all work performed and all materials furnished. The undersigned agrees to indemnify or reimburse all persons so relying upon the Release for any and all sums, including attorney’s fees and costs which may be incurred as the result of any claims made by the undersigned and/or its material suppliers, subcontractors or employees, servants, agents or assigns of such persons against the Project.

It is acknowledged that this Release is for the benefit of and may be relied upon the Housing Authority of the City of Lancaster, the general contractor (if different from the contractor, supplier or materialman executing this Release), any construction lenders, and the principal and surety on any labor and material bond for the Project.

(*Name of contractor, supplier or materialman*)

By: _____

Title: _____

Sworn to and subscribed before me this ____ day of _____, 20__.

Notary Public

SPECIAL CONDITIONS

1. HUD-5369-A *Representations, Certifications and Other Statements of Bidders* -- The completion and inclusion of this form with the bid **is required**.
2. This contract and the payment terms set forth herein supersede applicable provisions of the *Pennsylvania Contractor and Subcontractor Payment Act of 1994*, if any.

If at any time during the existence of this contract the LCHA, the Contracting Officer or the Architect discover an error in an estimate or invoice submitted by the Contractor or discover that work was not completed according to the specifications or quality standards set forth in the contract (a deficiency), the LCHA, the Contracting Officer or the Architect:

- a. shall notify the Contractor of such error or deficiency; and,
- b. may at any time during the contract withhold any payment to the Contractor (in addition to any retainage permitted under the contract) in an amount equal to 120% of the estimated cost to correct the error or deficiency until such correction is made.

The Contractor shall disclose the payment terms set forth herein and in the contract to each of the Contractor's subcontractors and material suppliers.

3. *Insurance*. In addition to the requirements listed in Paragraph 36 (Page 13 of 22) of the *General Conditions*, please note the following:
 - a. The Housing Authority of the City of Lancaster shall be added as an additional insured to the contractor's Comprehensive General Liability Coverage.
 - b. In addition to the above, the General Contractor will carry Builders Risk insurance for work to be performed on the units at Farnum Street East Towers.
4. *Access to Accounting Records*. The Contractor shall check all materials, equipment and labor entering into the work and shall keep such full and detailed accounts as may be necessary for proper financial management under this Agreement, and the system shall be satisfactory to the Owner. The Owner or its representative shall be afforded access to all the Contractor's records, books, correspondence, instructions, drawings, receipts vouchers, memoranda, and similar data relating to this Contract, and the Contractor shall preserve all such records for a period of three years, or for such longer period as may be required by law, after the final payment. (AIA Document A111-1978, Article 12)
5. *Assignment of Refund Rights*. The Contractor agrees to assign and transfer to the Owner all its rights to sales and use tax which may be refunded as a result of a claim for refund for materials purchased in connection with this contract. The Contractor further agrees that it will not file a claim for refund for any sales or use tax which is the subject of this assignment.
6. *Contracts with Subcontractors*. The Contractor agrees to include the "Access to Accounting Records" and "Assignment of Refund Rights" paragraphs, in full, in any contracts with subcontractors.
7. *Lead Based Paint Certification*. This project is federally-funded through the U.S. Department of Housing & Urban Development (HUD), therefore **all** contractors involved

in any work that impacts lead-based paint shall be certified through the Environmental Protection Agency (EPA) under the Renovation, Repair and Painting (RRP) Rule. After April 22, 2010, federal law requires you to be certified and that you use lead-safe work practices. To become certified, renovation contractors must submit an application and fee payment to the EPA.

ADDITIONAL PROVISIONS FOR PENNSYLVANIA AUTHORITIES

These provisions are cumulative to any related provisions appearing elsewhere in these conditions.

- A. The contractor shall provide, where practicable employers' general liability insurance for the benefit of his employees not protected by the State Workmen's Compensation Laws.

In compliance with the foregoing, the contractor shall accept, insofar as the work covered by this contract is concerned, the provisions of the Workmen's Compensation Act of 1915, and any supplements or amendments thereto, and he will insure his liability thereunder or file with the Authority a Certificate of Exemption from insurance from the Bureau of Workmen's Compensation of the Department of Labor and Industry

- B. None but citizens of the United States shall be employed in any capacity under this contract, provided, that this restriction shall not apply to apprentices to a trade or profession who may be under twenty-one (21) years of age.
- C. The contractor agrees that in the hiring of employees for the performance of work under this contract or any subcontract hereunder, that neither the contractor nor any subcontractor, nor any person acting on behalf of such contractor or such subcontractor, shall by reason of race, creed or color discriminate against any citizen of the Commonwealth of Pennsylvania who is qualified and available to perform the work to which the employment relates.
- D. Neither the contractor, nor any subcontractor, nor any person on his behalf, shall in any manner, discriminate against or intimidate any employee hired for the performance or work under this contract on account of race, creed, or color.
- E. This contract may be canceled or terminated by the Authority and all money due, or to become due hereunder may be forfeited for a second or any subsequent violation of the terms or conditions of subsections d. and e. of this section.
- F. The contractor shall promptly pay for all material furnished, labor supplied or performed, rental for equipment employed and services rendered by public utilities in or in connection with the prosecution of the work whether or not the said material, labor, equipment or service enter into and become component parts of the work or improvement contemplated. This provision shall be deemed to be included for the benefit of every person, co-partnership, association or corporation who as subcontractor or otherwise, has furnished materials supplied or performed labor, rented equipment or services in or in connection with the prosecution of the work as aforesaid and the inclusion thereof in this contract shall preclude the filing by any person, co-partnership, association or corporation of any mechanic's lien claim for such material, labor or rental of equipment.
- G. The contractor must be currently licensed to do business in Pennsylvania and must provide written evidence of recent, similar job experience within the Commonwealth of Pennsylvania. They must also be registered with the Attorney General's Office and a registration number must be supplied to the Lancaster City Housing Authority.

CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

-- LOWER TIER COVERED TRANSACTIONS --

Instructions for Certification

1. By signing and submitting this proposal, the prospective lower tier participant is providing the certification set out below.
2. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.
3. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
4. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.
5. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.
6. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.
7. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that it is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List (Tel. 202-501-3566 or 202-501-4740).
8. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

9. Except for transactions authorized under paragraph 5 of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

_____, the prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

NOTE: Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

Explanation Attached? _____ YES _____ NO

Signature

Name Printed/Typed

Date

Firm Name

Address/City/State/Zip

FEDERAL WAGE RATE DETERMINATIONS

*The Schedule of Occupation Classifications
and Minimum Hourly Wage Rates*
as required under the scope of this contract
are included herewith.

"General Decision Number: PA20240123 11/01/2024

Superseded General Decision Number: PA20230123

State: Pennsylvania

Construction Type: Residential

Counties: Lancaster and Lebanon Counties in Pennsylvania.

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
1	11/01/2024

BRPA0001-018 05/01/2021

	Rates	Fringes
BRICKLAYER.....	\$ 45.45	30.16

CARP0167-005 05/01/2023

	Rates	Fringes
CARPENTER.....	\$ 42.60	28.22

* ENGI0542-010 05/01/2021

	Rates	Fringes
OPERATOR: Backhoe/Excavator/Trackhoe.....	\$ 50.80	28.89

FOOTNOTE: A. PAID HOLIDAYS: New Year's Day; Memorial Day; Independence Day; Labor Day; Thanksgiving Day and Christmas Day

TOXIC/HARARDOUS WASTE REMOVAL

Add 20 per cent to basic hourly rate for all classifications

* LABO0413-011 05/01/2024

	Rates	Fringes
LABORER Common or General.....	\$ 37.70	26.54

PAIN0021-011 05/01/2021

	Rates	Fringes
PAINTER (Brush and Roller).....	\$ 29.02	21.14

PLUM0690-013 05/01/2023

	Rates	Fringes
PLUMBER.....	\$ 64.73	37.21

ROOF0030-015 05/01/2022

	Rates	Fringes
ROOFER.....	\$ 31.25	21.75

* UAVG-PA-0040 04/17/2019

	Rates	Fringes
ELECTRICIAN.....	\$ 23.68	22.74

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

=====
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.

State Adopted Rate Identifiers

Classifications listed under the ""SA"" identifier indicate that

the prevailing wage rate set by a state (or local) government was adopted under 29 C.F.R 1.3(g)-(h). Example: SAME2023-007 01/03/2024. SA reflects that the rates are state adopted. ME refers to the State of Maine. 2023 is the year during which the state completed the survey on which the listed classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 01/03/2024 reflects the date on which the classifications and rates under the ?SA? identifier took effect under state law in the state from which the rates were adopted.

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.

=====

END OF GENERAL DECISION"

CHANGE ORDER PROCEDURES

1. The combined overhead and profit described in document HUD-5370, subparagraph 29(f)(3) included in the total cost to the Owner of a change in the Work shall be based on the following schedule:
 - .1 For the Contractor, for Work performed by the Contractor's own forces, 10 percent of the cost.
 - .2 For the Contractor, for Work performed by the Contractor's Subcontractors, 10 percent of the amount due the Subcontractors.
 - .3 For each Subcontractor involved, for Work performed by that Subcontractor's own forces, 10 percent of the cost.
 - .4 For each Subcontractor involved, for Work performed by the Subcontractor's Sub-subcontractors, 10 percent of the amount due the Sub-subcontractor.
 - .5 Cost to which overhead and profit is to be applied shall be determined in accordance with document HUD-5370, Subparagraph 29(f).
 - .6 No other costs or mark-ups will be allowed or accepted
 - .7 The only time a supervision cost for changes are allowed is if it is warranted and additional supervision is required for the change. If the change does not require additional supervision time or additional supervision staff, supervision time is not allowed to be invoiced as part of the costs.
 - .8 Any costs for Contractor's corporate overhead, insurance, bonds, corporate staff such as project management, estimating, design, engineering or CAD staff costs are part of the 10 % overhead allowed. None of these costs are to be included in the cost of the change. They are to be a part of the overhead percentage.
 - .9 In order to facilitate checking of quotations for extras or credits, all proposals, except those so minor that their propriety can be seen by inspection, shall be accompanied by a complete itemization of costs including labor, materials and Subcontracts. Labor and materials shall be itemized in the manner prescribed above. Where major cost items are Subcontracts, they shall be itemized also. In no case will a change involving over \$1,000.00 be approved without such itemization.
 - .10 Hourly rates shall be based on the Federal Wage Rate Determination included in the Project Manual, unless alternate rates were submitted with the bid, approved by the Contracting Officer (LCHA) and included in the Contract.

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Contractor's use of site and premises.
4. Coordination with occupants.
5. Work restrictions.
6. Specification and Drawing conventions.

B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.2 PROJECT INFORMATION

A. Project Identification: Susquehanna Court and Franklin Terrace Remediations for the Lancaster City Housing Authority

1. Project Location: Susquehanna Court, located at 315 Susquehanna Street, Lancaster, PA.
2. Project Location: Franklin Terrace, located at 630 Almanac Ave, Lancaster, PA.

B. Owner: Lancaster City Housing Authority, 325 Church Street, Lancaster, PA

1. Owner's Representative: Barbara J. Wilson, Executive Director.
2. Owner's Consultants: Owner has retained the following design professional who have prepared designated portions of the Contract Documents:
 - a. Johnson Controls (JCI)

C. Architect: Hammel Associates Architects, LLC, 25 East Grant Street, Suite 102, Lancaster, PA 17602.

D. MEP Engineer: Moore Engineering Company, 3637 Columbia Avenue, Lancaster, PA 17603.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and consists of the following:

1. Base Bid: The work includes, but is not limited to demolition of existing gypsum board/ plasterboard wall finishes and wall cavity batt insulation, demolition of existing gypsum board/ plasterboard ceilings and above ceiling batt insulation, demolition of existing floor finishes and subfloor, demolition of existing bathroom window, demolition of existing bathroom plumbing fixtures/ accessories/ light fixtures and exhaust fans, demolition of gas furnaces and hot water heaters, demolition of existing kitchen base cabinets/wall cabinets/ countertops/ backsplash and undercabinet lighting, demolition of existing kitchen sink, removal and reinstallation of kitchen appliances, installation of new gypsum board wall finishes and wall cavity batt insulation, installation of new gypsum board ceiling finish and above ceiling batt insulation, installation of new subfloor and floor finishes, installation of new bathroom plumbing fixtures/ accessories/ lighting fixtures and exhaust fans, installation of new bathroom window, installation of new kitchen base cabinets/ wall cabinets/ countertops/ backsplash and undercabinet lighting.
2. Electrical Contract Add Alternate #1: This work includes, but is not limited to all work outlined in the Base Bid, demolition of existing electrical panels/ breakers and service feed. Installation of new electrical panels/ breakers and service feed from meter.

B. Type of Contract:

1. Project will be constructed under Multiple Prime Contracts, including the following:
 - a. General Construction Contract
 - b. Mechanical Construction Contract
 - c. Electrical Construction Contract
 - d. Plumbing Construction Contract

1.4 PROJECT SCHEDULE AND COORDINATION WITH OWNER

A. The project Schedule is as follows:

1. Anticipated Award of Contract: early February 2025
2. Anticipated Date of Notice-to-Proceed: mid February, 2025
3. Contract Duration from Notice-to- Proceed To Substantial Completion: 240 Calendar Days
4. Contract Duration from Substantial Completion to Final Completion: 10 Calendar Days

B. The intent for schedule and progress of work is as follows:

1. All work must be substantially complete within 240 days of the issuance of the Notice to Proceed.

C. The following limitations for duration of work Contractors to follow are as follows:

1. Roughly 8 units shall be remediated and renovated at a given time.
2. Prior to commencement of work, the Contractor shall confirm with Owner and Architect which units to begin with
3. Demolition and construction duration for each group of 8 units shall be 14 working days.
4. Prior to commencement of work, the Contractor is to submit a construction schedule in accordance with section 013200 for the proposed sequence of work. Contractor is required to provide adequate resources, including but not limited to additional manpower, overtime work, second shift work and weekend work, as needed to meet approved schedule at no additional cost to the Owner.

1.5 CONTRACTOR'S USE OF SITE AND PREMISES

- A. Restricted Use of Site: Contractor shall have limited use of Project site for construction operations as indicated on Drawings and as indicated by requirements of this Section.
- B. Limits on Use of Site: Limit use of Project site to Work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
 - 1. Driveways, Walkways, and Entrances: Keep driveways, parking areas, loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or for storage of materials.
- C. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.
- D. Condition of Existing Grounds: Maintain portions of existing grounds, landscaping, and hardscaping affected by construction operations throughout construction period. Repair damage caused by construction operations.

1.6 COORDINATION WITH OCCUPANTS

- A. Full Owner Occupancy: Owner will occupy site during entire construction period. Occupants of existing individual units undergoing remediations will be displaced during construction period of individual units. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's day-to-day operations. Maintain existing exits unless otherwise indicated.
- B. The owner will coordinate issues concerning occupied units including tenant notification, and relocation of stored items as required to allow the contractor to perform contracted work. The contractor will provide written notification to the respective building manager (5) five working days in advance of the scheduled date of work to be performed, or 14 days in advance of any utility shutdown. No contractor will proceed with work until written notification to proceed is received from Owner.

1.7 WORK RESTRICTIONS

- A. Comply with restrictions on construction operations.
 - 1. Comply with limitations on use of public streets, work on public streets, rights of way, and other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: Limit work in the existing building to normal business working hours of 8:00 a.m. to 4:30 p.m., Monday through Friday, unless otherwise indicated. No work may be completed in occupied units before 9:00 a.m.
- C. No onsite work is permitted on federal holidays, when the Owner is closed for business.

- D. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
 - 1. Notify Owner not less than fourteen days in advance of proposed utility interruptions.
 - 2. Obtain Owner's written permission before proceeding with utility interruptions.
- E. Noise, Vibration, Dust, and Odors: Coordinate operations that may result in high levels of noise and vibration, dust, odors, or other disruption to Owner occupancy with Owner.
 - 1. Notify Owner not less than two days in advance of proposed disruptive operations.
 - 2. Obtain Owner's written permission before proceeding with disruptive operations.
- F. Smoking and Controlled Substance Restrictions: Use of tobacco products, alcoholic beverages, and other controlled substances on Owner's property is not permitted.
- G. Employee Identification: Provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.

1.8 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - 1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
 - 2. Text Color: Text used in the Specifications, including units of measure, manufacturer and product names, and other text may appear in multiple colors or underlined as part of a hyperlink; no emphasis is implied by text with these characteristics.
 - 3. Hypertext: Text used in the Specifications may contain hyperlinks. Hyperlinks may allow for access to linked information that is not residing in the Specifications. Unless otherwise indicated, linked information is not part of the Contract Documents.
 - 4. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 00 Contracting Requirements: General provisions of the Contract, including General and Supplementary Conditions, apply to all Sections of the Specifications.
- C. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

SECTION 011200 - MULTIPLE CONTRACT SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes a summary of each contract, including responsibilities for coordination and temporary facilities and controls.
- B. Specific requirements for Work of each contract are also indicated in individual Specification Sections and on Drawings.
- C. Related Requirements:
 - 1. Section 011000 "Summary" for the Work covered by the Contract Documents, restrictions on use of Project site, coordination with occupants, and work restrictions.
 - 2. Section 013100 "Project Management and Coordination" for general coordination requirements.

1.3 DEFINITIONS (Not Used)

1.4 PROJECT COORDINATOR

- A. Project coordinator shall be responsible for coordination between the General Construction Contract, Plumbing Contract, HVAC Contract and Electrical Contract.
 - 1. The General Construction Contract is responsible for project coordinator.
- B. Mechanical/electrical coordinator, who shall be under the direction of Project coordinator, shall be responsible for coordination between the Plumbing Contract, HVAC Contract and Electrical Contract.
 - 1. HVAC Contractor shall act as mechanical/electrical/plumbing coordinator.

1.5 PROJECT COORDINATOR RESPONSIBILITIES

- A. Project coordinator shall perform Project coordination activities for the multiple contracts, including, but not limited to, the following:

1. Conduct bi-weekly job progress meetings between the Owner, Architect and all Prime Contractors, as well as prepare and distribute meeting minutes, 3 week look ahead construction schedules as well as maintain overall project schedule.
 2. Provide typical overall coordination of the Work.
 3. Coordinate shared access to workspaces.
 4. Provide overall coordination of temporary facilities and controls.
 5. Coordinate, schedule, and approve interruptions of permanent and temporary utilities, including those necessary to make connections for temporary services.
 6. Coordinate construction and operations of the Work with work performed by each Contract.
 7. Coordinate sequencing and scheduling of the Work. Include the following:
 - a. Initial Coordination Meeting: At earliest possible date, arrange and conduct a meeting with contractors for sequencing and coordinating the Work; negotiate reasonable adjustments to schedules.
 - b. Prepare combined Contractors' Construction Schedule for entire Project. Base schedule on preliminary construction schedule. Secure time commitments for performing critical construction activities from contractors. Show activities of each contract on a separate sheet. Prepare a simplified summary sheet indicating combined construction activities of contracts.
 - 1) Submit schedules for approval.
 - 2) Distribute copies of approved schedules to contractors.
 8. Coordinate progress cleaning of areas or pieces of equipment where more than one contractor has worked.
 9. Coordinate protection of the Work.
 10. Coordinate completion of interrelated punch list items.
 11. Coordinate preparation of Project Record Documents if information from more than one contractor is to be integrated with information from other contractors to form one combined record.
 12. Collect record Specification Sections from contractors, collate Sections into numeric order, and submit complete set.
 13. Coordinate preparation of operation and maintenance manuals if information from more than one contractor is to be integrated with information from other contractors to form one combined record.
- B. Mechanical/Electrical Coordinator: Coordination activities of mechanical/electrical coordinator include, but are not limited to, the following:
1. Coordinate the preparation and resolution of coordination drawings.
 2. Schedule and sequence mechanical, electrical and plumbing activities.
 3. Coordinate sharing access to workspaces by mechanical, electrical and plumbing contractors.
 4. Coordinate integration of mechanical, electrical and plumbing work into limited spaces.
 5. Coordinate protection of mechanical, electrical and plumbing contractors' work.
 6. Prepare mechanical, electrical and plumbing coordination drawings.
 7. Coordinate required tests and inspections for mechanical, electrical and plumbing work.
 8. Coordinate mechanical and electrical temporary services and facilities.

1.6 GENERAL REQUIREMENTS OF CONTRACTS

- A. Extent of Contract: Unless the Agreement contains a more specific description of the Work of each Contract, requirements indicated on Drawings and in Specification Sections determine which contract includes a specific element of Project.
1. Unless otherwise indicated, the work described in this Section for each contract shall be complete systems and assemblies, including products, components, accessories, and installation required by the Contract Documents.
 2. Each contractor is responsible to obtain and pay for all required permits and plan review fees for its own work.
 3. Furnishing of access panels for the work of each contract shall be the work of each contract for its own work. Installation of access panels shall be the work of each contract for its own work. All access panels must be provided by the same manufacturer,
 4. Interior equipment pads for the work of each contract shall be the work of each contract for its own work.
 5. Painting for the work of each contract shall be the work of each contract for its own work.
 6. Coordinate product selections for compatibility shall be the work of each contract for its own work.
 7. Provide photographic documentation of existing conditions shall be the work of each contract for its own work.
 8. Providing storage and office trailers for each contractor shall be the work of each contractor, including connection and disconnection of utilities.
 9. Provide quality-assurance and quality-control services specified in Section 014000 "Quality Requirements" shall be the work of each contract for its own work.
 10. Coordinate sequence of activities to accommodate tests and inspections, and coordinate schedule of tests and inspections shall be the work of each contract for its own work.
 11. Provide information necessary to adjust, move, or relocate existing utility structures affected by construction shall be the work of each contract for its own work.
 12. Prepare coordination drawings in collaboration with each contractor to coordinate work by more than one contract shall be the work of each contract for its own work.
 13. Contractors' Startup Construction Schedule: Within five working days after startup horizontal bar-chart-type construction schedule submittal has been received from Project coordinator, submit a matching startup horizontal bar-chart schedule showing construction operations sequenced and coordinated with overall construction.
- B. Substitutions: Each contractor shall cooperate with other contractors involved to coordinate approved substitutions with remainder of the work.
1. Project coordinator shall coordinate substitutions.
- C. Temporary Facilities and Controls: In addition to specific responsibilities for temporary facilities and controls indicated in this Section and in Section 015000 "Temporary Facilities and Controls," each contractor is responsible for the following:
1. Installation, operation, maintenance, and removal of each temporary facility necessary for its own normal construction activity, and costs and use charges associated with each facility, except as otherwise provided for in this Section.
 2. Plug-in electric power cords and extension cords, supplementary plug-in task lighting, and special lighting necessary exclusively for its own activities.

3. Its own storage and fabrication sheds.
4. Temporary enclosures for its own construction activities.
5. General hoisting facilities for its own construction activities, up to 2 tons (2000 kg).
6. Progress cleaning of work areas affected by its operations on a daily basis.
7. Secure lockup of its own tools, materials, and equipment.
8. Construction aids and miscellaneous services and facilities necessary exclusively for its own construction activities.

1.7 GENERAL CONSTRUCTION CONTRACT

A. Work of the General Construction Contract includes, but is not limited to, the following:

1. Remaining work not identified as work under other contracts.
2. Remediation of mold at affected Utility Rooms and Bathrooms.
3. Selective demolition at affected Utility Rooms and Bathroom including gypsum board/ plaster board walls and ceilings, wall cavity and above ceiling batt insulation, floor finish and subfloor at bathrooms, bathroom windows, bathroom accessories, wood door trim at interior side of bathrooms.
4. Selective demolition of rooms (kitchens, storage areas, linen closets, bedrooms, bedroom closets and halls) with walls adjacent to affected Utility Rooms and Bathrooms, including gypsum board/ plaster board walls, casework and countertops, floor finishes. Adjacent rooms vary per unit type.
5. Interior construction, including subflooring and batt insulation.
6. Interior finishes finish carpentry, wall, floor, base and ceiling finishes.
7. Window replacement.
8. Wood casework, countertops and backsplash.
9. Interior painting.

B. Temporary facilities and controls in the General Construction Contract include, but are not limited to, the following:

1. Temporary facilities and controls that are not otherwise specifically assigned to the Plumbing Contract, HVAC Contract and Electrical Contract.
2. General waste disposal facilities, including collection and legal disposal of hazardous, dangerous, unsanitary, or other harmful waste materials for all prime contracts.
3. Temporary signs.
4. Protection of interior rooms and stairs used by all prime contractors during remediations and renovations.
5. Environmental protection.
6. Maintenance and restoration of Owner's existing facilities used as temporary facilities.
7. Perform all work assigned in accordance with OSHA regulations.
8. Coordinating, verifying and providing documentation of background checks for all employees and subcontractors working on the jobsite.

1.8 PLUMBING CONTRACT

A. Work of the Plumbing Contract includes, but is not limited to, the following:

1. Temporary shut-off of plumbing supply lines, including water heaters, domestic water lines and gas piping.
2. Plumbing fixtures material and equipment.
3. Domestic water distribution.
4. Removal of hot water heater system.
5. Plumbing connections to equipment furnished by the General Construction Contract, Plumbing Contract, Mechanical Contract and Electrical Contract.

B. Temporary facilities and controls in the Plumbing Contract include, but are not limited to, the following:

1. Piped gas service.
2. Piped water service.
3. Perform all work assigned in accordance with OSHA regulations.
4. Coordinating, verifying and providing documentation of background checks for all employees and subcontractors working on the jobsite.

1.9 MECHANICAL CONTRACT

A. Work of the Mechanical Contract includes, but is not limited to, the following:

1. Removal of air handler units in Utility Rooms.
2. HVAC ductwork cleaning.
3. Radiant heating equipment.
4. Exhaust fans at restrooms.
5. Removal and reinstallation of existing kitchen exhaust hoods.
6. Mechanical connections to existing and new equipment furnished by the General Construction Contract, Plumbing Contract, HVAC Contract and Electrical Contract.

B. Temporary facilities and controls in the Mechanical Contract include, but are not limited to, the following:

1. Perform all work assigned in accordance with OSHA regulations.
2. Coordinating, verifying and providing documentation of background checks for all employees and subcontractors working on the jobsite

1.10 ELECTRICAL CONTRACT

A. Base Bid: Work of the Electrical Contract includes, but is not limited to, the following:

1. Interior lighting, including restroom vanity lights and under cabinet light fixtures.
2. Lighting and exhaust fan controls at restrooms.
3. Electrical connections to equipment furnished by the General Construction Contract, Plumbing Contract, HVAC Contract and Electrical Contract.

B. Electrical Contract Add Alternate #1: Work of the Electrical Contract Add Alternate #1 includes, but is not limited to, the following:

1. All work described in the Electrical Contract Base Bid.

2. Demolition of existing electrical panels, breakers and feed to service meter at Utility Rooms.
 3. Installation of new electrical panels, breakers and feed to service meter at Utility Rooms.
- C. Temporary facilities and controls in the Electrical Contract include, but are not limited to, the following:
1. Electric power service and distribution.
 2. Electrical connections to existing systems and controls furnished by the General Construction Contract, Plumbing Contract, HVAC Contract and Electrical Contract.
 3. Perform all work assigned in accordance with OSHA regulations.
 4. Coordinating, verifying and providing documentation of background checks for all employees and subcontractors working on the jobsite.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011200

SECTION 012100 - ALLOWANCES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements governing allowances.
- B. Types of allowances include the following:
 - 1. Lump-sum allowances.
 - 2. Unit-cost allowances.
 - 3. Quantity allowances.
 - 4. Contingency allowances.
- C. Related Requirements:
 - 1. Section 012200 "Unit Prices" for procedures for using unit prices, including adjustment of quantity allowances when applicable.

1.2 SELECTION AND PURCHASE

- A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection, or purchase and delivery, of each product or system described by an allowance must be completed by the Owner to avoid delaying the Work.
- B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
- C. Purchase products and systems selected by Architect from the designated supplier.

1.3 ACTION SUBMITTALS

- A. Submit proposals for purchase of products or systems included in allowances in the form specified for Change Orders.

1.4 INFORMATIONAL SUBMITTALS

- A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.
- B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.
- C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.5 LUMP-SUM ALLOWANCES

- A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include taxes, freight, and delivery to Project site.
- B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by Owner or selected by Architect under allowance shall be included as part of the Contract Sum and not part of the allowance.

1.6 UNIT-COST ALLOWANCES

- A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include taxes, freight, and delivery to Project site.
- B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by Owner or selected by Architect under allowance shall be included as part of the Contract Sum and not part of the allowance.

1.7 QUANTITY ALLOWANCES

- A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include taxes, freight, and delivery to Project site.
- B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by Owner or selected by Architect under allowance shall be included as part of the Contract Sum and not part of the allowance.

1.8 ADJUSTMENT OF ALLOWANCES

- A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.
 - 1. Include installation costs in purchase amount only where indicated as part of the allowance.
 - 2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other markups.
 - 3. Submit substantiation of a change in scope of Work, if any, claimed in Change Orders related to unit-cost allowances.
 - 4. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.

- B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or Contractor's handling, labor, installation, overhead, and profit.
 - 1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of Work has changed from what could have been foreseen from information in the Contract Documents.
 - 2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

- A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

- A. GENERAL CONSTRUCTION Allowance No. GC-01: Lump-Sum Allowance: Include the sum of \$5,000.00 for replacement of deteriorated 2x4 wood wall studs and 2x10 wood floor joists in bathrooms undergoing remediations.
 - 1. This allowance includes material, receiving, handling, and installation costs, and Contractor overhead and profit.

END OF SECTION 012100

SECTION 012200 - UNIT PRICES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for unit prices.
- B. Related Requirements:
 - 1. Section 012100 "Allowances" for procedures for using unit prices to adjust quantity allowances.

1.2 DEFINITIONS

- A. Unit price is an amount incorporated into the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

1.3 PROCEDURES

- A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.
- B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.
- C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.
- D. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICES

- A. Unit Price No. GC-01: Replacement of deteriorated wood wall studs.

1. Description: Removal and replacement of deteriorated 2x4 wood wall studs, including removal, disposal, provision and installation of new 2x4 wood wall studs.
 2. Unit of Measurement: Per linear foot of 2x4 studs.
 3. Quantity Allowance: Coordinate unit price with allowance adjustment requirements in Section 012100 "Allowances."
- B. Unit Price No. GC-02: Replacement of deteriorated wood floor joists.
1. Description: Removal and replacement of deteriorated 2x10 wood floor joists, including removal, disposal, preparation of substrate, provision and installation of new 2x10 floor joists.
 2. Unit of Measurement: Per linear foot of 2x10 joists.
 3. Quantity Allowance: Coordinate unit price with allowance adjustment requirements in Section 012100 "Allowances."
- C. Unit Price No. EC-1: Tamper Resistant GFCI Duplex Receptacle & Wiring:
1. Description: Provide a tamper resistant GFCI type duplex receptacle assembly. Include 20A, 120V GFCI duplex receptacle, backbox, cover plate, 3/4" conduit/raceway with 2 #12 conductors and 1 #12 ground wire to a point of authorized connection, necessary wall penetration cutting and patching, terminations and labeling. Perform in accordance with the applicable Division 26 Sections and drawing requirements for similar work.
 2. Unit of Measurement: Per assembly
 3. Maximum Distance: 30'
 4. Quantity Allowance: Include 5 assemblies
- D. Unit Price No. EC-2: Tamper Resistant Combination AFCI/GFCI Duplex Receptacle & Wiring:
1. Description: Provide a tamper resistant combination AFCI/GFCI type duplex receptacle assembly. Include 20A, 120V GFCI duplex receptacle, backbox, cover plate, 3/4" conduit/raceway with 2 #12 conductors and 1 #12 ground wire to a point of authorized connection, necessary wall penetration cutting and patching, terminations and labeling. Perform in accordance with the applicable Division 26 Sections and drawing requirements for similar work.
 2. Unit of Measurement: Per assembly
 3. Maximum Distance: 30'
 4. Quantity Allowance: Include 5 assemblies
- E. Unit Price No. EC-3: Light Fixture & Wiring:
1. Description: Provide an additional light assembly, consisting of luminaire type SW1, appropriate mounting equipment, 3/4" conduit with 2 #12 conductors and 1 #12 ground wire to a point of authorized connection, necessary wall penetration cutting and patching, terminations and connections. Perform in accordance with the applicable Division 26 Sections and drawing requirements for similar work.
 2. Unit of Measurement: Per assembly
 3. Maximum Distance: 30'
 4. Quantity Allowance: Include 5 assemblies
- F. Unit Price No. EC-4: Light Fixture & Wiring:
1. Description: Provide an additional light assembly, consisting of luminaire type SC1, appropriate mounting equipment, 3/4" conduit with 2 #12 conductors and 1 #12 ground wire to a point of authorized connection, necessary wall penetration cutting and patching,

- terminations and connections. Perform in accordance with the applicable Division 26 Sections and drawing requirements for similar work.
2. Unit of Measurement: Per assembly
 3. Maximum Distance: 30'
 4. Quantity Allowance: Include 5 assemblies
- G. Unit Price No. EC-5: Light Fixture & Wiring:
1. Description: Provide an additional light assembly, consisting of luminaire type UC1, appropriate mounting equipment, 3/4" conduit with 2 #12 conductors and 1 #12 ground wire to a point of authorized connection, necessary wall penetration cutting and patching, terminations and connections. Perform in accordance with the applicable Division 26 Sections and drawing requirements for similar work.
 2. Unit of Measurement: Per assembly
 3. Maximum Distance: 30'
 4. Quantity Allowance: Include 5 assemblies
- H. Unit Price No. EC-6: Humidity Sensor Switch & Wiring:
1. Description: Provide an additional humidity sensor switch assembly, combination fan control and light fixture control, appropriate mounting equipment, backbox, cover plate, wire and conduit, necessary wall penetration cutting and patching, terminations and connections. Perform in accordance with the applicable Division 26 Sections and drawing requirements for similar work.
 2. Unit of Measurement: Per assembly
 3. Maximum Distance: 30'
 4. Quantity Allowance: Include 5 assemblies
- I. **Add Alternate No. 1** - Unit Price No. EC-7: Service Entrance Cable:
1. Description: Provide additional Service Entrance Cable assembly consisting of 3#1/0 + #6 Ground CU from meter base to load center, necessary wall penetration cutting and patching, terminations and labeling. Perform in accordance with the applicable Division 26 Sections and drawing requirements for similar work.
 2. Unit of Measurement: Per assembly
 3. Maximum Distance: 100'
 4. Quantity Allowance: Include 5 assemblies

END OF SECTION 012200

SECTION 012300 - ALTERNATES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for alternates.

1.2 DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if the Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
 - 2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternates into the Work. No other adjustments are made to the Contract Sum.

1.3 PROCEDURES

- A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
 - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Execute accepted alternates under the same conditions as other work of the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

- A. See Schedule of Alternates on drawing CS1.1

END OF SECTION 012300

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS:

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Requirements:
 - 1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Specification Sections, apply to this section.

1.3 DEFINITIONS

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

1.4 ACTION SUBMITTALS

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.

- b. Coordination information that will be necessary to accommodate proposed substitution, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. Certificates and qualification data, where applicable or requested.
 - g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - h. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
 - i. Cost information, including a proposal of change, if any, in the Contract Sum.
 - j. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
 - k. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
- a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
 - b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

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

1.6 PROCEDURES

- A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

- A. Any and all proposed substitutions of materials or methods of execution must be approved by the Architect prior to submission of the Bid.
- B. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
 - 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - b. Substitution request is fully documented and properly submitted.
 - c. Requested substitution will not adversely affect Contractor's construction schedule.
 - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - e. Requested substitution is compatible with other portions of the Work.
 - f. Requested substitution has been coordinated with other portions of the Work.
 - g. Requested substitution provides specified warranty.
 - h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- C. Substitutions for Convenience:
 - 1. Not allowed unless proposed substitution meets all conditions outlined in this Section below.
 - 2. Architect will consider requests for substitution if received during the bid period only. Requests received after that time may be considered or rejected at discretion of Architect.
 - 3. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner

must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.

- b. Requested substitution does not require extensive revisions to the Contract Documents.
- c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
- d. Substitution request is fully documented and properly submitted.
- e. Requested substitution will not adversely affect Contractor's construction schedule.
- f. Requested substitution has received necessary approvals of authorities having jurisdiction.
- g. Requested substitution is compatible with other portions of the Work.
- h. Requested substitution has been coordinated with other portions of the Work.
- i. Requested substitution provides specified warranty.
- j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

Substitution Submittal Request Form

Contractor:	
Date:	
Substitution Request No:	

Reason for Request:	
<input type="checkbox"/> CAUSE – submitted 15 days prior to related submittals	<input type="checkbox"/> CONVENIENCE – submitted within 60 days after commencement of work
Reason for not providing specified item:	

Specification Title:	
Description:	
Section:	
Page:	
Article/Paragraph:	
Drawing No/Titles:	

Proposed Substitution:	
Manufacturer:	
Trade Name:	
Model No.:	
Warranty:	
Installer:	
Differences between proposed substitution and specified product:	
Proposed substitution affects other parts of Work:	<input type="checkbox"/> No <input type="checkbox"/> Yes, explain:

<input type="checkbox"/> Point-by-point Comparative Data attached – REQUIRED Include chart providing line by line comparison of key product attributes. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements.	
--	--

Cost Savings to Owner:	\$
Changes to Contract Time:	<input type="checkbox"/> No <input type="checkbox"/> Yes [Add] [Deduct] _____ days

Supporting Documents Attached:	<input type="checkbox"/> Coordination Information (including list of changes/revisions to other work) <input type="checkbox"/> Product Data <input type="checkbox"/> Drawings <input type="checkbox"/> Samples <input type="checkbox"/> Tests <input type="checkbox"/> Reports <input type="checkbox"/> Certificates <input type="checkbox"/> _____
---------------------------------------	--

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, are available.
- Proposed substitution will have no adverse effect on other trades.
- Proposed substitution does not affect dimensions and functional clearances.
- No additional costs will be incurred for changes to building design, including A/MEP design, detailing, and construction costs caused by the substitution.

Submitted by: _____

Signature: _____ Date: _____

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS:

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.

1.3 MINOR CHANGES IN THE WORK

- A. Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on the Architect's standard form: "Architect's Supplemental Instructions."

1.4 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
 - 2. Within time specified in Proposal Request or 10 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include costs of labor and supervision directly attributable to the change.
 - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times,

and activity relationship. Use available total float before requesting an extension of the Contract Time.

e. Quotation Form: Use Contractor’s standard forms acceptable to Architect.

B. Contractor-Initiated Proposal Requests: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Division 01 Section "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
7. Work Change Proposal Request Form: Use Contractor’s standard form acceptable to Architect.

1.5 ADMINISTRATIVE CHANGE ORDERS

- A. Allowance Adjustment: See Division 01 Section "Allowances" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect actual costs of allowances.
- B. Unit-Price Adjustment: See Division 01 Section "Unit Prices" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit-price work.

1.6 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Work Changes Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701.

1.7 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714 Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS:

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.3 RELATED DOCUMENTS

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

1.4 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
 - 1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with continuation sheets.
 - b. Submittal schedule.
 - c. Items required to be indicated as separate activities in Contractor's construction schedule.
 - 2. Submit the schedule of values to Architect at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
 - 3. Sub-schedules for Phased Work: Where the Work is separated into phases requiring separately-phased payments, provide sub-schedules showing values coordinated with each phase of payment.
- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
 - 1. Identification: Include the following Project identification on the schedule of values:

- a. Project name and location.
 - b. Name of Architect.
 - c. Architect's project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
2. Arrange schedule of values consistent with format of the HUD Form-51000, Schedule of Amounts for Contract Payments.
 3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
 4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
 5. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 6. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
 7. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
 8. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.
 9. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Each Application for Payment shall be separated out in two separate Applications for Payments between the project Base Bid and the EC-1 Add Alternate if the EC-1 Add Alternate is approved.

- C. Payment Application Times: Submit Application for Payment to Architect by the 25th of the month. The period covered by each Application for Payment is one month, ending on the last day of the month.
- D. Application for Payment Forms: Use form HUD-51001 as form for Applications for Payment.
- E. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
 - 1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
 - 2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
 - 3. Certified Payroll Forms must be submitted with each Application for Payment.
- F. Transmittal: Submit four signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.
 - 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
 - 1. List of subcontractors.
 - 2. Schedule of values.
 - 3. Contractor's construction schedule (preliminary if not final).
 - 4. Schedule of unit prices.
 - 5. Submittal schedule (preliminary if not final).
 - 6. List of Contractor's staff assignments.
 - 7. List of Contractor's principal consultants.
 - 8. Copies of building permits.
 - 9. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 - 10. Initial progress report.
 - 11. Report of preconstruction conference.
 - 12. Certificates of insurance and insurance policies.
- H. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- I. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 3. Updated final statement, accounting for final changes to the Contract Sum.
 4. AIA Document G706-1994, "Contractor's Affidavit of Payment of Debts and Claims."
 5. AIA Document G706A-1994, "Contractor's Affidavit of Release of Liens."
 6. AIA Document G707-1994, "Consent of Surety to Final Payment."
 7. Evidence that claims have been settled.
 8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
 9. Final liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS:

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

1.2 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 1. General Project coordination procedures
 2. Administrative and supervisory personnel
 3. Coordination drawings
 4. Requests for Information (RFIs).
 5. Project meetings.

1.3 DEFINITIONS

- A. RFI: Request from Owner, Architect or Contractor seeking information from each other during construction.

1.4 COORDINATION

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.
 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Coordination: Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each

contractor shall coordinate its own operations with operations included in different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 2. Coordinate installation of different components with other contractors to ensure maximum performance and accessibility for required maintenance, service, and repair.
 3. Make adequate provisions to accommodate items scheduled for later installation.
- C. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- D. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
1. Preparation of Contractor's construction schedule.
 2. Preparation of the schedule of values.
 3. Installation and removal of temporary facilities and controls.
 4. Delivery and processing of submittals.
 5. Progress meetings.
 6. Preinstallation conferences.
 7. Project closeout activities.
 8. Startup and adjustment of systems.
 9. Project closeout activities.
- E. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. Refer to other Sections for disposition of salvaged materials that are designated as Owner's property.

1.5 KEY PERSONNEL

- A. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and phone numbers, including home, office and cellular telephone numbers and email addresses. Provide names, addresses and

telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project..

1. Post copies of list in project meeting room, in temporary field office and by each temporary telephone. Keep list current at all times.

1.6 REQUESTS FOR INFORMATION (RFIs)

A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.

1. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.
2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:

1. Project name.
2. Project number.
3. Date.
4. Name of Contractor.
5. Name of Architect.
6. RFI number, numbered sequentially, by Prime Contract (eg: RFI GC-1).
7. RFI subject.
8. Specification Section number and title and related paragraphs, as appropriate.
9. Drawing number and detail references, as appropriate.
10. Field dimensions and conditions, as appropriate.
11. Contractor's suggested resolution. If Contractor's solution(s) impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
12. Contractor's signature.
13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

C. RFI Forms: To be submitted on Contractor’s standard form.

D. Architect's Action: Architect and Contractor will review each RFI, determine action required, and respond. Allow ten working days for Architect's and Contractor response for each RFI. RFIs received by Architect and Contractor after 1:00 p.m. will be considered as received the following working day.

1. The following RFIs will be returned without action:
 - a. Requests for approval of submittals.

- b. Requests for approval of substitutions.
 - c. Requests for coordination information already indicated in the Contract Documents.
 - d. Requests for adjustments in the Contract Time or the Contract Sum.
 - e. Requests for interpretation of Architect's actions on submittals.
 - f. Incomplete RFIs or inaccurately prepared RFIs.
2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.
 3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 01 Section "Contract Modification Procedures."
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Engineer in writing within 10 working days of receipt of the RFI response.
- E. On receipt of Engineer's and Contractor's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Engineer within seven days if Contractor disagrees with response.
- F. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly.
1. Project name.
 2. Name and address of Contractor.
 3. Name and address of Engineer.
 4. RFI number including RFIs that were dropped and not submitted.
 5. RFI description.
 6. Date the RFI was submitted.
 7. Date Engineer's response was received.

1.7 PROJECT MEETINGS

- A. Preconstruction Conference: Project Coordinator will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.
1. Attendees: Authorized representatives of Owner, Architect, Project Coordinator and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Tentative construction schedule.
 - b. Critical work sequencing and long-lead items.

- c. Designation of key personnel and their duties.
 - d. Procedures for processing field decisions and Change Orders.
 - e. Procedures for RFIs.
 - f. Procedures for processing Applications for Payment.
 - g. Distribution of the Contract Documents.
 - h. Submittal procedures.
 - i. Preparation of record documents.
 - j. Use of the premises and existing building.
 - k. Work restrictions.
 - l. Working hours.
 - m. Owner's occupancy requirements.
 - n. Responsibility for temporary facilities and controls.
 - o. Procedures for disruptions and shutdowns.
 - p. Construction waste management and recycling.
 - q. Parking availability.
 - r. Office, work, and storage areas.
 - s. Equipment deliveries and priorities.
 - t. Progress cleaning.
3. Minutes: Contractor will record and distribute meeting minutes.
- B. Progress Meetings: Contractor will conduct progress meetings at biweekly intervals.
1. Attendees: In addition to representatives of Owner and Engineer, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda and Minutes: Contractor will prepare agenda and record and distribute the meeting minutes to each party present and to parties requiring information.
- C. Coordination Meetings: Conduct Project coordination meetings at weekly intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.
1. Attendees: In addition to representatives of Owner, Contractor, and Engineer, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meetings shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

- a. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to combined Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - b. Schedule Updating: Revise combined Contractor's construction schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
 - c. Review present and future needs of each contractor present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Deliveries.
 - 5) Off-site fabrication.
 - 6) Access.
 - 7) Site use.
 - 8) Temporary facilities and controls.
 - 9) Work hours.
 - 10) Hazards and risks.
 - 11) Progress cleaning.
 - 12) Quality and work standards.
 - 13) Status of RFIs.
 - 14) Proposal Requests.
 - 15) Change Orders.
 - 16) Pending changes.
3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.
- D. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity when required by other sections and when required for coordination with other construction.
1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Engineer, Contractor of scheduled meeting dates.
 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. Contract Documents.
 - b. Options.
 - c. Related RFIs.

- d. Related Change Orders.
 - e. Purchases.
 - f. Deliveries.
 - g. Submittals.
 - h. Sustainable design requirements.
 - i. Review of mockups.
 - j. Possible conflicts.
 - k. Compatibility requirements.
 - l. Time schedules.
 - m. Weather limitations.
 - n. Manufacturer's written instructions.
 - o. Warranty requirements.
 - p. Compatibility of materials.
 - q. Acceptability of substrates.
 - r. Temporary facilities and controls.
 - s. Space and access limitations.
 - t. Regulations of authorities having jurisdiction.
 - u. Testing and inspecting requirements.
 - v. Installation procedures.
 - w. Coordination with other work.
 - x. Required performance results.
 - y. Protection of adjacent work.
 - z. Protection of construction and personnel.
3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
 4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

SECTION 013200 - CONSTRUCTION SCHEDULES

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS:

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Contractor's construction schedule.
 - 2. Daily construction reports.
 - 3. Site condition reports.

1.3 RELATED DOCUMENTS

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

1.4 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
 - 1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
 - 2. Predecessor Activity: An activity that precedes another activity in the network.
 - 3. Successor Activity: An activity that follows another activity in the network.
- B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.
- C. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

- D. Float: The measure of leeway in starting and completing an activity.

1.5 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
 - 1. Digital Submission.
- B. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
- C. CPM Reports: Concurrent with CPM schedule, submit each of the following reports. Format for each activity in reports shall contain activity number, activity description, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.
 - 1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
 - 2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
 - 3. Total Float Report: List of all activities sorted in ascending order of total float.
- D. Construction Schedule Updating Reports: Submit at monthly intervals.
- E. Daily Construction Reports: Submit at monthly intervals.
- F. Site Condition Reports: Submit at time of discovery of differing conditions.

1.6 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
- B. Coordinate Contractor's construction schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.
 - 1. Secure time commitments for performing critical elements of the Work from entities involved.
 - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Time Frame: Extend schedule from date established for the Notice to Proceed to date of final completion.
 - 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

- B. Activities: Treat each phase as a separate numbered activity for each main element of the Work. Comply with the following:
 - 1. Activity Duration: Define activities so no activity at individual units is longer than 14 days, unless specifically allowed by Architect.
 - 2. Procurement Activities: Include procurement process activities for the long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
 - 3. Submittal Review Time: Include review and resubmittal times indicated in Division 01 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
 - 4. Startup and Testing Time: Include no fewer than 15 days for startup and testing.
 - 5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.

- C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
 - 1. Phasing: Arrange list of activities on schedule by phase.
 - 2. Work under More Than One Contract: Include a separate activity for each contract.
 - 3. Work Restrictions: Show the effect of the following items on the schedule:
 - a. Coordination with existing construction.
 - b. Limitations of continued occupancies.
 - c. Uninterruptible services.
 - d. Partial occupancy before Substantial Completion.
 - e. Use of premises restrictions.
 - f. Seasonal variations.
 - g. Environmental control.

- D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion, and the following interim milestones:
 - 1. Completion dates of phased construction.
- E. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

- A. General: Prepare network diagrams using AON (activity-on-node) format.
- B. Startup Network Diagram: Submit diagram within 14 days of date established for the Notice to Proceed. Outline significant construction activities for the first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.
- C. CPM Schedule: Prepare Contractor's construction schedule using a time-scaled CPM network analysis diagram for the Work.
 - 1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 30 days after date established for the Notice to Proceed.
 - a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Architect's approval of the schedule.
 - 2. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
 - 3. Use "one workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule in order to coordinate with the Contract Time.
- D. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the startup network diagram, prepare a skeleton network to identify probable critical paths.
 - 1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
 - a. Preparation and processing of submittals.
 - b. Mobilization and demobilization.
 - c. Purchase of materials.
 - d. Delivery.

- e. Fabrication.
 - f. Utility interruptions.
 - g. Installation.
 - h. Testing.
 - i. Punch list and final completion.
 - j. Activities occurring following final completion.
2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
 3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
 4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
 - a. Sub-networks on separate sheets are permissible for activities clearly off the critical path.
- E. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall project schedule.
- F. Initial Issue of Schedule: Prepare initial network diagram from a sorted activity list indicating straight "early start-total float." Identify critical activities. Prepare tabulated reports showing the following:
1. Contractor or subcontractor and the Work or activity.
 2. Description of activity.
 3. Main events of activity.
 4. Immediate preceding and succeeding activities.
 5. Early and late start dates.
 6. Early and late finish dates.
 7. Activity duration in workdays.
 8. Total float or slack time.
- G. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:
1. Identification of activities that have changed.
 2. Changes in early and late start dates.
 3. Changes in early and late finish dates.
 4. Changes in activity durations in workdays.
 5. Changes in the critical path.
 6. Changes in total float or slack time.
 7. Changes in the Contract Time.

2.3 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
1. List of subcontractors at Project site.
 2. List of separate contractors at Project site.
 3. Approximate count of personnel at Project site.
 4. Equipment at Project site.
 5. Material deliveries.
 6. High and low temperatures and general weather conditions, including presence of rain or snow.
 7. Accidents.
 8. Meetings and significant decisions.
 9. Unusual events.
 10. Stoppages, delays, shortages, and losses.
 11. Meter readings and similar recordings.
 12. Emergency procedures.
 13. Orders and requests of authorities having jurisdiction.
 14. Change Orders received and implemented.
 15. Services connected and disconnected.
 16. Equipment or system tests and startups.
 17. Partial completions and occupancies.
 18. Substantial Completions authorized.
- B. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities.
1. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 2. As the Work progresses, indicate final completion percentage for each activity.
- B. Distribution: Distribute copies of approved schedule to Architect, Owner, separate contractors, and other parties identified by Contractor with a need-to-know schedule responsibility.
1. Post copies in Project meeting rooms and temporary field offices.

2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 013200

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS:

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

1.2 SUMMARY

- A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action.
- B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements.

1.4 ACTION SUBMITTALS

- A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or modifications to submittals noted by the Engineer and additional time for handling and reviewing submittals required by those corrections.

1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 - 2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

- B. Processing Time: Allow time for submittal review, including time for re-submittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including re-submittals.
1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 3. Re-submittal Review: Allow 15 days for review of each re-submittal.
- C. Identification and Information: Place a permanent label or title block on each paper copy submittal item for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
 2. Provide a space approximately 6 by 8 inches (150 by 200 mm) on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
 3. Include the following information for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Name of subcontractor.
 - f. Name of supplier.
 - g. Name of manufacturer.
 - h. Submittal number or other unique identifier, including revision identifier.
 - 1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 061000.01). Re-submittals shall include an alphabetic suffix after another decimal point (e.g., 061000.01.A).
 - i. Number and title of appropriate Specification Section.
 - j. Drawing number and detail references, as appropriate.
 - k. Other necessary identification.
- D. Transmittal: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will return submittals, without review, received from sources other than Contractor.
1. Transmittal Form: Use Contractor's standard form.
 2. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.
- E. Options: Identify options requiring selection by the Architect.

- F. Deviations: Identify deviations from the Contract Documents on submittals.
- G. Re-submittals: Make re-submittals in same form and number of copies as initial submittal.
 - 1. Note date and content of previous submittal.
 - 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
 - 3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.
- H. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- I. Use for Construction: Use only final submittals that are marked with approval notation from Architect's action stamp.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

- A. General Submittal Procedure Requirements:
 - 1. Action Submittals: Submit digital submittals to the Architect via email or other format as required by the Architect.
 - 2. Informational Submittals: Submit digital submittals of each submittal, unless otherwise indicated.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
 - 1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
 - 2. Mark each copy of each submittal to show which products and options are applicable.
 - 3. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Manufacturer's product specifications.
 - c. Standard color charts.
 - d. Statement of compliance with specified referenced standards.
 - e. Testing by recognized testing agency.
 - f. Application of testing agency labels and seals.
 - g. Notation of coordination requirements.
 - h. Availability and delivery time information.
 - 4. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams showing factory-installed wiring.
 - b. Printed performance curves.

- c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
 5. Submit Product Data before or concurrent with Samples.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
 1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Identification of products.
 - b. Schedules.
 - c. Compliance with specified standards.
 - d. Notation of coordination requirements.
 - e. Notation of dimensions established by field measurement.
 - f. Relationship and attachment to adjoining construction clearly indicated.
 - g. Seal and signature of professional engineer if specified.
 2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm) but no larger than 30 by 42 inches (750 by 1067 mm).
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
 1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 2. Identification: Attach label on unexposed side of Samples that includes the following:
 - a. Generic description of Sample.
 - b. Product name and name of manufacturer.
 - c. Sample source.
 - d. Number and title of applicable Specification Section.
 3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
 4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

- a. Number of Samples: Submit one (1) full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
- a. Number of Samples: Submit three (3) sets of Samples. Architect will retain two (2) Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a Project record sample.
 - 1) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three (3) sets of paired units that show approximate limits of variations.
- E. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
- F. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- G. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- H. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- I. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- J. Product Test Reports: Submit written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- K. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project.
- L. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

- M. Field Test Reports: Submit reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
- N. Maintenance Data: Comply with requirements specified in Division 01 Section "Operation and Maintenance Data."
- O. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

PART 3 -

3.1 CONTRACTOR'S REVIEW

- A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S ACTION

- A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.
- C. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- D. Incomplete submittals are not acceptable, will be considered nonresponsive, and will be returned without review.
- E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION 013300

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS:

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
 - 2. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner or authorities having jurisdiction are not limited by provisions of this Section.

1.3 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect.
- C. Mockups: Full-size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.

- D. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- E. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- F. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
 - 1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).
- G. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.4 CONFLICTING REQUIREMENTS

- A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for a decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.5 INFORMATIONAL SUBMITTALS

- A. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

1.6 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:

1. Date of issue.
 2. Project title and number.
 3. Name, address, and telephone number of testing agency.
 4. Dates and locations of samples and tests or inspections.
 5. Names of individuals making tests and inspections.
 6. Description of the Work and test and inspection method.
 7. Identification of product and Specification Section.
 8. Complete test or inspection data.
 9. Test and inspection results and an interpretation of test results.
 10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 12. Name and signature of laboratory inspector.
 13. Recommendations on retesting and reinspecting.
- B. Manufacturer's Field Reports: Prepare written information documenting tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of representative making report.
 2. Statement on condition of substrates and their acceptability for installation of product.
 3. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 4. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 5. Other required items indicated in individual Specification Sections.
- C. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.
- 1.7 QUALITY ASSURANCE
- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

- D. **Installer Qualifications:** A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. **Professional Engineer Qualifications:** A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.
- F. **Specialists:** Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
 - 1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.
- G. **Testing Agency Qualifications:** An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
 - 1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
 - 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- H. **Manufacturer's Representative Qualifications:** An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. **Preconstruction Testing:** Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
 - 1. Contractor responsibilities include the following:
 - a. Provide test specimens representative of proposed products and construction.
 - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - c. When testing is complete, remove test specimens, assemblies and mockups do not reuse products on Project.
 - 2. **Testing Agency Responsibilities:** Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

- J. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
 - 1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
 - 2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
 - 3. Demonstrate the proposed range of aesthetic effects and workmanship.
 - 4. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
 - a. Allow seven days for initial review and each re-review of each mockup.
 - 5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - 6. Demolish and remove mockups when directed unless otherwise indicated.

1.8 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
 - 1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
 - 2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
 - 3. Quality Control Services to be provided by the Owner:
 - a. Special Tests and Inspections, as indicated in the attached Form UCC-6
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
 - 1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
 - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
 - 2. Notify testing agencies at least 24 hours in advance, or as required by testing agency, of time when Work that requires testing or inspecting will be performed.
 - 3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 - 4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.

5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. **Manufacturer's Field Services:** Where indicated, engage a manufacturer's representative to observe and inspect the Work. Manufacturer's representative's services include examination of substrates and conditions, verification of materials, inspection of completed portions of the Work, and submittal of written reports.
- D. **Retesting/Reinspecting:** Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- E. **Testing Agency Responsibilities:** Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 6. Do not perform any duties of Contractor.
- F. **Associated Services:** Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 4. Facilities for storage and field curing of test samples.
 5. Delivery of samples to testing agencies.
 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 7. Security and protection for samples and for testing and inspecting equipment at Project site.
- G. **Coordination:** Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014000

SECTION 014200 - REFERENCES

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS:

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

1.2 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.
- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
 - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall be defined as indicated on drawing CS1.1 or shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."
- B. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
 - 1. AABC - Associated Air Balance Council; www.aabc.com.
 - 2. AAMA - American Architectural Manufacturers Association; www.aamanet.org.
 - 3. AAPFCO - Association of American Plant Food Control Officials; www.aapfco.org.
 - 4. AASHTO - American Association of State Highway and Transportation Officials; www.transportation.org.
 - 5. AATCC - American Association of Textile Chemists and Colorists; www.aatcc.org.
 - 6. ABMA - American Bearing Manufacturers Association; www.americanbearings.org.
 - 7. ABMA - American Boiler Manufacturers Association; www.abma.com.
 - 8. ACI - American Concrete Institute; (Formerly: ACI International); www.concrete.org
 - 9. ACPA - American Concrete Pipe Association; www.concrete-pipe.org.
 - 10. AEIC - Association of Edison Illuminating Companies, Inc. (The); www.aeic.org.
 - 11. AF&PA - American Forest & Paper Association; www.afandpa.org.
 - 12. AGA - American Gas Association; www.aga.org.
 - 13. AHAM - Association of Home Appliance Manufacturers; www.aham.org.
 - 14. AHRI - Air-Conditioning, Heating, and Refrigeration Institute (The); www.ahrinet.org.
 - 15. AI - Asphalt Institute; www.asphaltinstitute.org.
 - 16. AIA - American Institute of Architects (The); www.aia.org.
 - 17. AISC - American Institute of Steel Construction; www.aisc.org.
 - 18. AISI - American Iron and Steel Institute; www.steel.org.
 - 19. AITC - American Institute of Timber Construction; www.aitc-glulam.org.
 - 20. AMCA - Air Movement and Control Association International, Inc.; www.amca.org.
 - 21. ANSI - American National Standards Institute; www.ansi.org.
 - 22. AOSA - Association of Official Seed Analysts, Inc.; www.aosaseed.com.
 - 23. APA - APA - The Engineered Wood Association; www.apawood.org.
 - 24. APA - Architectural Precast Association; www.archprecast.org.
 - 25. API - American Petroleum Institute; www.api.org.
 - 26. ARI - Air-Conditioning & Refrigeration Institute; (See AHRI).

27. ARI - American Refrigeration Institute; (See AHRI).
28. ARMA - Asphalt Roofing Manufacturers Association; www.asphaltroofing.org.
29. ASCE - American Society of Civil Engineers; www.asce.org.
30. ASCE/SEI - American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
31. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers; www.ashrae.org.
32. ASME - ASME International; (American Society of Mechanical Engineers); www.asme.org.
33. ASSE - American Society of Safety Engineers (The); www.asse.org.
34. ASSE - American Society of Sanitary Engineering; www.asse-plumbing.org.
35. ASTM - ASTM International; www.astm.org.
36. ATIS - Alliance for Telecommunications Industry Solutions; www.atis.org.
37. AWEA - American Wind Energy Association; www.awea.org.
38. AWI - Architectural Woodwork Institute; www.awinet.org.
39. AWMAC - Architectural Woodwork Manufacturers Association of Canada; www.awmac.com.
40. AWPA - American Wood Protection Association; www.awpa.com.
41. AWS - American Welding Society; www.aws.org.
42. AWWA - American Water Works Association; www.awwa.org.
43. BHMA - Builders Hardware Manufacturers Association; www.buildershardware.com.
44. BIA - Brick Industry Association (The); www.gobrick.com.
45. BICSI - BICSI, Inc.; www.bicsi.org.
46. BIFMA - BIFMA International; (Business and Institutional Furniture Manufacturer's Association); www.bifma.org.
47. BISSC - Baking Industry Sanitation Standards Committee; www.bissc.org.
48. BWF - Badminton World Federation; (Formerly: International Badminton Federation); www.bissc.org.
49. CDA - Copper Development Association; www.copper.org.
50. CE - Conformance Europeenne; <http://ec.europa.eu/growth/single-market/ce-marking/>
51. CEA - Canadian Electricity Association; www.electricity.ca.
52. CEA - Consumer Electronics Association; www.ce.org.
53. CFFA - Chemical Fabrics and Film Association, Inc.; www.chemicalfabricsandfilm.com.
54. CFSEI - Cold-Formed Steel Engineers Institute; www.cfsei.org.
55. CGA - Compressed Gas Association; www.cganet.com.
56. CIMA - Cellulose Insulation Manufacturers Association; www.cellulose.org.
57. CISCA - Ceilings & Interior Systems Construction Association; www.cisca.org.
58. CISPI - Cast Iron Soil Pipe Institute; www.cispi.org.
59. CLFMI - Chain Link Fence Manufacturers Institute; www.chainlinkinfo.org.
60. CPA - Composite Panel Association; www.pbmdf.com.
61. CRI - Carpet and Rug Institute (The); www.carpet-rug.org.
62. CRRC - Cool Roof Rating Council; www.coolroofs.org.
63. CRSI - Concrete Reinforcing Steel Institute; www.crsi.org.
64. CSA - Canadian Standards Association; www.csa.ca.
65. CSA - CSA International; (Formerly: IAS - International Approval Services); www.csa-international.org.
66. CSI - Construction Specifications Institute (The); www.csinet.org.
67. CSSB - Cedar Shake & Shingle Bureau; www.cedarbureau.org.
68. CTI - Cooling Technology Institute; (Formerly: Cooling Tower Institute); www.cti.org.
69. CWC - Composite Wood Council; (See CPA).
70. DASMA - Door and Access Systems Manufacturers Association; www.dasma.com.

71. DHI - Door and Hardware Institute; www.dhi.org.
72. ECA - Electronic Components Association; (See ECIA).
73. ECAMA - Electronic Components Assemblies & Materials Association; (See ECIA).
74. ECIA - Electronic Components Industry Association; www.eciaonline.org.
75. EIA - Electronic Industries Alliance; (See TIA).
76. EIMA - EIFS Industry Members Association; www.eima.com.
77. EJMA - Expansion Joint Manufacturers Association, Inc.; www.ejma.org.
78. ESD - ESD Association; (Electrostatic Discharge Association); www.esda.org.
79. ESTA - Entertainment Services and Technology Association; (See PLASA).
80. ETL - Intertek (See Intertek); www.intertek.com.
81. EVO - Efficiency Valuation Organization; www.evo-world.org.
82. FCI - Fluid Controls Institute; www.fluidcontrolsintstitute.org.
83. FIBA - Federation Internationale de Basketball; (The International Basketball Federation); www.fiba.com.
84. FIVB - Federation Internationale de Volleyball; (The International Volleyball Federation); www.fivb.org.
85. FM Approvals - FM Approvals LLC; www.fmglobal.com.
86. FM Global - FM Global; (Formerly: FMG - FM Global); www.fmglobal.com.
87. FRSA - Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc.; www.floridarroof.com.
88. FSA - Fluid Sealing Association; www.fluidsealing.com.
89. FSC - Forest Stewardship Council U.S.; www.fscus.org.
90. GA - Gypsum Association; www.gypsum.org.
91. GANA - Glass Association of North America; www.glasswebsite.com.
92. GS - Green Seal; www.greenseal.org.
93. HI - Hydraulic Institute; www.pumps.org.
94. HI/GAMA - Hydronics Institute/Gas Appliance Manufacturers Association; (See AHRI).
95. HMMA - Hollow Metal Manufacturers Association; (See NAAMM).
96. HPVA - Hardwood Plywood & Veneer Association; www.hpva.org.
97. HPW - H. P. White Laboratory, Inc.; www.hpwhite.com.
98. IAPSC - International Association of Professional Security Consultants; www.iapsc.org.
99. IAS - International Accreditation Service; www.iasonline.org.
100. IAS - International Approval Services; (See CSA).
101. ICBO - International Conference of Building Officials; (See ICC).
102. ICC - International Code Council; www.iccsafe.org.
103. ICEA - Insulated Cable Engineers Association, Inc.; www.icea.net.
104. ICPA - International Cast Polymer Alliance; www.icpa-hq.org.
105. ICRI - International Concrete Repair Institute, Inc.; www.icri.org.
106. IEC - International Electrotechnical Commission; www.iec.ch.
107. IEEE - Institute of Electrical and Electronics Engineers, Inc. (The); www.ieee.org.
108. IES - Illuminating Engineering Society; (Formerly: Illuminating Engineering Society of North America); www.ies.org.
109. IESNA - Illuminating Engineering Society of North America; (See IES).
110. IEST - Institute of Environmental Sciences and Technology; www.iest.org.
111. IGMA - Insulating Glass Manufacturers Alliance; www.igmaonline.org.
112. IGSHPA - International Ground Source Heat Pump Association; www.igshpa.okstate.edu.
113. ILI - Indiana Limestone Institute of America, Inc.; www.iliai.com.
114. Intertek - Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); www.intertek.com.

115. ISA - International Society of Automation (The); (Formerly: Instrumentation, Systems, and Automation Society); www.isa.org.
116. ISAS - Instrumentation, Systems, and Automation Society (The); (See ISA).
117. ISFA - International Surface Fabricators Association; (Formerly: International Solid Surface Fabricators Association); www.isfanow.org.
118. ISO - International Organization for Standardization; www.iso.org.
119. ISSFA - International Solid Surface Fabricators Association; (See ISFA).
120. ITU - International Telecommunication Union; www.itu.int/home.
121. KCMA - Kitchen Cabinet Manufacturers Association; www.kcma.org.
122. LMA - Laminating Materials Association; (See CPA).
123. LPI - Lightning Protection Institute; www.lightning.org.
124. MBMA - Metal Building Manufacturers Association; www.mbma.com.
125. MCA - Metal Construction Association; www.metalconstruction.org.
126. MFMA - Maple Flooring Manufacturers Association, Inc.; www.maplefloor.org.
127. MFMA - Metal Framing Manufacturers Association, Inc.; www.metalframingmfg.org.
128. MHIA - Material Handling Industry of America; www.mhia.org.
129. MIA - Marble Institute of America; www.marble-institute.com.
130. MMPA - Moulding & Millwork Producers Association; www.wmmpa.com.
131. MPI - Master Painters Institute; www.paintinfo.com.
132. MSS - Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; www.mss-hq.org.
133. NAAMM - National Association of Architectural Metal Manufacturers; www.naamm.org.
134. NACE - NACE International; (National Association of Corrosion Engineers International); www.nace.org.
135. NADCA - National Air Duct Cleaners Association; www.nadca.com.
136. NAIMA - North American Insulation Manufacturers Association; www.naima.org.
137. NBGQA - National Building Granite Quarries Association, Inc.; www.nbgqa.com.
138. NBI - New Buildings Institute; www.newbuildings.org.
139. NCAA - National Collegiate Athletic Association (The); www.ncaa.org.
140. NCMA - National Concrete Masonry Association; www.ncma.org.
141. NEBB - National Environmental Balancing Bureau; www.nebb.org.
142. NECA - National Electrical Contractors Association; www.necanet.org.
143. NeLMA - Northeastern Lumber Manufacturers Association; www.nelma.org.
144. NEMA - National Electrical Manufacturers Association; www.nema.org.
145. NETA - InterNational Electrical Testing Association; www.netaworld.org.
146. NFHS - National Federation of State High School Associations; www.nfhs.org.
147. NFPA - National Fire Protection Association; www.nfpa.org.
148. NFPA - NFPA International; (See NFPA).
149. NFRC - National Fenestration Rating Council; www.nfrc.org.
150. NHLA - National Hardwood Lumber Association; www.nhla.com.
151. NLGA - National Lumber Grades Authority; www.nlga.org.
152. NOFMA - National Oak Flooring Manufacturers Association; (See NWFA).
153. NOMMA - National Ornamental & Miscellaneous Metals Association; www.nomma.org.
154. NRCA - National Roofing Contractors Association; www.nrca.net.
155. NRMCA - National Ready Mixed Concrete Association; www.nrmca.org.
156. NSF - NSF International; www.nsf.org.
157. NSPE - National Society of Professional Engineers; www.nspe.org.
158. NSSGA - National Stone, Sand & Gravel Association; www.nssga.org.
159. NTMA - National Terrazzo & Mosaic Association, Inc. (The); www.ntma.com.
160. NWFA - National Wood Flooring Association; www.nwfa.org.

161. PCI - Precast/Prestressed Concrete Institute; www.pci.org.
162. PDI - Plumbing & Drainage Institute; www.pdionline.org.
163. PLASA - PLASA; (Formerly: ESTA - Entertainment Services and Technology Association); <http://www.plasa.org>.
164. RCSC - Research Council on Structural Connections; www.boltcouncil.org.
165. RFCI - Resilient Floor Covering Institute; www.rfci.com.
166. RIS - Redwood Inspection Service; www.redwoodinspection.com.
167. SAE - SAE International; www.sae.org.
168. SCTE - Society of Cable Telecommunications Engineers; www.scte.org.
169. SDI - Steel Deck Institute; www.sdi.org.
170. SDI - Steel Door Institute; www.steeldoor.org.
171. SEFA - Scientific Equipment and Furniture Association (The); www.sefalabs.com.
172. SEI/ASCE - Structural Engineering Institute/American Society of Civil Engineers; (See ASCE).
173. SIA - Security Industry Association; www.siaonline.org.
174. SJI - Steel Joist Institute; www.steeljoist.org.
175. SMA - Screen Manufacturers Association; www.smainfo.org.
176. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association; www.smacna.org.
177. SMPTE - Society of Motion Picture and Television Engineers; www.smpte.org.
178. SPFA - Spray Polyurethane Foam Alliance; www.sprayfoam.org.
179. SPIB - Southern Pine Inspection Bureau; www.spib.org.
180. SPRI - Single Ply Roofing Industry; www.spri.org.
181. SRCC - Solar Rating & Certification Corporation; www.solar-rating.org.
182. SSINA - Specialty Steel Industry of North America; www.ssina.com.
183. SSPC - SSPC: The Society for Protective Coatings; www.sspc.org.
184. STI - Steel Tank Institute; www.steeltank.com.
185. SWI - Steel Window Institute; www.steelwindows.com.
186. SWPA - Submersible Wastewater Pump Association; www.swpa.org.
187. TCA - Tilt-Up Concrete Association; www.tilt-up.org.
188. TCNA - Tile Council of North America, Inc.; www.tileusa.com.
189. TEMA - Tubular Exchanger Manufacturers Association, Inc.; www.tema.org.
190. TIA - Telecommunications Industry Association (The); (Formerly: TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance); www.tiaonline.org.
191. TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance; (See TIA).
192. TMS - The Masonry Society; www.masonrysociety.org.
193. TPI - Truss Plate Institute; www.tpinst.org.
194. TPI - Turfgrass Producers International; www.turfgrasssod.org.
195. TRI - Tile Roofing Institute; www.tilerroofing.org.
196. UL - Underwriters Laboratories Inc.; <http://www.ul.com>.
197. UNI - Uni-Bell PVC Pipe Association; www.uni-bell.org.
198. USAV - USA Volleyball; www.usavolleyball.org.
199. USGBC - U.S. Green Building Council; www.usgbc.org.
200. USITT - United States Institute for Theatre Technology, Inc.; www.usitt.org.
201. WASTEC - Waste Equipment Technology Association; www.wastec.org.
202. WCLIB - West Coast Lumber Inspection Bureau; www.wclib.org.
203. WCMA - Window Covering Manufacturers Association; www.wcmanet.org.
204. WDMA - Window & Door Manufacturers Association; www.wdma.com.
205. WI - Woodwork Institute; www.wicnet.org.

206. WSRCA - Western States Roofing Contractors Association; www.wsrca.com.
207. WWPA - Western Wood Products Association; www.wwpa.org.

C. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.

1. DIN - Deutsches Institut fur Normung e.V.; www.din.de.
2. IAPMO - International Association of Plumbing and Mechanical Officials; www.iapmo.org.
3. ICC - International Code Council; www.iccsafe.org.
4. ICC-ES - ICC Evaluation Service, LLC; www.icc-es.org.

D. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Information is subject to change and is up to date as of the date of the Contract Documents.

1. COE - Army Corps of Engineers; www.usace.army.mil.
2. CPSC - Consumer Product Safety Commission; www.cpsc.gov.
3. DOC - Department of Commerce; National Institute of Standards and Technology; www.nist.gov.
4. DOD - Department of Defense; www.quicksearch.dla.mil.
5. DOE - Department of Energy; www.energy.gov.
6. EPA - Environmental Protection Agency; www.epa.gov.
7. FAA - Federal Aviation Administration; www.faa.gov.
8. FG - Federal Government Publications; www.gpo.gov/fdsys.
9. GSA - General Services Administration; www.gsa.gov.
10. HUD - Department of Housing and Urban Development; www.hud.gov.
11. LBL - Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; www.eetd.lbl.gov.
12. OSHA - Occupational Safety & Health Administration; www.osha.gov.
13. SD - Department of State; www.state.gov.
14. TRB - Transportation Research Board; National Cooperative Highway Research Program; The National Academies; www.trb.org.
15. USDA - Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; www.ars.usda.gov.
16. USDA - Department of Agriculture; Rural Utilities Service; www.usda.gov.
17. USDOJ - Department of Justice; Office of Justice Programs; National Institute of Justice; www.ojp.usdoj.gov.
18. USP - U.S. Pharmacopeial Convention; www.usp.org.
19. USPS - United States Postal Service; www.usps.com.

E. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. CFR - Code of Federal Regulations; Available from Government Printing Office; www.gpo.gov/fdsys.
2. DOD - Department of Defense; Military Specifications and Standards; Available from DLA Document Services; www.quicksearch.dla.mil.

3. DSCC - Defense Supply Center Columbus; (See FS).
 4. FED-STD - Federal Standard; (See FS).
 5. FS - Federal Specification; Available from DLA Document Services;
www.quicksearch.dla.mil.
 - a. Available from Defense Standardization Program; www.dsp.dla.mil.
 - b. Available from General Services Administration; www.gsa.gov.
 - c. Available from National Institute of Building Sciences/Whole Building Design Guide; www.wbdg.org/ccb.
 6. MILSPEC - Military Specification and Standards; (See DOD).
 7. USAB - United States Access Board; www.access-board.gov.
 8. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).
- F. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
1. CBHF; State of California; Department of Consumer Affairs; Bureau of Electronic and Appliance Repair, Home Furnishings and Thermal Insulation; www.bearhfti.ca.gov.
 2. CCR; California Code of Regulations; Office of Administrative Law; California Title 24 Energy Code; www.calregs.com.
 3. CDHS; California Department of Health Services; (See CDPH).
 4. CDPH; California Department of Public Health; Indoor Air Quality Program; www.cal-iaq.org.
 5. CPUC; California Public Utilities Commission; www.cpuc.ca.gov.
 6. SCAQMD; South Coast Air Quality Management District; www.aqmd.gov.
 7. TFS; Texas A&M Forest Service; Sustainable Forestry and Economic Development; www.txforestservation.tamu.edu.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014200

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Requirements:
 - 1. Section 011000 "Summary" for work restrictions and limitations on utility interruptions.

1.2 USE CHARGES

- A. Installation, removal, and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Engineer, testing agencies, and authorities having jurisdiction.
- B. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.
- C. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

1.3 INFORMATIONAL SUBMITTALS

- A. Site Utilization Plan: Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.
- B. Project Identification and Temporary Signs: Show fabrication and installation details, including plans, elevations, details, layouts, typestyles, graphic elements, and message content.
- C. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.
- D. Moisture- and Mold-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage and mold. Describe delivery, handling, storage, installation, and protection provisions for materials subject to water absorption or water damage.

1. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and requirements for replacing water-damaged Work.
2. Indicate methods to be used to avoid trapping water in finished work.

1.4 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.5 PROJECT CONDITIONS

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

PART 2 - PRODUCTS

2.1 TEMPORARY FACILITIES

- A. Field Offices and Storage: No space is available within the buildings or onsite for contractor's field offices. Contractor is required to provide any temporary facilities required for field offices or materials storage.

2.2 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- B. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

PART 3 - EXECUTION

3.1 TEMPORARY FACILITIES, GENERAL

- A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

3.2 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.
- C. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.

3.3 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
 - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Sanitary Facilities: Provide temporary toilets, wash facilities, safety shower and eyewash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

3.4 SUPPORT FACILITIES INSTALLATION

- A. Comply with the following:
 - 1. If required, provide construction for temporary field offices, shops, and sheds located within construction area or within 30 feet (9 m) of building lines that is noncombustible according to ASTM E136. Comply with NFPA 241.
 - 2. Owner will provide a designated area at LCHA Administrative Office for biweekly job conferences.
 - 3. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
- B. Traffic Controls: Comply with requirements of authorities having jurisdiction.
 - 1. Protect existing site improvements to remain including curbs, pavement, and utilities.
 - 2. Maintain access for fire-fighting equipment and access to fire hydrants.
- C. Parking: Use designated areas of Owner's existing parking areas for construction personnel, parking of construction vehicles, waste disposal and storage of materials, as needed. Provide vehicles with company signs/ logos to avoid vehicles from being towed at site specific parking lots. Owner does not have control of nonpermitted vehicles from being towed. Street parking is available if there are not parking spaces within site specific parking lots. Refer to Site Logistics Diagram for Susquehanna Court and Franklin Terrace.

- D. **Storage and Staging:** Use designated areas of Project site for storage and staging needs. Confirm location with Owner prior to set up of storage and staging areas. Refer to Site Logistics Diagram for Susquehanna Court and Franklin Terrace.
- E. **Waste Disposal Facilities:** Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 017300 "Execution."
- F. **Existing Stair Usage:** Use of Owner's existing stairs within individual units will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.
 - 1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas so no evidence remains of correction work.

3.5 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. **Protection of Existing Facilities:** Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
 - 1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.
- B. **Environmental Protection:** Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
- C. **Stormwater Control:** Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
- D. **Tree and Plant Protection:** Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
- E. **Barricades, Warning Signs, and Lights:** Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- F. **Temporary Egress:** Provide temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction. Provide signage directing occupants to temporary egress.
- G. **Temporary Enclosures:** Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.

1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.
- H. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
1. Prohibit smoking in construction areas. Comply with additional limits on smoking specified in other Sections.

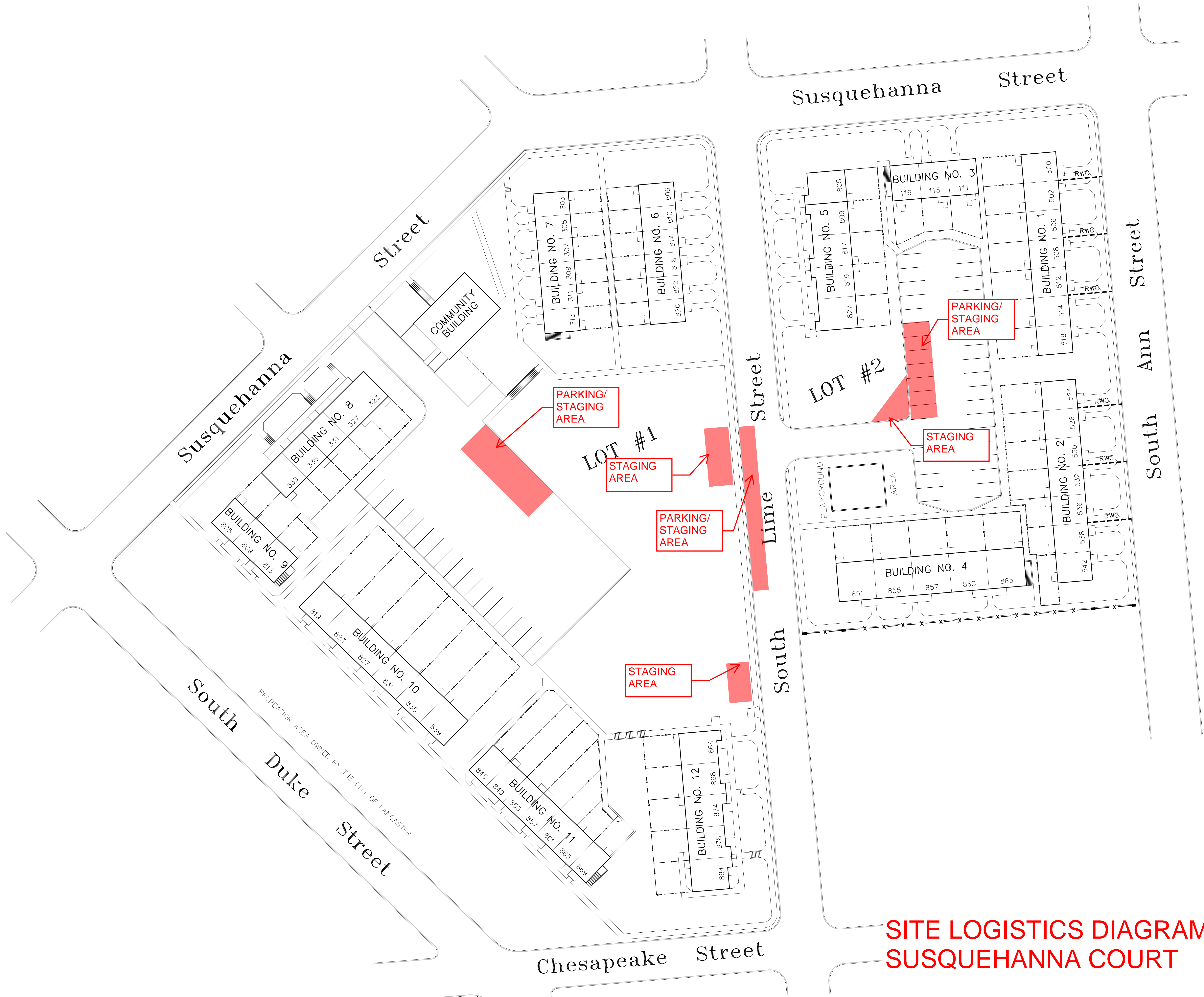
3.6 MOISTURE AND MOLD CONTROL

- A. Moisture and Mold Protection: Protect stored materials and installed Work in accordance with Moisture and Mold Protection Plan.
- B. Controlled Construction Period: Throughout the project, maintain as follows:
1. Control moisture and humidity inside building by maintaining effective dry-in conditions.

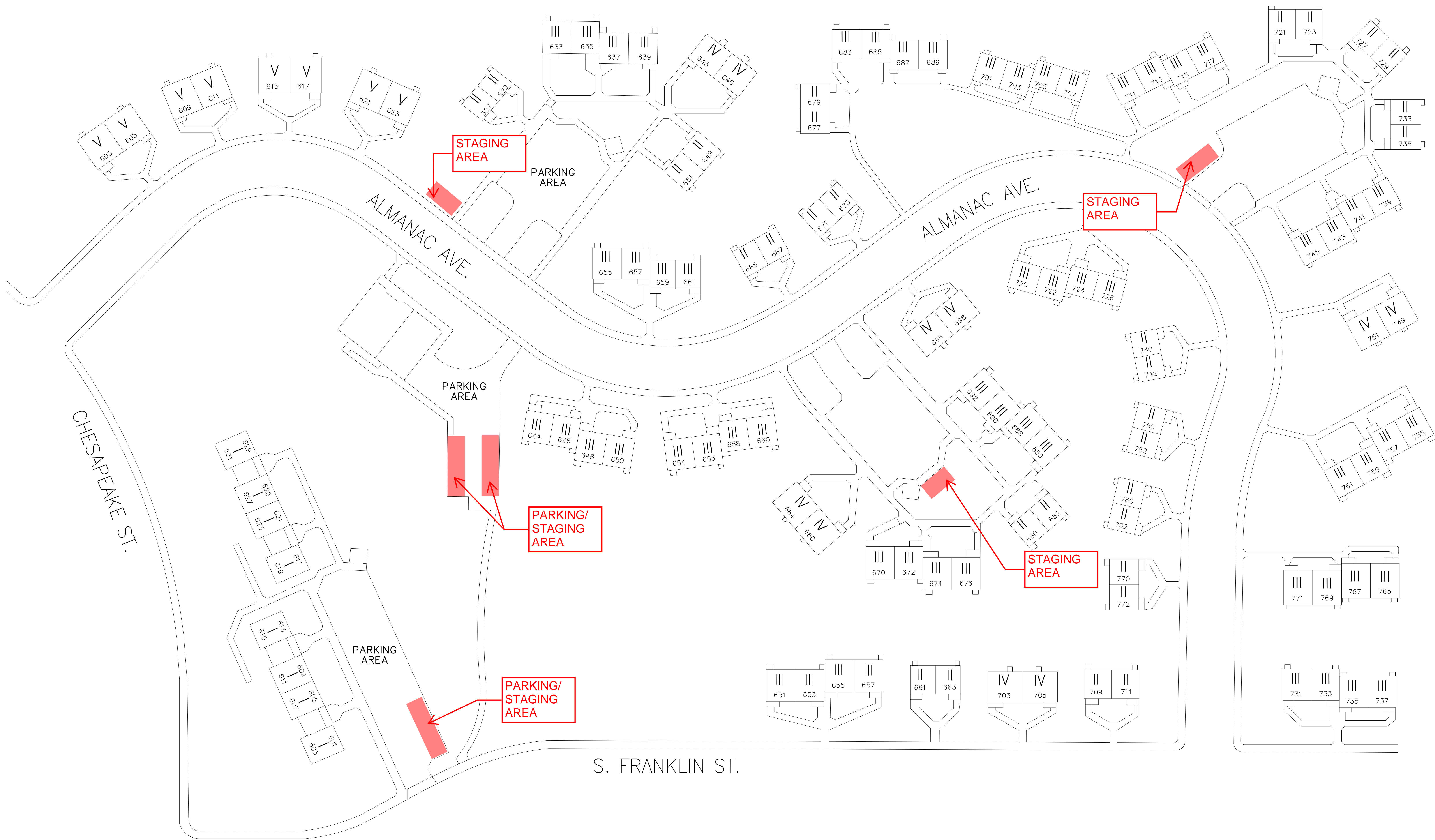
3.7 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
 2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION 015000



SITE LOGISTICS DIAGRAM - SUSQUEHANNA COURT



**SITE LOGISTICS DIAGRAM -
FRANKLIN TERRACE**

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS:

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

1.3 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
 - 3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

1.4 ACTION SUBMITTALS

- A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
 - 2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
 - a. Form of Approval: As specified in Division 01 Section "Submittal Procedures."
 - b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
- B. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 01 Section "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.
 - 1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
 - 2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
 - 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 - 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.

3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.
7. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.7 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
 2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
 3. See Divisions 02 through 33 Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Division 01 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 4. Where products are accompanied by the term "as selected," Architect will make selection.
 5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
 6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.
- B. Product Selection Procedures:
1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 3. Products:
 - a. Nonrestricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.
 4. Manufacturers:
 - a. Nonrestricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.
 5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications

indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

- C. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
 - 1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Division 01 Section "Substitution Procedures" for proposal of product.
- D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:
 - 1. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
 - 2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 - 3. Evidence that proposed product provides specified warranty.
 - 4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
 - 5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

SECTION 017300 - EXECUTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS:

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

1.2 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Construction layout.
 - 2. Installation of the Work.
 - 3. Cutting and patching.
 - 4. Coordination of Owner-installed products.
 - 5. Progress cleaning.
 - 6. Starting and adjusting.
 - 7. Protection of installed construction.
 - 8. Correction of the Work.

1.3 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.4 INFORMATIONAL SUBMITTALS

- A. Cutting and Patching Plan: Submit plan describing procedures at least 15 days prior to the time cutting and patching will be performed. Include the following information:
 - 1. Extent: Describe reason for and extent of each occurrence of cutting and patching.
 - 2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.

3. Products: List products to be used for patching and firms or entities that will perform patching work.
 4. Dates: Indicate when cutting and patching will be performed.
 5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.
 - a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.
- B. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

1.5 QUALITY ASSURANCE

- A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
 2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operational elements include the following:
 - a. Primary operational systems and equipment.
 - b. Mechanical systems and piping.
 - c. Control systems.
 - d. Communication systems.
 - e. Fire-detection and -alarm systems.
 - f. Electrical wiring systems.
 3. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- B. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
 - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.
 - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities.
 - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
 - 1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 - 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 - 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
 - 1. Description of the Work.
 - 2. List of detrimental conditions, including substrates.

3. List of unacceptable installation tolerances.
 4. Recommended corrections.
- D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Division 01 Section "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.
- B. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- C. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 FIELD ENGINEERING

- A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
 - 1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.
 - 2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- B. Benchmarks: Establish and maintain a minimum of permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
 - 1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
 - 2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
 - 3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

3.5 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - 3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.

- F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
 - 2. Allow for building movement, including thermal expansion and contraction.
 - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 CUTTING AND PATCHING

- A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
- C. Temporary Support: Provide temporary support of work to be cut.
- D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

- E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Division 01 Section "Summary."
- F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.
- G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill. Additional limitations contained in other specification sections and drawings for removal of mortar for repointing of masonry do not permit use of rotary or power tools.
 - 4. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 - 5. Proceed with patching after construction operations requiring cutting are complete.
- H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
 - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
 - 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
 - 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

- a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
- 4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
- 5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.
- I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.7 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
 - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 - 2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F (27 deg C).
 - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
 - a. Use containers intended for holding waste materials of type to be stored.
 - 4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 - 1. Remove liquid spills promptly.
 - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways.
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.8 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.9 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 017300

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS:

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Substantial Completion procedures.
 - 2. Final completion procedures.
 - 3. Warranties.
 - 4. Final cleaning.

1.3 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete with request.
 - 1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
 - 2. Advise Owner of pending insurance changeover requirements.
 - 3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - 4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - 5. Prepare and submit Project Record Documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
 - 6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
 - 7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 - 8. Complete startup testing of systems.
 - 9. Submit test/adjust/balance records.

10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
11. Advise Owner of changeover in heat and other utilities.
12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
13. Complete final cleaning requirements, including touchup painting.
14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for final completion.

1.4 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining final completion, complete the following:

1. Submit a final Application for Payment according to Division 01 Section "Payment Procedures."
2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report and warranty.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.

B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
 - 1. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.

1.6 WARRANTIES

- A. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
- B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
 - 1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch (215-by-280-mm) paper.
 - 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
 - 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
- C. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces. Comply with the VOC requirements of section 018113.13 for all cleaning agents.

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
 - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - d. Remove snow and ice to provide safe access to building.
 - e. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - f. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - g. Sweep concrete or unfinished wood floors broom clean in unoccupied spaces.
 - h. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
 - i. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - j. Remove labels that are not permanent.
 - k. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 - 1) Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates.
 - 1. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.

- m. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
 - n. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - o. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - p. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
 - q. Leave Project clean and ready for occupancy.
- C. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid Project of rodents, insects, and other pests. Prepare a report.

END OF SECTION 017700

SECTION 017823 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS:

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - 1. Operation and maintenance documentation directory manuals.
 - 2. Emergency manuals.
 - 3. Systems and equipment operation manuals.
 - 4. Systems and equipment maintenance manuals.
 - 5. Product maintenance manuals.

1.3 CLOSEOUT SUBMITTALS

- A. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
 - 1. Architect and Commissioning Authority will comment on whether content of operation and maintenance submittals is acceptable.
 - 2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
- B. Format: Submit operation and maintenance manuals in the following format:
 - 1. Submit one paper copy, bound in a 3-ring binder
 - 2. Submit 3 copies on digital media acceptable to Architect. Enable reviewer comments on draft submittals.
- C. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Architect and Commissioning Authority will return copy with comments.

1. Correct or revise each manual to comply with Architect's and Commissioning Authority's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's and Commissioning Authority's comments and prior to commencing demonstration and training.
- D. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

1.4 FORMAT OF OPERATION AND MAINTENANCE MANUALS

- A. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
 1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
 2. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.
- B. Manuals, Paper Copy: Submit manuals in the form of hard-copy, bound and labeled volumes.
 1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch (215-by-280-mm) paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
 2. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
 - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
 - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

1.5 REQUIREMENTS FOR OPERATION, AND MAINTENANCE MANUALS

- A. Organization of Manuals: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
 1. Title page.
 2. Table of contents.

3. Manual contents.
- B. Title Page: Include the following information:
1. Subject matter included in manual.
 2. Name and address of Project.
 3. Name and address of Owner.
 4. Date of submittal.
 5. Name and contact information for Contractor.
 6. Name and contact information for Architect.
 7. Name and contact information for Commissioning Authority.
 8. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
 9. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

1.6 SYSTEMS AND EQUIPMENT OPERATION MANUALS

- A. Systems and Equipment Operation Manual: Assemble a complete set of data indicating operation of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, and routine and special operating procedures.
- B. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
 2. Performance and design criteria if Contractor has delegated design responsibility.
 3. Operating standards.
 4. Operating procedures.
 5. Operating logs.
 6. Wiring diagrams.
 7. Control diagrams.
 8. Piped system diagrams.

9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

C. Descriptions: Include the following:

1. Product name and model number. Use designations for products indicated on Contract Documents.
2. Manufacturer’s name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

D. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

E. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

F. Piped Systems: Diagram piping as installed, and identify color coding where required for identification.

1.7 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

- A. Systems and Equipment Maintenance Manuals: Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of a system. Include manufacturers' maintenance documentation, preventive maintenance procedures and frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.
- B. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds, as described below.

- C. **Manufacturers' Maintenance Documentation:** Include the following information for each component part or piece of equipment:
 - 1. Standard maintenance instructions and bulletins; include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
 - a. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
 - 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
 - 3. Identification and nomenclature of parts and components.
 - 4. List of items recommended to be stocked as spare parts.
- D. **Maintenance Procedures:** Include the following information and items that detail essential maintenance procedures:
 - 1. Test and inspection instructions.
 - 2. Troubleshooting guide.
 - 3. Precautions against improper maintenance.
 - 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - 5. Aligning, adjusting, and checking instructions.
 - 6. Demonstration and training video recording, if available.
- E. **Maintenance and Service Schedules:** Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
- F. **Spare Parts List and Source Information:** Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- G. **Warranties and Bonds:** Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 - 1. Include procedures to follow and required notifications for warranty claims.
- H. **Drawings:** Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.

1.8 PRODUCT MAINTENANCE MANUALS

- A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- B. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- C. Product Information: Include the following, as applicable:
 - 1. Product name and model number.
 - 2. Manufacturer's name.
 - 3. Color, pattern, and texture.
 - 4. Material and chemical composition.
 - 5. Reordering information for specially manufactured products.
- D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
 - 1. Inspection procedures.
 - 2. Types of cleaning agents to be used and methods of cleaning.
 - 3. List of cleaning agents and methods of cleaning detrimental to product.
 - 4. Schedule for routine cleaning and maintenance.
 - 5. Repair instructions.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 - 1. Include procedures to follow and required notifications for warranty claims.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 017823

SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS:

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for Project Record Documents, including the following:
 - 1. Record Drawings.
 - 2. Record Specifications.
 - 3. Record Product Data.

1.3 SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit one set(s) of marked-up Record Prints.
- B. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications.
- C. Record Product Data: Submit one copy of each Product Data submittal.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one set of blue- or black-line white prints of the Contract Drawings and Shop Drawings.
 - 1. Preparation: Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether

individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.

- a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
2. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
 3. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
 4. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Record Prints: Organize Record Prints and newly prepared Record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 2. Identification: As follows:
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS."
 - d. Name of Architect.
 - e. Name of Contractor.

2.2 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
 4. Note related Change Orders, Record Product Data, and Record Drawings where applicable.

2.3 RECORD PRODUCT DATA

- A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
 - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 - 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
 - 3. Note related Change Orders, Record Specifications, and Record Drawings where applicable.

2.4 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.
- B. Maintenance of Record Documents and Samples: Store Record Documents and Samples in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.

END OF SECTION 017839

SECTION 020900– MOLD REMEDIATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

Technical specifications for:

- 1. Mold remediation in various bathrooms and mechanical rooms throughout the existing Susquehanna Court (321 Susquehanna St. Lancaster, PA) and Franklin Terrace Properties (630 Almanac Ave. Lancaster, PA), as detailed below.

1.3 SEPARATE CONTRACTS

None.

1.4 PERFORMANCE REQUIREMENTS

- A. Coordinate remediation activities under the work of this contract with the Owner’s Representative, Architect, Environmental Consultant, and the Owner at project meetings prior to the start of remediation, as applicable, and within agreed upon timeframes; and throughout the project.
- B. Work shall be performed in accordance with these specifications, including all appropriate codes, regulations, and requirements, if any, pertaining to the work detailed below in Scope of Work.

1.5 GENERAL REQUIREMENTS

- A. Any Remediation Contractor performing mold remediation activities must be trained and experienced in mold remediation and mold-related work and shall provide documentation (similar projects and references) prior to starting work.
- B. The Remediation Contractor will be responsible for means and methods necessary to safely access the areas with mold contamination and perform the mold remediation as specified in the scope of work.
- C. All remediation activities, cleaning procedures, etc. will be performed in strict accordance with the most stringent governing safety and health regulations **that apply**, including but not limited to the following:

Occupational Safety and Health Administration (OSHA)

- All other federal, state and local regulations that apply.

Where a conflict arises between specifications and regulations, the most stringent takes precedence.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 MOLD REMEDIATION – SCOPE OF WORK

A. Base Bid

CONTRACTOR will provide all labor and materials necessary for the following detailed scope of work for mold remediation at the existing Susquehanna Court (321 Susquehanna St. Lancaster, PA) and Franklin Terrace Properties (630 Almanac Ave. Lancaster, PA)

1. Mold Remediation, including removal of water damaged and or moldy drywall, including cleaning and sanitizing of remaining wall and ceiling structure (studs, joists, etc.) and masonry walls in the same spaces, in the following locations, various bathrooms in units and associated mechanical rooms at the existing Susquehanna Court (321 Susquehanna St. Lancaster, PA) and Franklin Terrace Properties (630 Almanac Ave. Lancaster, PA). **The Remediation Contractor is responsible for verifying quantities and work locations prior to bidding.**
2. Isolation of the work areas (areas specifically mentioned above) with critical barriers, HEPA negative air filtration, decon. entry, etc. as detailed in the Preparation section. Because of the probability of needed removal of electrically powered equipment (HVAC units, hot water heaters, etc.) from some work areas, there is a progression to the preparation that must be followed as detailed in the Preparation section.
3. Mold Remediation throughout the selected locations of the existing Susquehanna Court (321 Susquehanna St. Lancaster, PA) and Franklin Terrace Properties (630 Almanac Ave. Lancaster, PA) to include, as applicable, removal of water damaged and/or moldy drywall and water damaged and/or moldy insulation for access to the framing spaces of walls and ceilings for additional mold remediation. The removal of drywall for access will include disposal of water damaged, stained, moldy drywall and insulation as necessary based on condition and needed access. The primary remediation is the removal of the water damaged and or moldy drywall, the removal and disposal of all wall and ceiling cavity and/or joist space insulation in the wall cavities and/or ceiling joist spaces behind water damaged and or moldy drywall, and cleaning and sanitizing the wall cavities and ceiling joist spaces, and any exposed structure, masonry walls in the spaces or exposed by removal of the moldy drywall will also be cleaned and sanitized. Based on the extensive water damage and mold contamination there is potential for deterioration of wall studs and joists (due to rot (wood) or rust or corrosion (steel)) to the extent that replacement is required, which must be addressed. When the work is reported as completed in a unit or units, Environmental Consultant will perform a visual inspection and collect appropriate mold samples (air and/or surface) from each work area for rush lab analysis. **If the work is found to be Satisfactorily Completed based on the initial visual inspection and the test results, see #4 below.**

If the work area **fails** the Satisfactory Completion evaluation, the remediation contractor shall perform additional cleaning and sanitizing as appropriate, followed by re-inspection and re-testing. After a successful re-inspection and re-testing resulting in an acceptable Satisfactory Completion evaluation, **see #4 below**.

4. After the Satisfactory Completion of the mold remediation in any specific work area, including acceptable air and/or surface samples, reconstruction can be scheduled as appropriate. Reconstruction is not part of the Mold Remediation project.

See Section D – Removal Procedures – Mold Remediation below for more details regarding scope of work, work practices, procedures, project requirements, etc.

The presence of rotten wood or corroded metal studs or wall structure may require additional inspection by an appropriate expert (TBD) to determine if it is a structural problem that needs to be corrected or is it primarily a cosmetic issue; in any case, it should also be cleaned and sanitized. When the mold remediation and sanitizing is determined to be completed, the area **shall** be inspected for completeness by the remediation supervisor that they consider it completed (See details in the “D. Procedures” section). The Environmental Contractor is then notified of the finished work area so a Satisfactory Completion evaluation can be scheduled. The HEPA units will then be operated in the work area in air scrubber mode (recirculating, with no negative pressure) until the Satisfactory Completion evaluation can be performed.

If the Satisfactory Completion evaluation is passed, and HEPA air scrubbing continues, for the mechanical rooms specifically, and the bathrooms as well, the wall cavities and masonry walls and ceilings can then be sprayed or rolled as appropriate with the “Zinsser Mold Killing Primer ®” (or equivalent). **The walls and ceilings can then be reconstructed as part of the General Construction Contract, reconstruction of the remediated areas is not part of the remediation contract.**

B. Schedule

Mold Remediation work is scheduled to occur as soon as possible upon award and contracts, and upon agreement by the Owner and the Remediation Contractor but the work schedule must coordinate work hours and building access through the Owner. **The Remediation Contractor shall provide all manpower necessary to support the project and the work schedule.**

C. PROCEDURES – MOLD REMEDIATION

Requirements

Workers involved in the removal, cleaning and sanitization that have experience with any of these activities and/or mold remediation equipment, products and procedures and supervisors equally or more experienced in the same areas are recommended for the project. A Supervisor experienced in mold remediation procedures must be onsite during active removal. All personnel entering work areas must wear appropriate personal protective equipment for the phase or current activity of the removal, cleaning and sanitizing.

PPE

Appropriate personal protective equipment (PPE) should be worn for the stage of work, or the activity being performed – demolition, and remediation. **Safety shoes and appropriate gloves** are essential to prevent injury or exposure. With dusty items (mold spores, drywall dust and

insulation, etc.), aggressive cleaning (wire brushing, and scrubbing, etc.) and spraying of sanitizers and cleaners, **eye protection** is warranted, and goggle type eye protection is recommended. Respiratory protection should be at a minimum, **N95 HEPA respirators**, because of particulate that will be generated during moldy gypsum drywall and insulation removal, and years of dust and dirt deposition. Any personnel that have been tested and authorized to wear a more effective **P100 half face respirator** may do so. **Disposable overalls** are a minimum requirement but **Tyvek ®** or an equivalent are preferred; torn suits shall be replaced immediately. During active removal of the moldy drywall and insulation, and active cleaning of moldy structure (specifically in the bathrooms in the apartment or in any mechanical rooms inside the building and accessed from inside the building), personnel exiting the active work area must use a HEPA vacuum in the work area pop-up decon to remove loose dust, dirt and mold spores, before removing the Tyvek suit and disposing of it, and a fresh suit must be put on to re-enter the work area. Hard hats are required where there is potential for contact with overhead obstructions (pipes, pipe hangers, support structure, etc.). During mold remediation in the mechanical rooms accessed from outside the buildings, workers may exit the work area without removing the Disposable overalls if they are going to re-enter the active work area without entering any other building. It is the Remediation Contractor's responsibility that appropriate OSHA requirements that apply must be met for PPE, and the use of scaffolding, high lifts and or ladders will require appropriate fall protection for the working heights.

Work Area Preparation

This section of Work Area Preparation is primarily pertaining to the mold remediation of interior bathrooms and mechanical rooms. HEPA negative air units will be needed for each active work area and should be on and venting out of the active work area during all set up. During set-up and cleaning out of a room **before the start of actual mold remediation** it may be difficult to have a full sized HEPA negative air unit in the room so a smaller unit may be used initially. Ideally, during remediation inside a bathroom or mechanical room located in an apartment, the discharge air from the HEPA negative air unit should vent out a window. If a window is not in close proximity to the exhaust duct, it may be necessary to use wire re-enforced flex duct to reach a window in another room. Wire re-enforced flex duct minimizes losses in air flow due to constrictions and kinks that occur in ducting without the wire support. Operation of the HEPA units at this stage of the set-up is intended to capture mold spores released by the preparation phase, and this requirement is primarily related to the bathrooms or mechanical rooms located inside an apartment. The mold remediation in the bathrooms may require the removal of bathroom and closet doors (and all contents of the closet or cabinets), the toilet and the sink (and even the shower or the bathtub may need to be removed depending on where the mold growth and water damage extends), consequently the water supply (hot and cold) serving all fixtures in the bathroom must be shut down prior to the removal of toilet, sink and shower/tub. Any electrical connections that will be affected by the remediation (such as light fixtures, or a heater built into the wall or ceiling that is to be removed) will need to be de-energized (preferably at a circuit breaker) and should be removed by an electrician before any demolition begins. **Lock Out/Tag Out procedures should also be used on any circuit breakers for the bathrooms and the mechanical rooms to keep the power off in specific work areas.** Any hot water or steam heat radiators in the bathrooms or in the mechanical rooms should also be removed if they are hindering access to mold growth on a wall behind the radiator (this will most likely need to be done by a plumber or HVAC tech) to separate the units from the pipe connections and seal the hot water or steam supply pipes. The HEPA negative air unit(s) in each room during actual remediation should be installed inside the enclosed work area but as far from the entry door as possible and venting out a window, if at all possible. This placement maximizes the removal of

particulate from the room air by the HEPA neg. air unit. Interior walls with no actual mold growth, that are not expected to be demo'd can be wiped down with sanitizer and covered with 6 mil poly sheeting taped in place from ceiling to floor, however, this wall will need to be re-cleaned and sanitized at the end of the remediation project. It is also possible that all walls may be required to be removed in some areas regardless of whether mold growth was on all walls. **The floor in all remediated areas should be protected with at least 2 layers of 6 mil poly securely taped down.** If the floor covering in a room is also to be removed due to water damage or mold growth, it should be removed at the beginning of the remediation process in any particular room. The room entry door should have an overlapping flap on the door and at a minimum, a single stage "pop-up" decon outside of the bathroom or interior mechanical room also with a double flap entry. The decon is for doffing and donning Tyvek ® or equivalent coveralls before departing or entering the active work area. If a larger HEPA unit is to be used during the remediation than was in place during the setup, it should be installed before the decon is in place. The size of the HEPA negative air unit should be based on the room size it is servicing.

If there is no window in the room (possible in the case of interior mechanical rooms), the HEPA discharge must be run to an adjacent room with a window and wire re-enforced flex duct may be needed to maintain adequate flow if there is no window in the room to vent out of.

HEPA negative air units should maintain negative pressure in the work areas with a minimum of 0.02" of water column vacuum in the work areas due to the amount of dust and potential mold spores involved. Determining the number of air changes occurring on a continuous basis is difficult and the negative pressure option **will be required with a manometer to confirm proper vacuum for each operational work area during demo of drywall, through cleaning and sanitizing.** Negative pressure will not be required during the post remediation, HEPA air scrubbing prior to the Satisfactory Completion evaluations. Recirculation of HEPA filtered air is preferred at this point in the remediation as it helps to prevent re-contamination of the work area by mold in adjacent areas. It is important to isolate the work area by utilizing HEPA filtered negative pressure systems to prevent escape of potential mold spores, dust and debris from the work area during demo and cleaning), the HEPA systems when configured for proper negative pressure should prevent any dust or debris releases out of the work areas. When the room is ready for remediation to start, the HEPA unit(s) should be on and producing a proper vacuum in the work areas with all poly barriers in place and the entry way examined by remediation supervisor to ensure there is adequate air flow into the work area through the decon entrance. If there is not adequate air flow into the work area and the minimum vacuum cannot be maintained, work should not start until an additional or larger HEPA unit is installed and the flow deficiency and/or the inadequate amount of vacuum are corrected.

Special Preparation for Mechanical Rooms Outside or In

In general, the mechanical rooms have less access to the areas needing mold remediation because of the HVAC systems and hot water heaters, etc. placed in them. Consequently, the equipment must be removed. A small HEPA unit should be operational in the mechanical rooms during the equipment removal process, before the preparations for remediation are completed. There is **electrical service** to the HVAC units, hot water heaters and any other electrically powered devices in the mechanical room which should be de-energized at the circuit breaker and **Lock Out/Tag Out procedures** should also be used on any circuit breakers for the mechanical rooms to keep them off. **The HVAC units may need to have the "Freon" coolant drained off by others (HVAC Tech.) and the hot water heater can also be disconnected by others (a plumber) and drained once the power is shut off and all pipes should be plugged or capped.** Once all of the mechanical items are removed from the mechanical rooms, anything else in the

rooms can be removed to complete the room prep. The inside mechanical rooms should have a single stage decon pop-up with a flap door, but the outside mechanical rooms can simply use the flap door. **For the mechanical rooms, it may still be necessary to use wire re-enforced flex duct to maintain an open flow path through the duct.** Note: the exterior mechanical rooms have several walls that are masonry (cement block and several that are drywall, the moldy drywall should be removed and the framing cleaned and sanitized, and the masonry walls should be cleaned and sanitized.

D. REMEDIATION – DEMOLITION, CLEANING and SANITIZING

Demolition (removal) of drywall, Cleaning and Sanitization of Other Surfaces

All visible suspected mold growth in the work areas (bathrooms or mechanical rooms) should be HEPA vacuumed with brush attachments to remove loose spores. Any drywall being cut should have a HEPA vacuum near the cutting to capture as much dust as possible. Removing drywall in as large pieces as possible reduces the spores released and makes the clean-up faster. Finishing the drywall cut with a utility razor knife, remove all screws or nails for that portion of the panel and remove the loose section, smashing the drywall for removal is not recommended. If any moldy plaster walls are found, either instead of drywall or covered by drywall, they must also be removed. **When all moldy drywall is removed, the studs and joists can be examined for needed cleaning and the remaining wall side (the other side of the wall cavity - inside the wall cavity) can be examined. If this is also moldy and drywall, it will need to be removed as well.**

Removing the drywall on both sides of the dividing wall opens the initial work area to the adjacent space. Before the wall can be opened to the adjacent space, a small poly sheeting containment will need to be placed in the adjacent area. However, depending on how much wall to the adjacent space must be removed, the adjacent space may need to be set up as a separate work area with a separate entrance and HEPA neg. air filter.

If the moldy drywall is on exterior wall (cement block or poured cement) it must be removed leaving the studs and the wall cavity, it will then need to be HEPA vacuumed with brushes to remove loose material, followed by wiping/scrubbing with sanitizer wipes and spraying with sanitizer. If the drywall is attached directly to the masonry, it will be much harder to remove and to clean and sanitize the masonry wall. Masonry walls may take multiple efforts to clean adequately but must be clean enough to apply the anti-fungal paint (Zinsser Mold Killing Primer ® or equivalent), later at the end of the process specifically in the outside mechanical rooms but also in the bathrooms and interior mechanical rooms as needed.

It is unknown if there are any wires or pipes in the wall cavities, so using a saws-all or similar device to cut the drywall could cause problems, a small circular saw with the blade set to the thickness of the drywall will allow sections about the width of the joist space (16”) to be removed for disposal and only the drywall on the studs or joists will be harder to remove.

Continue until all of the water damaged/moldy drywall and insulation in the immediate work area is removed, then aggressively clean the interior of the wall and ceiling cavities, the wall studs and ceiling joists with brushes (wire ones if necessary) and HEPA vacuums. All loose material (including mold growth and residual insulation on the surfaces) should be removed with this process. **If any potentially rotten wood or badly corroded metal studs are observed, they should be reported to the supervisor and to the Owners representative as they may need to be replaced.**

All loose debris on the floor should be cleaned up and the floor HEPA vacuumed prior to the sanitizing.

Sanitization Procedures for Each Location

For the cleaning/sanitizing process, all of the wall cavities and ceiling cavities exposed by the removal of the moldy drywall and insulation should be aggressively HEPA vacuumed with brushes to remove any loose debris or mold and wiped down with clean fabric shop rags dipped in the sanitizer/cleaner (such as Sporidicin ® or an equivalent product) additional sanitizer can be applied using pump up sprayers. All surfaces exposed by the drywall and insulation removal (including the wall studs and ceiling joists, and the wall sill plate, and any cement block or poured foundation walls, etc.) shall be well wetted by this method and the finished removal should be inspected by the remediation supervisor for completeness. This is a cleaning process as well as a sanitizing process.

If the supervisor is satisfied that the remediation (removal) is completed and the initial cleaning and sanitizing is completed, the final sanitizing can be performed as follows: All exposed cleaned surfaces (including the wall studs, ceiling joists, and masonry foundation or exterior walls, etc.) should be sprayed with additional sanitizer/cleaner products (such as Sporidicin ® or Benefect ® or Vital Oxide ® or their equivalents) to maximize contact time and ensure any mold or fungi not removed by other cleaning processes is effectively non-viable. About 30 minutes after the spraying is completed, the HEPA air scrubbers (in recirculating mode) can be turned on and a dehumidifier can be added to the work area to speed drying. The dehumidifier should be plumbed to a drain or out of a window and is intended to quickly remove the excess moisture added by the sanitization. During the air scrubbing/drying process the space is not under negative pressure, HEPA filtered air is just recirculating in the work area to remove residual airborne spores and any remaining airborne demolition dust. **Environmental Consultant** should be notified by the supervisor when the air scrubbing starts that the specific area is ready for the Satisfactory Completion evaluation.

The dehumidifiers and the HEPA units should continue to operate in recirculation mode until Satisfactory Completion sampling is performed and passed. Relative humidity (% RH) readings will be taken in the work area and compared to outside % RH. Temperatures in both areas will also be compared as ambient temperatures control % RH and results will be compared to appropriate guidelines.

Other sanitizing or cleaning agents suggested by the contractor must be approved by the owner, architect and the Environmental Consultant, and the contractor shall supply the Environmental Consultant with the product SDS, usage instructions and other appropriate product info.

Satisfactory Completion Evaluation

Following completion of the cleaning, sanitization procedures, and HEPA air scrubbing a Satisfactory Completion inspection/evaluation will be performed, which includes a visual inspection and appropriate sampling. Satisfactory Completion sampling usually includes airborne mold spore samples collected at one or more representative locations in the remediated space and comparison to previous pre-remediation sampling results if any, mold in current outside conditions, and current adjacent accessible spaces. A surface sample (tape lift) will also be collected from suspected residual mold on the remediated surfaces, if necessary. The mold spore samples will be analyzed by an AIHA certified microbiology lab, with Rush Lab Turnaround. If the inspection observations and sample results and comparisons are found to be acceptable, the remediation is considered to be Satisfactorily Completed. Acceptable results would indicate the

following: No elevated spore counts of certain mold genera (for example Aspergillus/Penicillium, but specifically mold genera that were identified as being at high spore counts in previous testing in these areas) after the cleaning and sanitizing and air scrubbing, spore counts of Aspergillus/Penicillium and other mold genera should substantially be reduced to a low percentage of the previous air sample result and a tape lift sample of a surface in the cleaned area should have no more than a Rare spore count (1 to 10 spores/sample), however, tape lifts are intended to be used to evaluate suspected residual mold on a surface. Other molds found in the Satisfactory Completion sample that were present in the previous evaluations when mold was discovered should be present at a similar proportion to Aspergillus/Penicillium or less than the pre-sample. Other molds present in the Satisfactory Completion sample will be compared to molds found outside and/or in the adjacent space. If some of the mold genera found in the outside sample are present in the remediated area but are at a greatly reduced count it will generally still be Satisfactory. If they are at a higher count in the work area, depending on the other factors it **may** be considered to have failed, and additional corrective actions shall be recommended and follow up sampling performed once the recommended corrective actions are completed. The level of additional effort to be used will be determined by Environmental Consultant and may be as simple as running the HEPA recirculating filters (for an additional period until the airborne mold spore counts drop to an acceptable level) or it may require additional cleaning.

Sealing the Sanitized surfaces

After the visual Satisfactory Completion evaluation and the airborne mold and potential surface sampling is completed and the results have been evaluated and the work area remediation has been confirmed as Satisfactorily Completed, it is recommended that wall and ceiling cavities and the exposed masonry walls in the mechanical rooms be sprayed with an anti-fungal primer – “Zinsser Mold Killing Primer” ® or equivalent, this product will seal the surfaces, prevent any residual staining from “bleeding” through and will prevent new mold from growing on the remediated surfaces.

After the painting is completed the poly critical barriers can be removed and the work area floors HEPA vacuumed and all equipment removed. The interior reconstruction can now be scheduled for completed areas.

Material Replacement

Reconstruction will be addressed in the General Construction Project and is not part of the Mold Remediation project.

The Remediation Contractor is responsible for protecting the floor finishes in the work area and for damages to the walls remaining. Remediation Contractor shall repair/replace any damaged materials caused by the Remediation Contractor and its employees or sub-contractor’s employees performing the work.

GENERAL REQUIREMENTS

If the clearance inspection and test results do not meet clearance criteria, as defined in the Satisfactory Completion Evaluation section above, the Remediation Contractor is responsible to re-clean as recommended based on the observations and the results at no additional cost to Owner and would be responsible for additional costs related to the additional final clearance sampling and analysis. After the reinspection and retesting passes, the area is considered to be Satisfactorily Completed and the sealing (with the Zinsser product or equivalent) of the remediated areas can be completed.

3.2 AIR MONITORING

- A. The Owner has contracted with a third-party to have mold remediation oversight, air monitoring, and final air clearance air quality testing (Satisfactory Completion testing) performed for this project. Remediation Contractor shall cooperate fully with the Environmental Consultant.

3.3 SUBMITTALS

- A. Work Plan and Waste Management Plan
- B. Safety Data Sheets (SDS), as applicable
- C. Proposed Waste Hauler and Landfill
- D. Sub-Contractors (if applicable)

END OF SECTION

SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Demolition and removal of selected portions of building or structure.
2. Salvage of existing items to be reused or recycled.

1.2 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.
- B. Historic items, relics, antiques, and similar objects including items of interest or value to Owner that may be uncovered during demolition or site excavation remain the property of Owner.
1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.3 INFORMATIONAL SUBMITTALS

- A. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property. Indicate proposed locations and construction of barriers.
- B. Schedule of selective demolition activities with starting and ending dates for each activity.
- C. Predemolition photographs or video.

1.4 CLOSEOUT SUBMITTALS

- A. Inventory of items that have been removed and salvaged.

1.5 FIELD CONDITIONS

- A. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical, except as noted below
1. Before selective demolition, Owner will remove the following items:
 - a. Furniture, fixtures, equipment and personal items from the work area.
- B. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

- C. Hazardous materials are present in buildings and structures to be selectively demolished. Hazardous materials are expected to be remediated in specified rooms delineated on Drawings.
 - a. Hazardous material remediation is specified in Section <Insert Section number> "<Insert Section title>."
- D. On-site sale of removed items or materials is not permitted.
- E. Storage or sale of removed items or materials on-site is not permitted.
- F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
- G. Arrange selective demolition schedule so as not to interfere with Owner's operations.

1.6 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties.

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.
- B. Standards: Comply with ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.
- C. Inventory and record the condition of items to be removed for salvage or reinstallation.
- D. 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 Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
- B. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition.

3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL 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. Owner will arrange to shut off indicated utilities when requested by Contractor.
 - 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. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
 - c. 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. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area designated by Owner.
5. Protect items from damage during transport and storage.

B. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

3.5 PROTECTION

- 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. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
- C. Remove temporary barricades and protections where hazards no longer exist.

3.6 SELECTIVE DEMOLITION

- A. General: Demolish and remove existing construction only to the 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.
 4. Maintain fire watch during and for at least 24 hours after flame-cutting operations.
 5. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.

- 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.

3.7 CLEANING

- A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.
 - 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.
 - 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- B. Burning: Do not burn demolished materials.
- C. 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 SECTION 024119

SECTION 061000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Wood blocking.
 - 2. Wood nailers.
 - 3. Plywood sheathing.

1.3 SUBMITTALS

- A. Product Data for engineered wood products, underlayment, insulating sheathing, air-infiltration barriers, metal framing anchors, and construction adhesives.
- B. Material certificates for dimension lumber specified to comply with minimum allowable unit stresses.
- C. Wood treatment data, including chemical treatment manufacturer's instructions for handling, storing, installing, and finishing treated materials.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
 - 1. Factory mark each piece of lumber with grade stamp of grading agency.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

- D. Application: Treat items indicated on Drawings, and the following:
 - 1. Wood framing members that are less than 18 inches (460 mm) above the ground.

2.2 FASTENERS

- A. General: Fasteners are to be of size and type indicated and comply with requirements specified in this article for material and manufacture. Provide nails or screws, in sufficient length, to penetrate not less than 1-1/2 inches (38 mm) into wood substrate.
- A. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- B. Screws for Fastening to Metal Framing: length as recommended by screw manufacturer for material being fastened.

2.3 SHEATHING

- A. Plywood Floor Sheathing: Pressure treated sheathing.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted.
- B. Fit rough carpentry to other construction; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds, and similar supports to allow attachment of other construction.
- C. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. CABO NER-272 for power-driven staples, P-nails, and allied fasteners.
 - 2. Published requirements of metal framing anchor manufacturer.
 - 3. "Recommended Nailing Schedule" of referenced framing standard and with AFPA's "National Design Specifications for Wood Construction."
 - 4. "Table 2305.2--Fastening Schedule" of the BOCA National Building Code.
- D. Use finishing nails for exposed work, unless otherwise indicated. Countersink nail heads and fill holes with wood filler.
- E. Use hot-dip galvanized or stainless-steel nails where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity.

- F. Framing Standard: Comply with AFPA's "Manual for Wood Frame Construction," unless otherwise indicated.

- G. Installation of Structural-Use Panels: Comply with applicable recommendations contained in APA Form No. E30, "APA Design/Construction Guide: Residential & Commercial," for types of structural-use panels and applications indicated.
 - 1. Comply with "Code Plus" provisions of above-referenced guide.
 - 2. Fastening Methods: Fasten panels as indicated below:
 - a. Sheathing: Nail to framing.

END OF SECTION 061000

SECTION 062023 - INTERIOR FINISH CARPENTRY

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS:

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Interior trim.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product.
- B. Samples: For each type of material and profile.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Lumber: DOC PS 20.
 - 1. Factory mark each piece of lumber with grade stamp of grading agency.
 - 2. For exposed lumber, mark grade stamp on end or back of each piece.

2.2 INTERIOR STANDING AND RUNNING TRIM FOR OPAQUE FINISH

- A. Grade: Premium.
- B. Wood Species: Poplar, paint grade
- C. Interior Finish Classification in accordance with ASTM E84:
 - 1. Class: C
 - 2. Flame Spread Index: 200 or less
 - 3. Smoke Developed Index: 450 or less

2.3 WOOD MATERIALS

- A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of wood trim and quality grade specified unless otherwise indicated.
 - 1. Wood Moisture Content for Interior Materials: 5 to 10 percent.
- B. Molding Patterns:
 - 1. As indicated on drawings for bathroom wall trim.
 - 2. Match existing door trim profile for new interior side of bathroom door trim.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before installing interior finish carpentry, condition materials to average prevailing humidity in installation areas for a minimum of 24 hours unless longer conditioning is recommended by manufacturer.

3.2 INSTALLATION, GENERAL

- A. Install interior finish carpentry level, plumb, true, and aligned with adjacent materials. Use concealed shims where necessary for alignment.
 - 1. Scribe and cut interior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.
 - 2. Where face fastening is unavoidable, countersink fasteners, fill surface flush, and sand unless otherwise indicated.
 - 3. Install to tolerance of 1/8 inch in 96 inches (3 mm in 2438 mm) for level and plumb. Install adjoining interior finish carpentry with 1/32-inch (0.8-mm) maximum offset for flush installation and 1/16-inch (1.5-mm) maximum offset for reveal installation.

3.3 STANDING AND RUNNING TRIM INSTALLATION

- A. Install with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Do not use pieces less than 24 inches (610 mm) long, except where necessary. Stagger joints in adjacent and related standing and running trim. Miter at returns, miter at outside corners, and cope at inside corners to produce tight-fitting joints with full-surface contact throughout length of joint. Use scarf joints for end-to-end joints.

END OF SECTION 062023

SECTION 064116 - PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Plastic-laminate-clad architectural cabinets.
2. Wood furring, blocking, shims, and hanging strips for installing plastic-laminate-clad architectural cabinets that are not concealed within other construction.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.

B. Shop Drawings:

1. Include plans, elevations, sections, and attachment details.

C. Samples: For each exposed product and for each color and texture specified.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For manufacturer and Installer.

B. Research reports.

C. Field quality control reports.

1.4 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.

B. Installer Qualifications: Manufacturer of products

PART 2 - PRODUCTS

2.1 PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

- A. Quality Standard: Unless otherwise indicated, comply with the Architectural Woodwork Standards for grades of cabinets indicated for construction, finishes, installation, and other requirements.
- B. Architectural Woodwork Standards Grade: Premium.
- C. Type of Construction: Face frame.
- D. Door and Drawer-Front Style: Flush overlay.
- E. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by quality standard.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Wilsonart or approved equal, submittal in accordance with specification section 012500.
- F. Laminate Cladding for Exposed Surfaces:
 - 1. Horizontal Surfaces: Grade HGS.
 - 2. Postformed Surfaces: Grade HGP.
 - 3. Vertical Surfaces: Grade HGS.
 - 4. Edges: Grade HGS matching laminate in color, pattern, and finish.
 - 5. Pattern Direction: Vertically for drawer fronts, doors, and fixed panels.
- G. Concealed Backs of Panels with Exposed Plastic-Laminate Surfaces: High-pressure decorative laminate, NEMA LD 3, Grade BKL.
- H. Drawer Construction: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.
 - 1. Join subfronts, backs, and sides with glued rabbeted joints supplemented by mechanical fasteners.
- I. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
 - 1. Casework at Kitchens and Bathrooms:
 - a. Wilsonart, Brazilwood 7946, Matte Finish
 - 2. Countertops, wall backsplash and side splash at Kitchens:
 - a. Wilsonart, Misted Zephyr 4843, Matte Finish

WOOD MATERIALS

- J. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.

1. Wood Moisture Content: 8 to 13 percent.

K. Composite Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.

1. Medium-Density Fiberboard (MDF): ANSI A208.2, Grade 130.
2. Particleboard: ANSI A208.1, Grade M-2-Exterior Glue.
3. Softwood Plywood: DOC PS 1.
4. Thermoset Decorative Panels: Particleboard or MDF finished with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD 3, Grade VGL, for Test Methods 3.3, 3.4, 3.6, 3.8, and 3.10.

2.2 CABINET HARDWARE AND ACCESSORIES

A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets.

B. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 170 degrees of opening, self-closing.

C. Back-Mounted Pulls: BHMA A156.9, B02011.

D. Wire Pulls: Back mounted, solid metal, 4 inches (100 mm) long, 5/16 inch (8 mm) in diameter.

E. Shelf Rests: BHMA A156.9, B04013; metal.

F. Drawer Slides: BHMA A156.9.

1. Grade 1 and Grade 2: Side mounted and extending under bottom edge of drawer.

- a. Type: Full extension.
- b. Material: Zinc-plated steel with polymer rollers.

2. Grade 1HD-100 and Grade 1HD-200: Side mounted; full-extension type; zinc-plated-steel ball-bearing slides.

G. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.

1. Brushed satin nickel: BHMA 647 for steel base.

H. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

2.3 MISCELLANEOUS MATERIALS

A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln-dried to less than 15 percent moisture content.

- B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.
- C. Adhesive for Bonding Plastic Laminate: Unpigmented contact cement.
 - 1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.

2.4 FABRICATION

- A. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
- B. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Before installation, condition cabinets to humidity conditions in installation areas for not less than 72 hours.
- B. Architectural Woodwork Standards Grade: Install cabinets to comply with quality standard grade of item to be installed.
- C. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with cabinet surface.
- D. Install cabinets level, plumb, and true in line to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm) using concealed shims.
 - 1. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
 - 2. Install cabinets without distortion so doors and drawers fit openings and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
 - 3. Maintain veneer sequence matching of cabinets with transparent finish.
 - 4. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches (400 mm) o.c. with No. 10 wafer-head screws sized for not less than 1-1/2-inch (38-mm) penetration into wood framing, blocking, or hanging strips or No. 10 wafer-head sheet metal screws through metal framing behind wall finish.

END OF SECTION 064116

SECTION 072100 - THERMAL INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Glass-fiber blanket insulation.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

1.4 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Research/evaluation reports.

PART 2 - PRODUCTS

2.1 GLASS-FIBER BLANKET INSULATION

- A. 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. CertainTeed Corporation.
 - 2. Johns Manville.
 - 3. Owens Corning.
- B. Unfaced, Glass-Fiber Blanket Insulation: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.
- C. Glass-Fiber Blanket Insulation, Reinforced-Foil Faced: ASTM C665, Type III (reflective faced), Class A (faced surface with a flame-spread index of 25 or less); Category 1 (membrane is a vapor barrier), faced with foil scrim, foil-scrim kraft, or foil-scrim polyethylene.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- C. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

3.2 INSTALLATION OF INSULATION FOR FRAMED CONSTRUCTION

- A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. 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. Glass-Fiber Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
 - 1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
 - 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
 - 3. Install eave ventilation troughs between roof framing members in insulated attic spaces at vented eaves.

END OF SECTION 072100

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes sealants for the following:
 - 1. Exterior joints in vertical surfaces and nontraffic horizontal surfaces.
 - 2. Interior joints in vertical surfaces and horizontal nontraffic surfaces.

1.3 SUBMITTALS

- A. Product Data: For each joint sealant product indicated.
- B. Samples: Cured Samples For each joint sealant product indicated including color selection charts.
- C. Sealant compatibility and adhesion test reports.
- D. Preconstruction field-adhesion test reports.
- E. Product certificates.

1.4 QUALITY ASSURANCE

- A. Sealant Compatibility and Adhesion Testing: Use sealant manufacturer's standard test methods to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
- B. Preconstruction Field-Adhesion Testing: Before installing elastomeric sealants, field test their adhesion to joint substrates. Coordinate with mockups where required that include sealant joints.
- C. Mockups: Before installing joint sealants, apply elastomeric sealants to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution.
 - 1. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 WARRANTY

- A. Special Installer's Warranty: Written warranty in which Installer agrees to repair or replace elastomeric joint sealants that do not meet requirements specified in this Section or fail in adhesion within specified warranty period two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products specified.

2.2 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
- B. Colors of Exposed Joint Sealants: As selected by architect from manufacturer's standard selection of a minimum of thirty different colors.

2.3 ELASTOMERIC JOINT SEALANTS

- A. Low-Modulus Nonacid-Curing Silicone Sealant (ES-1):
 - 1. Products:
 - a. Dow Corning; 790.
 - b. GE Silicones; UltraPruf SCS2300.
 - c. NUCO Industries, Inc.; NuFlex 309
 - d. Ohio Sealants, Inc.; VP 275.
 - e. Pecora Corporation; 890.
 - f. Polymeric Systems, Inc.; PSI-641.
 - g. Sonneborn Building Products Div., ChemRex Inc.; Omniseal.
 - h. Tremco; Spectrem 1.
 - 2. Type and Grade: S (single component) and NS (nonsag).
 - 3. Class: 25.
 - 4. Additional Movement Capability: Capable of 50 percent movement in extension and 50 percent movement in compression when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719.
 - 5. Exposure: Use NT (nontraffic).
 - 6. Substrates: Uses M, G, A, and, as applicable to joint substrates indicated, O.

7. Non-staining to porous substrates when testing per ASTM C 1248 for substrates indicated.

B. One-Part Mildew-Resistant Sealant (ES-4):

1. For joints not subject to traffic and requiring additional movement capability, provide the following:
 - a. Products:
 - 1) Pecora Corporation; Pecora 860.
 - 2) PPG Paints; Top Gun 350 Acid Curing Silicone Sealant, 1419 Series
 - b. Type and Grade: S (single component), NS (non-sag).
 - c. Class: 25.
 - d. Additional Movement Capability: 25 percent movement in extension and 25 percent in compression when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719.
 - e. Exposure: Use NT (nontraffic).
 - f. Substrates: M,G, A, and, as applicable to joint substrates indicated, O.

2.4 ACRYLIC EMULSION JOINT SEALANTS: (LS)

- a. Painter's caulk: INTERIOR JOINTS IN FIELD-PAINTED VERTICAL AND OVERHEAD SURFACES AT PERIMETER OF HOLLOW METAL DOOR FRAMES; IN GYPSUM DRYWALL, PLASTER AND CONCRETE OR CONCRETE MASONRY; AND ALL OTHER INTERIOR JOINTS NOT INDICATED OTHERWISE.

2.5 JOINT-SEALANT BACKING

- A. General: Provide sealant backings of material and type that are non-staining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:
 1. Type: C, (closed-cell material with a surface skin) O, (open-cell material) B, (bicellular material with a surface skin). Use C, O, or B in accordance with sealant manufacturer's written recommendations.
- C. Elastomeric Tubing Sealant Backings: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to minus 26 deg F Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and otherwise contribute to optimum sealant performance.

- D. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.6 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants with joint substrates.
- C. Masking Tape: Non-staining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants.
 - 1. Remove foreign material from joint substrates that could interfere with adhesion of joint sealant.
 - 2. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.
 - 3. Remove laitance and form-release agents from concrete.
 - 4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues could interfere with adhesion of joint sealants.
- B. Joint Priming: Prime joint substrates where recommended in writing by joint sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.
- D. Sealant Installation: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

- E. Install sealant backings to support sealants during application and at position required to produce optimum sealant movement capability.
 - 1. Do not leave gaps between ends of sealant backings.
 - 2. Do not stretch, twist, puncture, or tear sealant backings.
 - 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- F. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and back of joints.
- G. Place sealants so they directly contact and fully wet joint substrates.
 - 1. Completely fill recesses provided for each joint configuration.
 - 2. Produce uniform, cross-sectional shapes and depths that allow optimum sealant movement capability.
- H. Clean excess sealants or sealant smears adjacent to joints as installation progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.2 JOINT SEALANT SCHEDULE

- A. See CS1.1 for sealant schedule and recommended uses. **INSTALL JOINT SEALANTS IN ACCORDANCE WITH DESCRIPTIONS AND LOCATIONS LISTED, AND IN LOCATIONS IDENTIFIED ON DRAWINGS BY DRAWING DESIGNATIONS LISTED ABOVE.**

END OF SECTION 079200

SECTION 085313 - VINYL DOUBLE-HUNG WINDOWS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Vinyl double-hung windows.

1.2 RELATED SECTIONS

- A. Section 079200 – Joint Sealants: Sealants and caulking.

1.3 REFERENCES

- A. American Architectural Manufacturers Association (AAMA):
 - 1. AAMA 303 - Voluntary Specification for Poly (Vinyl Chloride) (PVC) Exterior Profile Extrusions; American Architectural Manufacturers Association.
 - 2. AAMA 502 – Voluntary Specification for Field Testing of Windows and Sliding Doors.
- B. ASTM International:
 - 1. ASTM C 1036 – Flat Glass.
 - 2. ASTM C 1048 – Heat-Treated Flat Glass--Kind HS, Kind FT Coated and Uncoated Glass.
 - 3. ASTM D 1929 – Standard Test Method for Determining Ignition Temperature of Plastics.
 - 4. ASTM D 3656 – Insect Screening and Louver Cloth Woven from Vinyl-Coated Glass Yarns.
 - 5. ASTM E 283 – Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Difference Across the Specimen.
 - 6. ASTM E 547 - Water Penetration of Exterior Windows, Curtain Walls and Doors by Cyclic Static Air Pressure Differential.
 - 7. ASTM E 1105 – Standard Test Method for Field Determination of Water Penetration of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
- C. Screen Manufacturers Association (SMA):
 - 1. SMA 1201 – Specifications for Insect Screens for Windows, Sliding Doors and Swinging Doors.
- D. Window and Door Manufacturers Association (WDMA):
 - 1. ANSI/AAMA/NWWDA 101/I.S.2 – Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors.

1.4 PERFORMANCE REQUIREMENTS

- A. Windows shall meet Rating H-R-PG specifications in accordance with ANSI/AAMA/NWWDA 101/I.S.2/A440-08 or ANSI/AAMA/NWWDA 101/I.S.2/A440-11.
- B. Window Air Leakage, ASTM E 283: Window air leakage when tested at 1.57 psf (25 mph) shall be 0.24 cfm/ft² of frame or less.

- C. Window Water Penetration, ASTM E 547: No water penetration through window when tested under static pressure of [3.0 psf (34 mph)] [5.25 psf (45 mph)] [7.5 psf (54 mph)] after 4 cycles of 5 minutes each, with water being applied at a rate of 5 gallons per hour per square foot.

1.5 SUBMITTALS

- A. Comply with Division 1 requirements.
- B. Product Data: Submit manufacturer's product data, including installation instructions.
- C. Shop Drawings: Submit manufacturer's shop drawings, indicating dimensions, construction, component connections and locations, anchorage methods and locations, hardware locations, and installation details.
- D. Samples: Submit full-size or partial full-size sample of vinyl double-hung windows illustrating glazing system, quality of construction, and color of finish.
- E. Warranty: Submit manufacturer's standard warranty.

1.6 QUALITY ASSURANCE

- A. Mockup:
 - 1. Provide sample installation for field testing window performance requirements and to determine acceptability of window installation methods.
 - 2. Approved mockup shall represent minimum quality required for the Work.
 - 3. Approved mockup shall remain in place within the Work.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials to site undamaged in manufacturer's or sales branch's original, unopened containers and packaging, with labels clearly identifying manufacturer and product name. Include installation instructions.
- B. Storage:
 - 1. Store materials in accordance with manufacturer's instructions.
 - 2. Store materials off ground and under cover.
 - 3. Protect materials from weather, direct sunlight, and construction activities.
- C. Handling: Protect materials and finish during handling and installation to prevent damage.

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Pella Corporation; Pella Encompass or approved equal, submitted in accordance with specification section 012500.

2.2 VINYL DOUBLE-HUNG WINDOWS

- A. Vinyl Double-hung Windows: Encompass by Pella.

1. Factory-assembled windows with sash installed in frame.
 2. Frame and Sash Material: Extruded, rigid polyvinylchloride (uPVC) complying with AAMA 303, having minimum ignition temperature 824 degrees F. when tested in accordance with ASTM D 1929.
- B. Frame:
1. Type:
 - a. Integral fin.
 - b. Integral fin with brick mold profile J-channel.
 - c. Block Frames (No Fin).
 2. Overall Frame Depth:
 - a. Integral Fin Frame: 4-3/16 inches for 2-9/16-inch wall depth.
 - b. Block Frame: 3-1/4 inches.
 3. Nominal Wall Thickness, Vinyl Members: 0.065 inch to 0.075 inch.
 4. Frame Corners:
 - a. Mitered.
 - b. Heat-fused, fully welded corners.
 5. Sill: Fitted with weeps.
 6. Jamb: Factory-drilled, counter-bored, installation screw holes.
- C. Sash:
1. Vent Sash: Removable for cleaning exterior glass.
 2. Sash Corners:
 - a. Mitered.
 - b. Heat-fused, fully welded corners.
- D. Glazing:
1. Float Glass: ASTM C 1036, Quality 1.
 - a. Tempered Glass: ASTM C 1048.
 2. Type: Exterior face-glazed, 3/4-inch, sealed insulating glass.
 - a. Clear tempered glass at windows specified on drawing A/5.1.
 - b. Obscure tempered glass at windows specified on drawing A/5.1.
- E. Weather Stripping:
1. Vent Sash: Fin-type, pile around perimeter.

2.3 OPTIONS

- A. Insect Screens:
1. Compliance:
 - a. ASTM D 3656.
 - b. SMA 1201.
 2. Screen Cloth: Full-size with black, vinyl-coated, 18/14 mesh, fiberglass screen cloth set in aluminum frame fitted to window exterior.
 3. Screens for window with frame height $\leq 51\text{-}1/2\text{'}$ have one plunger per side, screens for windows with frame height $> 51\text{-}1/2\text{'}$ have two plungers per side.
 4. Screens for windows with frame width $> 39\text{'}$ or frame height $> 53\text{-}1/2\text{'}$ have a screen spreader bar.
 5. Complete with necessary hardware.
 6. Screen Frame Finish: Baked enamel.
 - a. Color: Match window exterior.

2.4 HARDWARE

- A. Balances: Inverted Constant Force Stainless Steel Coil Balances.
- B. Lock:
 - 1. Type: Factory-installed, zinc-die-cast, self-aligning, cam-action lock on meeting rail.
 - 2. Units with Frame Width 29-1/2 Inches or Greater: 2 locks.
 - 3. Color: Match window interior.
- C. Tilt Latches:
 - 1. Type: Factory install zinc-die-cast, self-aligning tilt latches.
 - 2. Located on check rail of lower sash and top rail of upper sash.
 - 3. Color: Match window interior.
- D. Limited Opening Hardware:
 - 1. Nominal Opening: 3-3/4 inches.
 - 2. Extruded vinyl.
 - 3. Color: Match window interior.

2.5 TOLERANCES

- A. Windows shall accommodate the following opening tolerances:
 - 1. Horizontal Dimensions Between High and Low Points: Plus 1/4 inch, minus 0 inch.
 - 2. Width Dimensions: Plus 1/4 inch, minus 0 inch.
 - 3. Building Columns or Masonry Openings: Plus or minus 1/4 inch from plumb.

2.6 FINISH

- A. Window Frame and Sash Vinyl Extrusions: Integral color throughout profile.
- B. Exposed Surfaces: Smooth, glossy, and uniform in appearance.
- C. Color: White.

2.7 INSTALLATION ACCESSORIES

- A. Flashing/Sealant Tape: Pella SmartFlash.
 - 1. Aluminum-foil-backed butyl window and door flashing tape.
 - 2. Maximum Total Thickness: 0.013 inch.
 - 3. UV resistant.
 - 4. Verify sealant compatibility with sealant manufacturer.
- B. Interior Insulating-Foam Sealant: Low-expansion, low-pressure polyurethane insulating window and door foam sealant.
- C. Exterior Perimeter Sealant: "Pella Window and Door Installation Sealant" or equivalent high quality, multi-purpose sealant as specified in the joints sealant section.
- D. Jamb Extensions: Factory-applied, primed-wood jamb extensions for 4-9/16-inch wall depth.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive vinyl double-hung windows. Notify Architect of conditions that would adversely affect installation or subsequent use. Do not proceed with installation until unsatisfactory conditions are corrected.

3.2 INSTALLATION

- A. Install vinyl double-hung windows in accordance with manufacturer's instructions.
- B. Install vinyl double-hung windows to be weather-tight and freely operating.
- C. Maintain alignment with adjacent work.
- D. Secure assembly to framed openings, plumb and square, without distortion.
- E. Integrate vinyl double-hung window installation with exterior weather-resistant barrier using flashing/sealant tape. Apply and integrate flashing/sealant tape with weather-resistant barrier using watershed principles in accordance with window manufacturer's instructions.
- F. Seal vinyl double-hung windows to exterior wall cladding with sealant and related backing materials at perimeter of assembly.
- G. Place interior seal around vinyl double-hung window perimeter to maintain continuity of building thermal and air barrier using backer rod and sealant.
- H. Leave vinyl double-hung windows closed and locked.

3.3 FIELD QUALITY CONTROL

- A. Field Testing: Field water testing shall be conducted in accordance with ASTM E1105 Test Procedure B. The test pressure shall be based on the maximum positive components and cladding design pressure. Utilizing the AAMA 502 field test reduction, the water test pressure is 10% of the maximum positive design pressure.

3.4 CLEANING

- A. Clean vinyl double-hung windows in accordance with manufacturer's instructions.
- B. Do not use harsh cleaning materials or methods that would damage finish or glass.
- C. Remove labels and visible markings.
- D. Keep window tracks clear of dirt and debris.
- E. Keep weep holes open and clear of obstructions.

3.5 PROTECTION

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

END OF SECTION

SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior gypsum board.
2. Exterior gypsum board.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.3 INTERIOR GYPSUM BOARD

- A. 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. American Gypsum.
2. Georgia-Pacific Gypsum LLC.
3. USG Corporation.

- B. Gypsum Board, Type X: ASTM C 1396/C 1396M.

1. Thickness: 1/2 inch (15.9 mm).
2. Long Edges: Tapered.

- C. Gypsum Ceiling Board, Type X: ASTM C 1396/C 1396M.

1. Thickness: 1/2 inch (15.9 mm)
2. Long Edges: Tapered.

1.4 EXTERIOR GYPSUM BOARD

- A. 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. American Gypsum
2. Georgia-Pacific Gypsum LLC.
3. USG Corporation.

- B. Glass-Mat Gypsum Sheathing Board: ASTM C 1177/C 1177M, with fiberglass mat laminated to both sides and with manufacturer's standard edges.

1. Core: 1/2 inch (12.7 mm), Type X.

1.5 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475/C 475M.
- B. Joint Tape:
 - 1. Interior Gypsum Board: Paper.
- C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

1.6 AUXILIARY MATERIALS

- A. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
- B. Thermal Insulation: As specified in Section 072100 "Thermal Insulation."

PART 2 - EXECUTION

2.1 APPLYING AND FINISHING PANELS

- A. Comply with ASTM C 840.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- D. Install trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- E. Prefill open joints and damaged surface areas.
- F. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- G. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
 - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 - 2. Level 2: Panels that are substrate for tile.
 - 3. Level 3: At panel surfaces above the ceiling plane or unoccupied spaces.
 - 4. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.

- H. Protect adjacent surfaces from drywall compound and texture finishes and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- I. Remove and replace panels that are wet, moisture damaged, and mold damaged.

END OF SECTION 092900

SECTION 096513 - RESILIENT BASE AND ACCESSORIES

1.1 SUMMARY

A. Section Includes:

1. Resilient base.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

- B. Samples: For each exposed product and for each color and texture specified, not less than **12 inches (300 mm)** long.

PART 2 - PRODUCTS

2.1 VINYL BASE

- A. Basis of Design: Johnsonite, or approved equal.
- B. Provide COLOR-INTEGRATED VINYL Wall Base having a nominal total thickness of 1/8 in. (3.2 mm), meeting the requirements of ASTM F 1861, Type TV - Vinyl, Thermoplastic, Group 1 - Solid, Straight Base. The material shall consist of a composition of polyvinyl chloride resin binder, fillers and pigments.
- C. Color: 20 Charcoal WG.
- D. Corners will be formed on the job.
- E. Adhesives: Manufacturer's Standard Wall Base Adhesive.

2.2 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- C. Do not install resilient products until they are the same temperature as the space where they are to be installed.
- D. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.2 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- G. Preformed Corners: Install preformed corners before installing straight pieces.
- H. Job-Formed Corners:
 - 1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than **3 inches (76 mm)** in length.
 - a. Form without producing discoloration (whitening) at bends.
 - 2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than **3 inches (76 mm)** in length.
 - a. Miter or cope corners to minimize open joints.

3.3 RESILIENT ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.
- B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.
- B. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION 096513

SECTION 096519 – RESILIENT TILE FLOORING

PART 1 – GENERAL

1. SUBMITTALS
 - a. Product Specification
 - b. Specification for Adhesive
 - c. Floor Layouts
 - d. Samples
 - e. Qualifications for Installer
2. CLOSEOUT SUBMITTALS
 - a. Maintenance Instructions
 - b. Warranty
3. QUALITY ASSURANCE
 - a. Installer Qualifications: Installer who has been trained in the installation of resilient plank flooring.
4. MATERIAL STORAGE AND HANDLING
 - a. Store tiles on a flat surface and squarely on top of one another.
 - b. Store away from vents and direct sunlight.
 - c. Store in protected dry conditions between 65 and 85 degrees.
5. SITE CONDITIONS
 - a. Material and adhesive must be acclimated to the installation area for a minimum of 48 hours prior to installation.

PART 2 – PRODUCTS

1. Basis-of-Design Product: Subject to compliance with requirements, provide Shaw Contract; Reside, Solace or approved equal, submitted in accordance with specification section 012500.
2. RESILIENT TILE:
 - a. Basis of Design Manufacturer: Shaw Contract
 - b. Basis of Design Product Collection: Reside
 - c. Style Number: 4381V
 - d. Size: 6"x47" (15cm x 120 cm)
 - e. Color: Solace, 94700
 - f. Installation method: stagger
 - g. Construction: Heavy Commercial Luxury Vinyl Tile
 - h. Wear-layer Thickness: 0.012 in | 20 mil
 - i. Overall Thickness: 0.086 in | 2.2 mm
 - j. Finish: ExoGuard+™
 - k. Installation: Direct Glue
3. INSTALLATION MATERIALS
 - a. Adhesives:
 - i. As recommended by the manufacturer

- b. Weld Rod
 - i. Heat
- c. Primer: Shaw 9050
- d. Leveling and Patching Compounds: Use only Portland-based patching and leveling compounds. Do not install resilient flooring over gypsum-based patching and/or leveling compounds.
- e. Take Abatement Coating: Shaw 6200
- f. Barrier Coat Floor Encapsulation: Shaw 9000
- g. Floor Polish

PART 3 – EXECUTION

1. EXAMINATION

- a. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content, pH, smoothness and level.
- b. Proceed with installation after any unsatisfactory conditions have been corrected.

2. PREPARATION

- a. Concrete substrates should be tested for Internal Relative Humidity according to ASTM F 2170 and must not exceed 90% RH.
- b. The PH of the concrete sub-floor must be between 7 and 10.
- c. Substrates shall be smooth, structurally sound, permanently dry, clean and free of all foreign material such as dust, wax, solvents, paint, grease, oils, old adhesive residue, curing and hardening/ curing compounds, sealers and other foreign material that might prevent adhesive bond.
- d. Concrete floors shall be flat and smooth within 1/8" in 6 feet or 3/16" in 10 feet.

3. INSTALLATION

- a. LAYOUT AND INSTALLATION
- b. Install using conventional tile and plank installation techniques. Plank products should have a minimum of 6 to 8" seam stagger.
- c. Center rooms so borders are not less than half of a tile or plank.
- d. Work out of multiple boxes at the same time.
- e. In small spaces, work lengthwise from one end.
- f. Ensure cut edges are always against the wall.
- g. To cut products, score the top side of the material with a utility knife. Bend the product and finish the cut through the back side. It may be necessary to use a heat gun to cut around vertical obstructions. Allow the heated product to return to room temperature before installation.
- h. If you cut the product into a fine point, it may delaminate. Use an ethyl cyanoacrylate-based super glue to fuse the points together. Clean all glue from the top surface immediately. Alcohol-based super glues may cause the vinyl to swell.
- i. Roll the plank or tile with a 3-section 100 lb. roller. Re-roll the floor within the working time of the adhesive. Continue to roll the floor throughout the working day to ensure a proper bond.

- j. Use floor protection after installation. DO NOT use a plastic adhesive-based protection system.
4. MAINTENANCE
- a. Initial Maintenance
 - i. Sweep, vacuum or dust mop to remove dirt and grit.
 - ii. If needed, add neutral cleaner to cool water following the manufacturer's instructions.
 - iii. Scrub with a low-rpm machine or auto scrubber. Use a red pad or brush.
 - iv. Never use brown or black pads (too aggressive and can damage the product)
 - v. Remove the cleaning solution with a wet-dry vacuum or auto scrubber until the floor is dry.
 - vi. Rinse the floor with clean water. Repeat the rinse process if necessary to remove all haze.
 - b. Routine Maintenance
 - i. Sweep, vacuum or dust mop to remove dirt and grit.
 - ii. Add neutral pH cleaner to cool water following the manufacturer's instructions.
 - iii. As needed, scrub with a low-rpm machine or auto scrubber to retain appearance. Use a red (light scrubbing) pad and neutral cleaner following the manufacturer's instructions.
 - c. Preventative Floor Care
 - i. Use mats with a non-staining backing.
 - ii. Floor protectors should be used on all furniture legs.
 - iii. The surface area of the floor protectors should be no less than 1" in diameter.
 - d. Full maintenance instructions will be provided by the manufacturer.

END OF SECTION 096519

SECTION 099123 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes surface preparation and the application of paint systems on the following interior substrates:
 - 1. Wood.
 - 2. Gypsum board.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: For each finish and for each color and texture required.
- C. Product List: Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.

1.3 QUALITY ASSURANCE

- A. MPI Standards:
 - 1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."
 - 2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and paint systems indicated.
- B. Mockups:
 - 1. Apply samples of each paint system indicated and each color and finish selected, in order to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects.
 - 2. Architect will select one representative surface for application of each paint system specified in Part 3. Provide samples of at least 100 sq. ft. (9 sq. m). Architect may designate other items or areas, as required.
 - 3. If preliminary samples are not approved, apply additional samples of colors selected by Architect at no added cost to Owner.
 - 4. Approved samples will become benchmarks to set quality standards for materials and execution. Final approval of color selections will be based on benchmark samples.

1.4 EXTRA MATERIALS

- A. Furnish an additional 5 percent extra of each material described below, but not less than 1 gal. (3.8 L), that is from same production run (batch mix) as materials applied. Package extra materials for storage and identify with labels describing contents.

PART 2 - PRODUCTS

2.1 PAINT, GENERAL

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product specified in this section or comparable product approved by the Architect.
- B. Material Compatibility:
 - 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- C. VOC Content of Field-Applied Interior Paints and Coatings: Provide products that comply with the following limits for VOC content, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24); these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:
 - 1. Flat Paints, Coatings, and Primers: VOC content of not more than 50 g/L.
 - 2. Nonflat Paints, Coatings, and Primers: VOC content of not more than 150 g/L.
 - 3. Anti-Corrosive and Anti-Rust Paints Applied to Ferrous Metals: VOC not more than 250 g/L.
 - 4. Floor Coatings: VOC not more than 100 g/L.
 - 5. Shellacs, Clear: VOC not more than 730 g/L.
 - 6. Shellacs, Pigmented: VOC not more than 550 g/L.
 - 7. Flat Topcoat Paints: VOC content of not more than 50 g/L.
 - 8. Nonflat Topcoat Paints: VOC content of not more than 150 g/L.
 - 9. Anti-Corrosive and Anti-Rust Paints Applied to Ferrous Metals: VOC not more than 250 g/L.
 - 10. Floor Coatings: VOC not more than 100 g/L.
 - 11. Shellacs, Clear: VOC not more than 730 g/L.
 - 12. Shellacs, Pigmented: VOC not more than 550 g/L.
 - 13. Primers, Sealers, and Undercoaters: VOC content of not more than 200 g/L.
 - 14. Dry-Fog Coatings: VOC content of not more than 400 g/L.
 - 15. Zinc-Rich Industrial Maintenance Primers: VOC content of not more than 340 g/L.
 - 16. Pre-Treatment Wash Primers: VOC content of not more than 420 g/L.
- D. Chemical Components of Field-Applied Interior Paints and Coatings: Provide topcoat paints and anti-corrosive and anti-rust paints applied to ferrous metals that comply with the following chemical restrictions; these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:

1. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
2. Restricted Components: Paints and coatings shall not contain any of the following:
 - a. Acrolein.
 - b. Acrylonitrile.
 - c. Antimony.
 - d. Benzene.
 - e. Butyl benzyl phthalate.
 - f. Cadmium.
 - g. Di (2-ethylhexyl) phthalate.
 - h. Di-n-butyl phthalate.
 - i. Di-n-octyl phthalate.
 - j. 1,2-dichlorobenzene.
 - k. Diethyl phthalate.
 - l. Dimethyl phthalate.
 - m. Ethylbenzene.
 - n. Formaldehyde.
 - o. Hexavalent chromium.
 - p. Isophorone.
 - q. Lead.
 - r. Mercury.
 - s. Methyl ethyl ketone.
 - t. Methyl isobutyl ketone.
 - u. Methylene chloride.
 - v. Naphthalene.
 - w. Toluene (methylbenzene).
 - x. 1,1,1-trichloroethane.
 - y. Vinyl chloride.

- E. Colors: As selected by Architect from manufacturer's full range, allow for up to 6 colors in multiple sheens to be selected.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 1. Concrete: 12 percent.
 2. Masonry (Clay and CMU): 12 percent.
 3. Wood: 15 percent.
 4. Gypsum Board: 12 percent.
 5. Plaster: 12 percent.

- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
 - 1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION AND APPLICATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
- B. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.
- C. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- D. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- E. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.3 INTERIOR PAINTING SCHEDULE

- A. Dressed Lumber Substrates:
 - 1. High-Performance Architectural Latex System:
 - a. Prime Coat: SW: PrepRite ProBlock Int./Ext. Latex Primer/Sealer, B51 series
Dur: Terminator 2 Int./Ext. Latex Primer/Sealer, 171series
MAB: PrepRite ProBlock Int./Ext. Latex Primer/Sealer, B51 series
 - b. Intermediate Coat:
SW: Pro Industrial Pre-Catalyzed Water Based Epoxy Semi-Gloss (K46 series)
Dur: Pro Industrial Pre-Catalyzed Water Based Epoxy Semi-Gloss (K46 series)
MAB: Pro Industrial Pre-Catalyzed Water Based Epoxy Semi-Gloss (K46 series)
 - c. Topcoat:

SW: Pro Industrial Pre-Catalyzed Water Based Epoxy Semi-Gloss (K46 series)
Dur: Pro Industrial Pre-Catalyzed Water Based Epoxy Semi-Gloss (K46 series)
MAB: Pro Industrial Pre-Catalyzed Water Based Epoxy Semi-Gloss (K46 series)

B. Gypsum Board Substrates:

1. High-Performance Architectural Latex System:

a. Prime Coat:

SW: ProMar 200 Zero VOC Latex Primer, B28W2650

Dur: Acrylic Drywall Primer, 04-124

MAB: ProMar 200 Zero VOC Latex Primer, B28W2650

a. Intermediate Coat:

SW: Pro Industrial Pre-Catalyzed Water Based Epoxy Eg-Shel (K45 series)

Dur: Pro Industrial Pre-Catalyzed Water Based Epoxy Eg-Shel(K45 series)

MAB: Pro Industrial Pre-Catalyzed Water Based Epoxy Eg-Shel(K45 series)

b. Top Coat:

SW: Pro Industrial Pre-Catalyzed Water Based Epoxy Eg-Shel (K45 series)

Dur: Pro Industrial Pre-Catalyzed Water Based Epoxy Eg-Shel(K45 series)

MAB: Pro Industrial Pre-Catalyzed Water Based Epoxy Eg- Shel(K45 series)

END OF SECTION 099123

SECTION 102800 - TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Bathroom accessories.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
 - 1. Identify locations using room designations indicated.
 - 2. Identify products using designations indicated.

1.4 INFORMATIONAL SUBMITTALS

- A. Warranty: Sample of special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.6 WARRANTY

- A. Special Mirror Warranty: Manufacturer's standard form in which manufacturer agrees to replace mirrors that develop visible silver spoilage defects and that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 WASHROOM AND SHOWER ROOM ACCESSORIES

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product approved by the Architect.

2.2 TOWEL BARS/ TOILET PAPER HOLDERS

- A. 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:
- B. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
 - 1. Square towel bar by Pamex.
 - 2. Donner Economy Collection by Moen.

2.3 RECESSED MIRRORED MEDICINE CABINET

- A. 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:
- B. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
 - 1. Ketcham by Grainger.

2.4 GRAB BARS

- A. 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:
- B. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
 - 1. B-6806 Series straight grab bars by Bobrick.

2.5 FABRICATION

- A. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
- B. Grab Bars: Install to withstand a downward load of at least 250 lbf (1112 N), when tested according to ASTM F 446.

END OF SECTION 102800

SECTION 220250 - INSULATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Piping Insulation
- B. Jackets and Accessories
- C. Equipment Insulation
- D. Covering
- E. Insulation Jackets

1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM)
- B. National Fire Protection Association (NFPA)
- C. Underwriters Laboratories (UL)
- D. ASHRAE Standard 90A-1980

1.3 SUBMITTALS

- A. Submit in accordance with provisions.
- B. Product Data: Provide product description, list of materials and thickness for each service, and locations.

1.4 QUALITY ASSURANCE

- A. Materials: Flame spread/smoke developed rating of 25/50 or less in accordance with ASTM E84, NFPA 255, UL 723.

PART 2 - PRODUCTS

2.1 PIPING

- A. Manufacturers:
 - 1. Owens-Corning
 - 2. Johns Manville
 - 3. Certainteed
 - 4. Armstrong

5. PPG

2.2 DOMESTIC WATER PIPING INSULATION

- A. All domestic hot and cold water pipes, fittings, flanges, and valves shall be insulated with heavy density fiberglass insulation similar to Owens/Corning Fiberglass 24ASJ/SSL pipe insulation or equal with all service jacket, self-sealing lap and UL listed. Insulation shall have flame spread rating of 25 or less when tested by ASTM E-84 method.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that piping, equipment, materials, have been tested before applying insulation materials.
- B. Verify that surfaces are clean, foreign material removed, and dry.

3.2 INSTALLATION

- A. Install materials in accordance with manufacturer's instructions.
- B. On exposed piping, locate insulation and cover seams in least visible locations.
- C. Insulated pipes and equipment conveying fluids below ambient temperature:
1. Provide vapor barrier jackets, factory applied or field applied.
 2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe.
 3. PVC fitting covers shall be used.
 4. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations.
 5. Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, and expansion joints.
- D. For insulated pipes and equipment conveying fluids above ambient temperature:
1. Provide standard jackets, with vapor barrier, factory applied or field applied.
 2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe.
 3. PVC fitting covers shall be used.
- E. Install insulation for equipment requiring access for maintenance, repair, or cleaning, in such a manner that it can be easily removed and replaced without damage.
- F. Insulation including finishes and adhesive on the exterior surfaces of ducts and equipment shall have a flame spread rating of 25 or less and a smoke developed rating of 50 or less as determined by an independent testing laboratory in accordance with NFPA 255-1972 as required by NFPA 90A. Smoke development rating for pipe insulation shall not exceed 50.
- G. Plumbing piping shall be insulated with thickness of insulation indicated below:
1. CW Pipe – 0.5" thick or minimum as required by code.
 2. Hot Water/HW Recirc:
 - a. Up to 2" pipe size – 1.0" or minimum as required by code.

END OF SECTION 220250

SECTION 220410 - PLUMBING PIPING & SPECIALTIES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Pipe and Pipe Fittings
- B. Valves
- C. Sanitary Sewer Piping System
- D. Domestic Water Piping System

1.2 REFERENCES

- A. ASME B16.3 - Malleable Iron Threaded Fittings.
- B. ASME B16.18 - Cast Bronze Solder-Joint Pressure Fittings.
- C. ASME B16.22 - Wrought Copper and Bronze Solder-Joint Pressure Fittings
- D. ASME B16.23 - Cast Copper Alloy Solder-Joint Drainage Fittings - DWV.
- E. ASME B16.29 - Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings - DWV.
- F. ASTM A47 - Ferritic Malleable Iron Castings.
- G. ASTM A53 - Pipe, Steel, Black and Hot-Dipped Zinc Coated, Welded and Seamless.
- H. ASTM A74 - Cast Iron Soil Pipe and Fittings.
- I. ASTM A120 - Pipe, Steel, Black and Hot-Dipped Zinc Coated (Galvanized), Welded and Seamless, for Ordinary Uses.
- J. ASTM A234 - Pipe Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures.
- K. ASTM B32 - Solder Metal.
- L. ASTM B88 - Seamless Copper Water Tube.
- M. ASTM C564 - Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
- N. AWWA C111- Rubber-Gasket Joints for Ductile Iron and Gray-Iron Pressure Pipe and Fittings.
- O. AWWA C651 - Disinfecting Water Mains.

- P. CISPI 301 - Cast Iron Soil Pipe and Fittings for Hubless Cast Iron Sanitary Systems.
- Q. NFPA 54 - National Fuel Gas Code, latest enforced version.
- R. ICC 2021 – International Fuel Gas Code, or latest enforced version.

1.3 SUBMITTALS

- A. Submit in accordance with provisions.
- B. Product Data: Provide data on pipe materials, pipe fittings, valves, specialties and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.

PART 2 - PRODUCTS

2.1 SANITARY SEWER PIPING, ABOVE GRADE, DRAIN AND VENT

- A. Cast Iron Pipe: ASTM A74, service weight.
 - 1. Fittings: Cast iron.
 - 2. Joints: ASTM C564, neoprene gasket system.
- B. Cast Iron Pipe: CISPI 301, hubless, service weight.
 - 1. Fittings: Cast iron.
 - 2. Joints: Neoprene gaskets and stainless steel clamp-and-shield assemblies.
- C. PVC Pipe: ASTM D2655 (if approved by local authority), Schedule 40, Solid Wall:
 - 1. Fittings: PVC
 - 2. Joints: ASTM D2855, solvent weld with ASTM D2564 solvent cement
 - 3. For use above ground sanitary vent piping only

2.2 WATER PIPING, ABOVE GRADE

- A. PEX-a Plastic Tubing (Uponor AQUAPEX or equal by Viega, Manabloc, Nibco): ASTM F 876, ASTM F877; IPC 2009, UCC 2009, NSF 61 Annex G
 - 1. Fittings: Uponor PROPEX or equal by Viega, Manabloc, Nibco: ASTM F877, ASTM F1807, NSF 61 Annex G
 - 2. Blue for cold water, red for hot water.
- B. Manifolds: Viega, Uponor, Manabloc, Nibco; ASTM F877, NSF 61 Annex G
- C. Provide complete PEX system including stop valves, tees, supports, plugs, adapters, rings, etc.

2.3 BALL VALVES

- A. Manufacturers:
 - 1. Nibco
 - 2. Viega
 - 3. Marabloc
 - 4. Uponor

- B. PEX, ASTM 877, ASTM F1807, NSF 61 Annex G

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that excavations are to required grade, dry, and not over-excavated.
- B. Ream pipe and tube ends. Remove burrs.
- C. Remove scale and dirt, on inside and outside, before assembly.
- D. Prepare piping connections to equipment with flanges or unions.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.
- C. Route piping in orderly manner and maintain gradient.
- D. Install piping to conserve building space and not interfere with use of space.
- E. Group piping whenever practical at common elevations.
- F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- G. Provide clearance for installation of insulation and access to valves and fittings.
- H. Provide access where valves and fittings are not exposed.
- I. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.
- J. Install bell and spigot pipe with bell end upstream.
- K. Install valves with stems upright or horizontal, not inverted.
- L. Pipe vents from gas pressure reducing valves to outdoors and terminate in weather proof hood.
- M. The Contractor shall provide suitable gas pressure regulators of a type approved by the local gas company. All regulators shall be properly vented to the atmosphere.
- N. The Contractor shall furnish and install wedge type shutoff valves and unions at each piece of gas-fired equipment. Valves shall be installed with handle lever on top when installed in vertical configuration.
- O. Solenoid valves for auto gas shut-off shall be normally closed type.

- P. Installation of gas piping shall be in accordance with ICC 2021 International Fuel Gas Code, or latest enforced code.
- Q. Install unions downstream of valves and at equipment or apparatus connections.
- R. Install ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.
- S. Install ball valves for throttling, bypass, or manual flow control services.
- T. Provide plug valves in Natural gas systems for shut-off service.
- U. Provide flow controls in water recirculating systems where indicated.
- V. Horizontal drainage lines shall be laid to a uniform pitch of 1/4" per foot, if practical, but in no case less than 1/8" to the foot, except where otherwise specifically detailed on the drawings. Each length of pipe and each fitting shall be inspected for defects before installation. Any defective pipe or fitting damaged during or after installation shall be replaced. Each length of pipe shall be laid to bring the inverts to the required line and grade. No stretch of joints will be allowed. All pipe shall be installed to a true straight line. Piping shall be bedded on firm earth foundation of uniform density carefully shaped to fit the lower section of pipe. Each section of pipe shall have a full bearing along its entire length, except at joints where clearance shall be allowed for making up joints. Any length which shows settlement after laying or which is not in true alignment shall be taken up and reset. Under track or roads, the piping shall be run in a standard weight steel pipe sleeve.
- W. Slope water piping and arrange to drain at low points.
- X. Cleanouts shall be installed where indicated on the drawings and at all bends, angles, upper terminals, and not over 50' apart in any lineal run of piping. All cleanouts shall be accessible.
- Y. All horizontal sanitary vent piping shall be sloped a minimum of 1/4" per ft.
- Z. All underslab sanitary sewer piping shall be minimum 2" size.

3.3 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

- A. Prior to starting work, verify system is complete, flushed and clean.
- B. Ensure PH of water to be treated is between 7.4 and 7.6 by adding alkali (caustic soda or soda ash) or acid (hydrochloric).
- C. Inject disinfectant, free chlorine in liquid, powder, tablet or gas form, throughout system to obtain 50 to 80 mg/L residual.
- D. Bleed water from outlets to ensure distribution and test for disinfectant residual at minimum 15% of outlets.
- E. Maintain disinfectant in system for 24 hours.
- F. If final disinfectant residual tests less than 25 mg/L, repeat treatment.

- G. Flush disinfectant from system until residual equal to that of incoming water or 1.0 mg/L.
- H. Take samples no sooner than 24 hours after flushing, from outlets and from water entry, and analyze in accordance with AWWA C651.
- I. Provide Owner with test locations and final report/certification.

3.4 OPERATING ADJUSTMENTS

- A. All flush valves shall be adjusted for quiet operation and to pass the required amount of water for the proper flushing action.

3.5 TEST OF WATER SUPPLYING SYSTEM

- A. At the completion of the work, the water supply system must be tested to do a hydrostatic pressure of 50 pounds over the working pressure but not less than 100 pounds to the square inch.
- B. Any water piping run in chases, in walls, or in any way concealed by structural work must be tested to above pressure and proven tight before the pipes are concealed.

3.6 TESTS OF PLUMBING AND DRAINAGE SYSTEMS

- A. The entire system of soil, waste, drain and vent piping must be tested with water or air, as hereinafter described and proved tight to the satisfaction of representatives of Architect/ Engineer before trenches are backfilled, or fixtures connected. Testing instruments must be furnished by the Plumbing Contractor.
- B. When water is used for testing, the drainage system below ground floor shall be filled with water to top of a vertical section of pipe 10' high (except for clay pipe) temporarily connected to the highest point on the lines to be tested. The water shall be allowed to stand for at least 60 minutes for inspection, after which if the lines prove tight, the water is to be drawn off, connection made with the sanitary sewer and trenches backfilled.
- C. All plumbing and drainage piping above the ground floor line must have the openings plugged where necessary and be filled with water to the level of the main roof or tops of vent pipes. The water shall be allowed to stand for at least 60 minutes for inspection, after which if the lines prove tight, the water is drawn off and the fixtures connected.
- D. When air is used for testing, a pressure of not less than 20" of mercury must be maintained without pressure loss for at least 15 minutes. A mercury column gauge must be used in making air tests.

END OF SECTION 220410

SECTION 220440 - PLUMBING FIXTURES & EQUIPMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Water Closets
- B. Lavatories
- C. Sinks
- D. Showers
- E. Tubs
- F. Carriers
- G.

1.2 SUBMITTAL

- A. Submit in accordance with provisions of Section 220010.
- B. Product Data: Provide catalogue illustrations of fixtures, sizes, rough-in dimensions, utility sizes, trim, and finishes.

PART 2 - PRODUCTS

2.1 WATER CLOSET (WC-1) (ADA)

- A. Furnish and install 17" High Bowl height, floor mounted, Elongated Water Closet Niagara "The Original" Model N7717 Bowl and N7714TFH Tank. Pressure-assist flush chamber and air transfer system, low consumption 0.8 gpf. Unit shall include closed front seat with cover, vitreous china construction, and chrome supply pipe and valve.

2.2 WATER CLOSET (WC-2)

- A. Furnish and install 17" High Bowl height, floor mounted, Elongated Water Closet Niagara "The Original" Model N7717 Bowl and N7714TFH Tank. Pressure-assist flush chamber and air transfer system, low consumption 0.8 gpf. Unit shall include closed front seat with cover, vitreous china construction, and chrome supply pipe and valve. Unit shall be ADA.

2.3 LAVATORY (LV-1)

- A. Furnish and install small single hole style vanity. Faucet shall be Glacier Bay, Arnette, 1.2 GPM, fitted with Neoperl 1.0 GPM Flow Restrictor/Aerator, shall have chrome finish, One-Handle Lavatory Faucet. Unit shall be supplied with Glacier Bay Pop-Up drain, adjustable P-trap, flexible supply pipes. Faucet shall be compatible with countertop as supplied by the general contractor.

2.4 LAVATORY (LV-2) (ADA)

- A. Furnish and install ADA compliant, wall mounted, extra thick vitreous china lavatory, American Standard Declyn, 18-1/2" wide by 17" wide (maximum) with a 6" deep bowl, rectangular, bathroom lavatory, with 3 faucet holes on 4" centers. Shall have integral overflow and be provided with concealed arm supports. Shall be provided with Chrome Plated faucet, pop-up drain, and tailpiece. Faucet shall be Moen, , model no. 8413F15, 1.5 gpm, Chrome plated solid brass construction with ADA compliant, lever handle faucet, with ceramic disc cartridge, for usage where mounting using 3 - 1" diameter holes on 4" centers.

2.5 BATHTUB/SHOWER (P-1)

- A. Furnish and install American Standard Princeton Bathtub in color selected by Architect.
 - 1. Type: Acid resisting porcelain finish bath with integral apron, slip resistant bottom, left hand or right hand outlets as required, integral base, Americast material, integral overflow, drain stopper assembly, and escutcheons.
- B. Trim:
 - 1. Furnish and install Delta Commercial Bathtub/Shower Trim Model T13H202 with Danze Model D460027 shower head.
 - 2. Anti-scald balance pressure balancing tub/shower valve with color coded dial plate, heavy cast bronze body with integral checkstops, adjustable high temperature limit stop, and chrome plated brass lift-latch diverter spout, shower arm, flange and shower head.
- C. Surrounds:
 - 1. Furnish and install Maax Iredell Bathtub/Shower 5-piece glue-up Wall Kit Model #807137-000-129-000.
 - 2. Surrounds shall be Maax Iredell in color selected by the Architect.
 - 3. Surrounds shall include soap dish, recessed shampoo shelf, curtain rod and curtain.
- D. Trap: Provide P-Trap with cleanout.

2.6 KITCHEN SINK (SK-1)

- A. Furnish and install Elkay stainless steel double compartment Celebrity Sink Model STCR3322L with 3 holes on 4" centers and 7" deep bowls. Faucet shall be Wolverine Brass Endurance Model #85000 single lever handle faucet with 8" centers, aerator and flow restrictor. Sinks shall include JB Product 11335 drain with basket and PASCO waste arm. Units shall be supplied with Zurn Z8808LR flexible pipes and Dearborn Brass P9704BG P-Trap.

2.7 KITCHEN SINK (SK-2) (ADA)

- A. Furnish and install Elkay stainless steel double compartment Dayton Sink Model GE23322 with 3 holes on 4" centers and 5-3/8" deep bowls. Faucet shall be Wolverine brass Endurance Model #85000 single lever handle faucet with 8" centers, aerator and flow restrictor. Sinks shall include JB Product 11335 drain with basket and PASCO waste arm. Unit shall be supplied with Zurn Z8808LR flexible pipes and Dearborn Brass P970FBG P-Trap. Sink and faucet shall be ADA compliant.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that walls and floor finishes are prepared and ready for installation of fixtures.
- B. Verify that electric power is available and of the correct characteristics.

3.2 PREPARATION

- A. Rough-in fixture piping connections in accordance with minimum sizes indicated in fixture rough-in schedule for particular fixtures.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install each fixture with trap, easily removable for servicing and cleaning.
- C. Provide chrome plated rigid or flexible supplies to fixtures with stops, reducers, and escutcheons.
- D. Install components level and plumb.
- E. Install and secure fixtures in place.
- F. Seal fixtures to wall and floor surface with sealant as specified in Section 07 09 00, color to match fixture.
- G. Solidly attach water closets to floor with lag screws.

3.4 INTERFACE WITH OTHER PRODUCTS

- A. Review millwork shop drawings. Confirm location and size of fixtures and openings before rough-in and installation.

3.5 ADJUSTING

- A. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

3.6 CLEANING

- A. At completion clean plumbing fixtures and equipment.

3.7 PROTECTION OF FINISHED WORK

- A. Protect finished work.
- B. Do not permit use of fixtures.

3.8 FIXTURE HEIGHTS

- A. Install fixtures to heights above finished floor as indicated on the Architectural Drawings.

END OF SECTION 220440

SECTION 230010 – MECHANICAL GENERAL PROVISIONS

PART 1 - GENERAL

1.1 GENERAL

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to all Division 23 Specification Sections.
- B. All references to Mechanical Contractor, HC or MC shall be same as reference to HVAC Contractor.

1.2 SCOPE OF PROJECT

- A. Provide a complete and operating heating, ventilating and air conditioning installation in accordance with these specifications and accompanying contract drawings. This includes all required labor, materials, apparatus, and supervision.
- B. The work shall include but is not limited to the following systems, equipment, materials, and labor for a complete system including the following:
 - 1. Finned Tube Radiation
 - 2. Ductwork
 - 3. Diffusers, Registers & Grilles (D & R)
 - 4. Exhaust Fans (EF)

1.3 DESCRIPTION OF BASE BID AND ALTERNATE BIDS

- A. Refer to Specification Section 012300.

1.4 UNIT PRICE ITEMS

- A. Refer to Section 012129 and 012200.

1.5 DEFINITION OF WORK RESPONSIBILITY

- A. All electrical control components including starters required for operation of HVAC and plumbing equipment whether integral or remote shall be furnished and installed under this Contract. Control wiring, conduits and accessories for control devices shall be furnished and installed by the Contractor who provides the HVAC and plumbing equipment.
- B. Power wiring from panelboard or similar source through all equipment disconnects to motors or heating equipment shall be furnished and installed by the Electrical Contractor.
- C. Equipment disconnect switches, unless otherwise specified or supplied by the equipment supplier as an integral part of the equipment shall be furnished and installed by the Electrical Contractor.

- D. All electrical equipment, components, and wiring furnished and installed under this portion of the specifications shall conform to all requirements of the applicable portions of the electrical specifications.
- E. All base flashing, where required, shall be by others, with necessary counter-flashing by this contractor.
- F. All structural work needed for support of mechanical equipment or components shall be supplied by this contractor.
- G. All concrete pads necessary for the support of HVAC and plumbing equipment or components shall be supplied by the contractor who provides the HVAC and plumbing equipment.
- H. All access panels in finished walls or ceilings shall be supplied by this contractor for installation by the General Contractor.
- I. If any changes are required in the installation of mechanical, structural or electrical services to any mechanical equipment accepted as approved equals, the Mechanical Contractor shall be responsible for any additional costs incurred or coordination required.
- J. For Temporary Equipment, HVAC Contractor shall be responsible to coordinate all support services required by temporary equipment including but not limited to electrical service, and make-up water. Contractor shall be responsible to provide temporary equipment with all necessary appurtenance for a fully functioning unit.

1.6 RULES AND REGULATIONS

- A. Perform in accordance with the current rules and regulations of the Pennsylvania Uniform Construction Code, International Building Code (IBC), International Mechanical Code (IMC), International Energy Conservation Code (IECC), National Electrical Code (NEC), National Fire Protection Association (NFPA), International Fire Code (IFC) and other Codes and Standards cited in this specification and the requirements of the utility companies serving the project site.
- B. All work shall be performed in accordance with the rules and regulations of Pennsylvania Department of Labor and Industry, Federal Department of Labor (Occupational Safety and Health Administration) and any other national, state, or local authority having jurisdiction, including The City of Lancaster Building Ordinance and all referenced regulations (Building, Existing Building, Plumbing, Electrical, Mechanical, Fuel Gas, Performance, Residential, Fire, Accessibility, and Energy Code where applicable).
- C. Perform all construction, design, fabrication, tests, rating, and installation in compliance with the regulations of all local, state, or national agencies having jurisdiction over the project. Pay all costs involved in work necessary to comply with these regulations.
- D. The Contractor assumes all responsibility and liability for any code violations, damage or injury which occurs as a result of a deviation from or a change to the requirements of these plans and specifications which has not been approved in writing by the Engineer.
- E. This Contractor shall obtain and pay for all construction and installation permits, certificates, and inspection fees relative to his work. He shall also prepare all specific plans as required by proper

authorities before acceptance of the work. Costs incurred in the preparation of such plans shall be included in the Contractor's original bid.

- F. The intent of these drawings and specifications is to define the scope-of-work and standards of quality for the project. The Contractor is responsible for understanding and following the requirements of the codes and standards referenced by these documents. The Contractor shall be responsible for costs associated with changes when a code enforcement official determines that work does not comply with referenced codes and standards.

1.7 DEFINITIONS

- A. General - Basic Contract definitions are included in the Conditions of the Contract.
- B. Indicated - The term indicated refers to graphic representations, notes, or schedules on the Drawings, or other Paragraphs or Schedules in the Specifications, and similar requirements in the Contract Documents. Terms such as shown, noted, scheduled, and specified are used to help the reader locate the reference. There is no limitation on location.
- C. Directed - Terms such as directed, requested, authorized, selected, approved, required, and permitted mean directed by the Architect, requested by the Architect, and similar phrases.
- D. Approved - The term approved, when used in conjunction with the Architect's action on the Contractor's submittals, applications, and requests, is limited to the Architect's duties and responsibilities as stated in the Conditions of the Contract.
- E. Regulation - The term regulation includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. Refurbishment - Disassemble existing equipment and reassemble to its original factory condition by means of cleaning the equipment and replacing missing, damaged or worn components.
- G. Furnish - The term furnish means supply and deliver to the Project Site, ready for unloading, unpacking, assembly, installation, and similar operations.
- H. Install - The term install describes operations at the Project site including the actual unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- I. Provide - The term provide means to furnish and install, complete and ready for the intended use.
- J. Contractor - The Contractor or Electrical Contractor - The term means the Contractor responsible for all work under this Division.
- K. Installer - An installer is the Contractor, or another entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier, to perform a particular construction activity, including installation, erection, application, and similar operations. Installers are required to be experienced in the operations they are engaged to perform.
 - 1. The term experienced, when used with the term installer, means having a minimum of five previous projects similar in size and scope to this Project, being familiar with the special

- requirements indicated, and having complied with requirements of the authority having jurisdiction.
2. Trades - Using terms such as carpentry is not intended to imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as carpenter. It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.
 3. Assigning Specialists - Certain Sections of the Specifications require that specific construction activities are performed by specialists who are recognized experts in those operations. The specialists must be engaged for those activities, and their assignments are requirements over which the Contractor has no choice or option. However, the ultimate responsibility for fulfilling Contract requirements remains with the Contractor.
 - a. This requirement is not to be interpreted to conflict with enforcing building codes and similar regulations governing the Work. It is also not intended to interfere with local trade union jurisdictional settlements and similar conventions.
- L. Project Site is the space available to the Contractor for performing construction activities either exclusively or in conjunction with others performing other work as part of the Project. The extent of the Project site is shown on the drawings and may or may not be identical with the description of the land on which the Project is to be built.
- M. Testing Agencies - A testing agency is an independent entity engaged to perform specific inspections or tests, either at the Project Site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.
- N. AHJ – Authority Having Jurisdiction
- O. Abbreviations and Names - Trade association names and titles of general standards are frequently abbreviated. The following acronyms or abbreviations, as referenced in Contract Documents, are defined to mean the associated names.
1. ASHRAE American Society of Heating, Refrigeration and Air-Conditioning Engineers
 2. ACI American Concrete Institute
 3. ADA Americans with Disabilities Act
 4. AISC American Institute of Steel Construction
 5. AISI American Iron and Steel Institute
 6. ANSI American National Standards Institute
 7. ASTM American Society for Testing and Materials
 8. AWS American Welding Society
 9. CRSI Concrete Reinforcing Steel Institute
 10. ETL ETL Testing Laboratories Inc.
 11. ISA Instrument Society of America
 12. NEC National Electrical Code
 13. NFPA National Fire Protection Assoc.
 14. UL Underwriters Laboratories, Inc.
- P. Federal Government Agencies - Names and titles of federal government standard- or Specification-producing agencies are often abbreviated. The following acronyms or abbreviations referenced in the Contract Documents indicate names of standard- or Specification-producing agencies of the federal government. Names and addresses are subject to change but are believed to be, but are not assured to be, accurate and up to date as of the date of the Contract Documents.
1. CFR Code of Federal Regulations

2. EPA Environmental Protection Agency
3. FAA
4. OSHA Occupational Safety and Health Administration (US Department of Labor)
5. REA Rural Electrification Administration (US Department of Agriculture)

1.8 DRAWINGS

- A. The accompanying drawings are a part of the contract documents and are intended to show approximate and relative locations of services and equipment. Do not scale drawings to determine exact positions, locations, and clearances.
- B. Due to the diagrammatic layout and small scale of the drawings, certain piping and duct rises, drops, offsets, valves, and related specialties are not shown. The Contractor shall provide all ductwork, piping, fittings, valves, and specialties required to insure a complete installation without additional cost to the Owner.
- C. All drawings and specifications pertaining to general construction, kitchen, plumbing, HVAC, sprinkler, electrical and other work shall be carefully examined. Where physical interferences with his work occur because of his failure to coordinate with other trade, this Contractor shall rearrange his work at his own expense.

1.9 SUBMITTAL OF SHOP DRAWINGS FOR REVIEW

- A. The Contractor shall submit, with a letter of transmittal to the Architect, six (6) sets of shop drawings containing all capacities, performances, features, options, accessories and technical data of all materials and equipment listed herein. All submittals shall be made within 45 days after awarding of the contract.
- B. Refer to Division 1.
- C. Properly prepare submittals before transmitting to the designated reviewer.
 1. Prepare an individual submittal package for each related group of materials.
 2. Refer to individual 230000 Sections for materials to be submitted for review and approval.
 3. Collate all items to be submitted as required by Division 1 consisting of one copy of each item. Permanently bind together by staples or other means all pages in each set.
 4. Bind with each set a typed cover sheet showing the date, project name, project location, Engineer's name, Contractor's name, Specification Section, and an index of all items included.
 5. Provide space on the cover sheet for the approval stamps of the Subcontractor, Contractor, Engineer, and Architect. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.
 6. Clearly mark each page in the submittal set to show the manufacturer's name.
 7. When a page shows more than one item or catalog number, mark the item and catalog number which is proposed for use. Show all accessories, options and appurtenances which are required or which the Contractor desires to use.
 8. Improperly prepared submissions will be returned without action.

- D. All disapproved submittals shall be corrected as directed by the Architect/Engineer and resubmit the same quantity as originally submitted until approved. No work involving any materials or equipment covered by shop drawings shall be started until the respective shop drawings are approved.
- E. None of the items listed under Section 1.2 shall be installed until final approval has been given by the Architect.
- F. Identify Project, Contractor, Subcontractor, or supplier; pertinent drawing and detail number and specification section number, as appropriate on shop drawings.
- G. On shop drawings, apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the Work and Contractor Documents.
- H. On shop drawings, provide space for Contractor and Architect/Engineer review stamps.
- I. Contractor shall include with each submittal/shop drawing, a matrix outlining all items that do not match the specified unit. If an item is not listed on the matrix, the submitted unit will be assumed to meet all parts of the specification. Contractors will be responsible to insure the specifications are met in full. Items in matrix shall include scheduled performance data vs submitted performance data, specified components vs submitted unit components, specified construction weight, warranty, etc. vs submitted construction weight, warranty, etc.

1.10 SUBSTITUTIONS

- A. All substitutions must be submitted in accordance with Division 1 requirements.
- B. Substitutions submitted not in accordance with Division 1 requirements will be returned without review.
- C. All costs involved in changes in the building, to the equipment, to the arrangement of equipment, or to the work performed or to be performed under other sections of the specifications, due to the substitution of equipment in lieu of that shown on the drawings or specified, shall be borne by the Contractor making such substitutions, and shall include, but not necessarily be limited to, costs or fees in connection with resubmission of drawings for approval, if required, by the Commonwealth of Pennsylvania, local authorities or insuring agencies having jurisdiction over the work.

1.11 SUBMITTALS FOR CLOSEOUT

- A. Record Drawings: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
 - 1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, Subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an acceptable drawing technique.

- c. Record data as soon as possible after obtaining it.
 - d. Record and check the mark-up before enclosing concealed installations.
 2. Content: Types of items requiring marking include, but are not limited to, the following:
 - a. Dimensional changes to Drawings.
 - b. Revisions to details shown on Drawings.
 - c. Depths of foundations below first floor.
 - d. Locations and depths of underground utilities.
 - e. Revisions to routing of cable tray and conduits.
 - f. Revisions to electrical circuitry.
 - g. Actual equipment locations.
 - h. Locations of concealed internal utilities.
 - i. Changes made by Change Order.
 - j. Changes made following Architect's written orders.
 - k. Details not on the original Contract Drawings.
 - l. Field records for variable and concealed conditions.
 - m. Record information on the Work that is shown only schematically.
 3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
 4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
 6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
 7. Provide one (1) hard copy and one (1) PDF electronic file on digital media acceptable to Architect/Engineer for Owner. Provide one (1) additional PDF electronic file for the Engineer.
- B. O&M Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
 1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
 2. File Names and Bookmarks: Enable bookmarking of individual documents based upon file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel upon opening file.
 3. Provide two (2) copies of the PDF electronic files on digital media acceptable to Architect/Engineer. One copy shall be for the Owner and the other shall be for the Engineer.
- C. O&M Manuals, Paper Copy: Submit manuals in the form of hard copy, bound and labeled volumes.
 1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2" x 11" paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.

- a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders, if necessary, to provide essential information for proper operation or maintenance of equipment or system.
 - b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL", Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.
 2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
 3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment.
 4. Supplementary Text: Prepared on 8-1/2" x 11" white bond paper.
 5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
 - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
 - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.
 6. Provide three (3) hard copies for Owner. Submit to Architect/Engineer for review and approval.
- D. The Contractor shall submit 3 copies of the final wiring certificates.
- E. The Contractor shall submit a copy of the Project Warranty

1.12 WARRANTY

- A. The Contractor shall submit the following guarantee:
1. Written one (1) year full warranty guarantees shall be submitted for the entire mechanical installation installed under this project. The warranty shall begin at substantial completion of the project. If the manufacturer's warranty begins when the equipment ships or is ordered, then the Contractor shall extend the warranty to cover the construction period plus the warranty specified under substantial completion. If the manufacturer's standard guarantee provides for a longer period, the longer period shall apply.
 2. Where defects in the material, equipment and/or workmanship become evident within this guarantee period, the Contractor shall be responsible for providing new manufacturer approved material and equipment, and/or correcting the defective workmanship without any costs to the Owner.
- B. During such a period, and before the expiration of each such guarantee, contractor shall agree to make any and all repairs, adjustments, or replacements which may become necessary, owing to initial settlement or shrinkage, defective material, workmanship, or installation.
- C. He shall further agree to provide all labor and material which may be required and to restore to its original condition any adjacent work that he may disturb in making the necessary repairs, adjustments, or replacements in order to fulfill this guarantee.

1.13 VISIT TO THE SITE

- A. Prior to submission of bid, the Contractor is required to visit the site to become acquainted with existing conditions. Bids as submitted will be interpreted to include all costs and changes made necessary by such conditions. Refer to the pre-bid meeting schedule in invitation to bid.

1.14 COORDINATION OF WORK

- A. Coordination and meetings: Coordinate the installation of all interior and exterior products and systems specified for this construction project including those specified under multiple prime contracts in accordance with Division 1.
- B. Coordination with Various Trades: Contractor shall coordinate space and installation requirements of all work, including underground utilities, which is indicated diagrammatically on drawings, with the project manager, respective contractors, and Utility Company's prior to starting any work. In case of interference or problems, the Architect shall decide which work is to be relocated, regardless of which work is installed first, at no additional cost. See Division 1 General Requirements.
- C. The Mechanical Contractor shall prepare dimensioned arrangement drawings at a scale of (1/4" = 1'-0") to be utilized by all contractors for coordination. Each contractor shall be required to, and responsible for, adding their respective work to these coordination drawings. Each contractor shall coordinate with all other trades to fit all equipment and materials in allocated space. Completed coordination drawings shall be submitted to Architect/Engineer for review.

1.15 LOCATION OF EQUIPMENT

- A. All locations of plumbing, HVAC and fire protection equipment and pipe connections there to shall be verified by the Architect/Engineer. The contractor shall verify locations sufficiently in advance of the installation to allow uninterrupted progress of the work of all trades.
- B. This contractor shall obtain approval of all arrangement drawings before continuing his work.

1.16 MATERIAL QUALITY

- A. All materials and equipment, unless otherwise specified, shall be new and of the best quality, approved for their specific application.
- B. This Contractor shall provide, when required by the Architect, labeled samples of materials to be used on the project. Samples shall be submitted for approval by the Architect prior to their installation.
- C. All materials and equipment installed by the Contractor shall be securely and rigidly supported from or attached to the building structure.
- D. Furnish products listed and classified by Underwriters Laboratories, Inc., or other testing firms acceptable to the authority having jurisdiction.

1.17 WORKMANSHIP

- A. Execute all work utilizing qualified and competent employees in a manner consistent with the best practices of the trade by qualified and competent tradesmen. Install all equipment in accordance with Engineer's approved shop drawings and manufacturer's recommendations.
- B. Firmly support and secure to the building structure all materials and equipment. Use only approved hardware and methods as described in these Specifications.

1.18 PROTECTION OF EQUIPMENT AND MATERIALS

- A. The Contractor shall protect all material and equipment from damage until final acceptance as installed. He shall close all openings during construction with temporary plugs and replace all damaged items with ones of exact sameness at his expense.
- B. He shall schedule material and systems for delivery in such a pattern that critical pieces of equipment may be stored within the building, protected from weather. Where materials are stored outside, they must be protected from the elements and damage.
- C. This Contractor shall be responsible for coordinating the procurement of specified materials and equipment being supplied by his sub-contractors and suppliers.

1.19 SCAFFOLDING AND HOISTING

- A. The Contractor shall furnish and erect all scaffolding, hoists, shoring, platforms, railings, ladders, and other devices required by local, state, and federal laws to install all systems and equipment. Scaffolding and all other equipment shall be removed at completion of the work.
- B. Contractor shall hoist or rig his own material and equipment into place or arrange for the rigging of it by others at his expense.

1.20 FOREMAN

- A. Contractor must provide a competent foreman, subject to approval of the Architect. The foreman shall be deemed the agent of the Contractor and must be on duty at the building during all working hours.
- B. Any instructions or notices given to the foreman shall have the same force as if given to the Contractor in person.

1.21 EXCAVATION AND BACKFILL

- A. The Contractor shall provide all excavation and backfilling and all shoring, sheeting, pumping, and other work incidental to excavating as required for his work. Refer to Division 31 & 32.
- B. Backfill shall be made with clear earth; free from rocks, frozen earth, debris, or other foreign materials. Backfill shall be deposited in uniform layers of not over 8" thick and each layer shall be mechanically tamped before the next layer is applied.

- C. All excavated material remaining after the backfilling operation shall be removed from the site by this Contractor.
- D. Any settlement in trench backfill shall be brought to grade, and damage to pavement or slabs caused by such settlement shall be repaired at the Contractor's expense.
- E. All ditching, pumping, canvas covers, and other methods required to protect and keep all excavation and trenches free from water at all times during the construction period shall be furnished, installed, and maintained by the Contractor. If the trench bottom becomes muddy, all mud shall be removed and replaced by bankrun sand and gravel or other suitable material as approved by Architect and compacted to the density of the surrounding undisturbed soil. Bottom of trench shall be protected against frost or freezing. This Contractor shall provide adequate shoring to protect his and other workmen. Shoring shall be maintained until tests of lines is completed.
- F. Trenches that pass under paving or roads and have less than 2' of cover, shall have a load-relieving slab over the pipe. Trenches which pass under or within 18" of any wall foundation shall be backfilled with concrete mixes 1-part cement, 3-parts sand, and 5-parts coarse aggregate.
- G. All repair of macadam or concrete paving made necessary by work done under this contract shall be performed by the Mechanical Contractor at the expense of this Contractor-as required by the specifications. All such repairs shall match surrounding paving in materials and workmanship. Work shall comply with the appropriate sections of the General Specification.
- H. All grading and seeding made necessary by work done under this contract shall be performed by the Mechanical Contractor as required by the specifications. Work shall comply with the appropriate sections of the General Specifications.
- I. All excavation is unclassified unless otherwise noted on the drawings or in Division 31 of the Specifications.
- J. Provide warning tape above all underground services, properly identifying each type of service.

1.22 PAINTING

- A. All exposed piping, iron work, and equipment installed in the mechanical equipment rooms under this contract shall be painted by the installing contractor with 1 prime coat and 2 coats of best quality oil paint of color as selected by the Architect.
- B. In all non-mechanical rooms or storage rooms that are finished spaces with cloud ceilings, partial ceilings with exposed areas above, or areas exposed without ceilings, all items and systems and areas will be painted by the general contractor. All mechanical equipment, piping, ductwork and other items in these areas will be provided with surfaces to receive paint from the general contractor. For any mechanical items that cannot be painted, the HVAC contractor shall protect these items from being painted.
- C. Unless specifically noted, insulation and any galvanized piping in ceiling cavity area shall not be painted.
- D. All grilles, louvers, etc. unless otherwise indicated shall be either furnished in or painted in a color selected by the Architect. When requested by the Architect, the equipment shall be finished with

a prime coat and then professionally painted in the field in a color selected by the Owner. The Mechanical Contractor shall assume responsibility for all costs involved.

- E. Factory painted and galvanized finishes which are damaged before the Owner occupies the building shall be repaired with matching paint or cold galvanizing compound respectively. Touch-up of factory finishes shall be done by the Mechanical Contractor.

1.23 CUTTING AND PATCHING

- A. This Contractor shall be responsible for all cutting and patching required for installation of work on this project. Cutting and patching methods shall conform to the requirements for new construction contained in other sections of this specification.
 - 1. Patching in surfaces that will remain visible when the project is finished shall be identical in appearance to the undisturbed surface.
 - 2. Patches in fire rated walls, ceilings and floors shall maintain the fire rating of these barriers by the use of approved materials including special fire rated sealing compounds or materials identical to the barrier materials. Refer to the Architectural Specifications for approved methods and materials. Provide through-penetration firestopping for work of this contract; refer to Specification Section 23 0100 for firestopping materials.
 - 3. Any patch work not deemed suitable by the Architect, Owner or CM will be replaced at the expense of the related Contractor.

1.24 WORK SEQUENCE

- A. Refer to Architectural Drawings and Specifications for Phasing Requirements for this Project and the approved Contractors Phasing Schedule. This Contractor shall plan and coordinate his work in accordance with those requirements. Provide any and all temporary valves, pipe, vents, systems, etc. as required to keep the occupied areas in service and maintained by the respective contractor.
- B. Mechanical Contractor shall provide temporary piping, insulation, valves, etc. as required to keep systems operational during the phased construction project.
- C. The Mechanical Contractor shall review contract document and project phasing to provide temporary equipment and distribution systems for the indicated phasing. The Mechanical Contractor shall coordinate demolition of existing distribution systems and installation of new systems with overall project phasing.

1.25 CLEANING AND FINISHING

- A. After all tests have been made and the system proven satisfactory to the Architect, the Contractor shall go over the entire project, clean all equipment and material installed by him, and leave in a clean and working condition.
- B. Upon completion of the installation, thoroughly purge all piping of all obstructions and scale and adequately flush all liquid carrying piping to assure a clean system.

1.26 PERFORMANCE OF EQUIPMENT

- A. Provide materials, equipment, and appurtenances of any kind, shown on the drawings, hereinafter specified, or required for the completion of the work in accordance with the intent of these specifications, which are completely satisfactory and acceptable in operation, performance, and capacity. Approval, either written or verbal, of any drawings, descriptive data or samples of such material, equipment, and/or appurtenance does not relieve the Contractor of his responsibility to turn over the same to the Owner in perfect working order at the completion of the work.
- B. Replace any materials, equipment, or appurtenances, the operation, capacity, or performance of which does not comply with the drawings and/or specification requirements or which is damaged prior to acceptance by the Owner with proper and acceptable items in working order, satisfactory to the Engineer and Architect without additional cost to the Owner.

1.27 ACCESS

- A. Furnish and erect all scaffolding and ladders required in the installation of wiring, equipment and fixtures.

1.28 OPERATING AND MAINTENANCE INSTRUCTIONS

- A. The Contractor shall prepare for the Owner, 3 hard bound volumes, each containing all operating instructions and information necessary for the care and maintenance of the system. These volumes shall be complete in every respect and shall include detailed operating instructions for each piece of equipment and diagrams for control wiring and piping so arranged and detailed that the maintenance staff may trace the control in event of operational malfunctioning.
- B. The Contractor shall submit 1 of the hard-bound volumes to the Architect for approval prior to presenting same to Owner.
- C. Printed instructions covering the operation and maintenance of each item of equipment shall be posted at locations designated by the Architect.
- D. The Contractor shall provide Project Records Documents in accordance with requirements of Division 1.

1.29 EXAMINATION OF CONTRACT DOCUMENTS

- A. Carefully examine the architectural, civil, structural, electrical, plumbing and sprinkler drawings. If any discrepancies occur between the drawings or between the drawings and the specifications, report such discrepancies to the Engineer and the Architect in writing in a Request For Information (RFI) form and obtain written instructions as to the manner in which to proceed. Make no departures from the contract drawings without prior written approval of the Architect/Engineer.
- B. Report any discrepancies prior to the submission of bid. In the event such discrepancies are not reported and claims for extra charges to the contract result, such claims will be allocated to and paid for by the Contractor, who, in the opinion of the Engineer and the Architect, is the responsible party.

1.30 INSTRUCTION OF EMPLOYEES

- A. At the completion of the work this Contractor shall instruct the employees who shall have charge of the equipment in the care, adjustment, and operation of all parts of the system.
- B. At the time designated by the Architect, the equipment manufacturer's engineer shall instruct representatives of the Owner in the operation and maintenance of the equipment.

1.31 GENERAL NOTE

- A. The HVAC Contractor shall replace air filters in all new equipment at the completion of the project.
- B. Any permanent equipment used for conditioning of the building during construction shall have temporary filters installed, replaced on a weekly basis, to keep interior of equipment and ductwork clean and free of construction dust and dirt. Temporary filters shall be minimum MERV 13
- C. Provide functional testing for all HVAC equipment. Contractor shall complete and submit Mechanical Equipment Checkout sheet for each HVAC Unit, which can be found at the end of this specification section. Functional testing shall be completed by the HVAC Contractor together with his ATC Sub-Contractor in the presence of the Owner and Engineer. Coordinate functioning testing with Owner's Commissioning Agent. Functioning testing of equipment shall be performed by the completion of each phase for all the equipment installed as part of that phase.
- D. Attention is directed to Article 23 "Exclusion of Certain Aluminum, Steel and Cast-Iron Products" in the General Conditions of the Construction Contract for references to statutes that impose restrictions for this project on the use of foreign-made steel and steel products.
- E. All mechanical equipment shall bear the label of an approved agency.
- F. All mechanical equipment shall be installed in accordance with the manufacturers' installation instructions which shall be available at job site.
- G. All roof mounted equipment requiring maintenance or service shall be located a minimum of 10 feet from any roof edge. Any roof mounted equipment mounted less than 15 feet from any roof edge shall include a means for those serving equipment for safety tie off meeting the requirements of OSHA.

1.32 ATTIC STOCK

- A. Contractor shall provide the following attic stock to the Owner at completion of the project:
 - 1. Contractor shall provide a complete filter change for each piece of equipment upon occupancy of area by Owner.
 - 2. Furnish one replacement set of filters for all HVAC equipment. A chart shall be provided indicating filter sizes and related HVAC equipment.
 - 3. Furnish one spare set of belts and bearings for each belt driven unit.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install equipment to permit removal of components and parts which require periodic replacement or maintenance. Arrange pipes, ducts, and equipment to permit access to valves, gauges, starters, motors, doors and access panels.
- B. Provide access panels in equipment, ducts, etc. as required for inspection and maintenance.
- C. All equipment on roof shall be secured to roof supports. Unfastened equipment is not acceptable.

3.2 PIPING INSTALLATION

- A. In general, piping shall be exposed in equipment rooms, and concealed in all finished rooms. Where piping is exposed, it shall be run so as to allow maximum headroom consistent with proper pitch. No piping or ductwork shall cross below the head of any window or door.
- B. Exposed piping, ducts, conduits, and/or appurtenances indicated on the inside of buildings, shall be installed parallel to the building lines. All piping shall be kept as close as possible to the ceilings and walls, and columns, to take up the minimum amount of space.
- C. All work shall be arranged and installed as high as possible to prevent obstruction of window areas, and to give adequate clearance and access for operation and maintenance.

3.3 SLEEVES

- A. Where pipes pass through concrete or masonry walls or concrete floors, they shall be protected through the full depth of the construction with galvanized sleeves; same to be at least one size larger than the pipe plus insulation.
- B. Where sleeves occur in concrete floors, the top of sleeve shall be flush with finished floor line, and the end shall be filed to a smooth round finish.
- C. This Contractor shall supply all pipe sleeves and shall inform general contractor of exact sleeve locations in time for their incorporation onto the concrete forms or masonry work.
- D. Any cutting and patching in masonry or concrete made necessary by failure to adequately coordinate with the general contractor shall be done by the Masonry or Pre-Cast Contractor at the expense of this contractor.
- E. The space between pipes and sleeves shall be caulked air-tight with a non-combustible inorganic material.

3.4 UNIONS

- A. Unions shall be provided at all connections to each piece of equipment and on both sides of all automatic valves, and devices which requires removal for maintenance. No unions are to be placed in a location which will be inaccessible after the completion of the project.

- B. Unions of copper tubing shall be 200 lbs. SWP brass ground joint.
- C. Unions for steel pipe shall be 250 lbs. SWP, malleable iron with brass to iron seat.

3.5 CLEARANCE

- A. All piping, including valves and fittings shall be installed to provide the following minimum clearances between the finish coverings, adjacent pipe and/or conduits: 2" between for piping services and 6" between piping services and electrical conduits.

3.6 ACCESS PANELS

- A. Removable panels shall be located so as to provide easy access to all concealed plumbing accessories that may require adjustments or maintenance, such as valves, water hammer arresters, traps, strainers, cleanouts or others.
- B. Access panels in finished wall or ceiling surfaces shall be furnished by this Contractor for installation by the General Contractor.
- C. This Contractor shall pay for any work made necessary by his failure to inform other trades of access panel locations.

3.7 APPLICATIONS OF INSULATION AND COVERING

- A. No covering shall be installed by the Contractor until the piping and ducts have been approved by the Architect/ Engineer.

3.8 PIPING UNDER FLOORS

- A. Wherever piping, conduits and associated materials is run under a floor slab on grade, the work is to be installed after the sub-grade has been brought to the proper level. The work shall then be installed and backfilled, allowed to settle, and refilled before placing crushed stone fill.

3.9 INSERTS

- A. Except as noted, provide box type inserts for all hangers and supports intended to suspend piping or lightweight equipment from new concrete construction. Fasten all inserts to the formwork before concrete is poured. Inserts to be Grinnel Figure No. 282 or Figure No. 279 depending upon the maximum load to be carried.
- B. No toggle bolts, expansion screw anchors or similar imbedded hanger supports shall be used in new construction.

3.10 CONCRETE BASES

- A. Construct concrete bases of dimensions indicated, but not less than 4" larger, in both directions, than supporting unit. Follow supported equipment manufacturer's anchorage recommendations and setting templates for anchor-bolt and tie locations, unless otherwise indicated. Use 3000-psi, 28-day compressive-strength concrete and reinforcement as specified in Division 3.

- B. Provide minimum 4" high bases for all floor mounted equipment unless noted otherwise.

3.11 CHASES AND OPENINGS IN FLOORS AND WALLS

- A. It shall be the duty of the Contractor requiring chases, openings or the placement of any sleeves, anchors, and supports required for his work, whether or not shown on the drawings, to advise the General Contractor accordingly, prior to or at the time of pouring concrete slabs, beams or the building of walls, etc. He shall furnish all such sleeves, anchors, and supports in place, and all necessary information for the proper location of said chases or openings.
- B. If a contractor shall fail to observe and comply with those requirements, he shall cut, at his own expense, after receiving the consent of the Architect, such chases or openings as may be necessary and proper, providing and building in place all lintels required by these openings, doing the necessary patching and rebuilding of the work required under the direction of the General Contractor and he shall be responsible for all loss or delay resulting therefrom.

3.12 LUBRICATION

- A. The contractor shall provide all oil for the operation of all equipment until acceptance. The Contractor shall run in all bearings and, after they are run in, drain all oil from the bearings, flush out all bearings, and refill with new oil. The Contractor shall be held responsible for all damage to bearings while equipment is being operated by him up to the date of acceptance of the equipment. The contractor shall be required to protect all bearings during installation and shall thoroughly grease steel shafts to prevent corrosion. All motors and other equipment shall be provided with covers as required for proper protection during construction.

3.13 JOINTS AND CONNECTIONS

- A. Screwed Connections - All joints made in screwed pipe shall be made with red lead or pipe compound applied to the threaded end of the pipe and not applied within the fitting. Threads shall be cut straight and true with sections reamed and cleaned before installation.

3.14 EQUIPMENT START-UP

- A. The HVAC Contactor shall engage a factory authorized service representative to perform start-up on all equipment.

3.15 EQUIPMENT CHECKOUT SHEET

- A. See sheet attached.

END OF SECTION 230010

MECHANICAL EQUIPMENT CHECKOUT SHEET

DATE: _____
 O.A. TEMP: _____

UNIT/ROOM # _____
 RTU DOAS IDU EF

SPACE TEMP FAN STARTS YES NO
 O.A. DAMPER CLOSED YES NO

 FAN STARTS YES NO

WARMUP R.A. DAMPER OPEN YES NO
 RELIEF DAMPER CLOSED YES NO
 HEAT VALVE MODULATES OPEN YES NO

OCCUPIED HEAT O.A. DAMPER TO MIN. POSITION YES NO
 R.A. AND RELIEF MOD. PRO-PORTIONAL TO O.A. DAMPER YES NO

OCCUPIED COOL H/W VALVE
 MOD. CLOSED YES NO

 O.A. DAMPER MOD. OPEN YES NO
 R.A. & RLF MOD. PROP. TO O.A. YES NO

UNOCCUPIED FAN STOPS YES NO
 O.A. DAMPER CLOSED YES NO

 R.A. DAMPER OPEN YES NO

FAN CYCLE & H/W VALVE
 MOD OPEN TO MAINTAIN SETBACK TEMP YES NO
 YES NO

FREEZE CONTROL FAN STOPS YES NO
 O.A. DAMPER CLOSES YES NO

 HEAT VALVE OPEN YES NO

FIRE/SMOKE CONTROL FAN STOPS YES NO
 O.A. DAMPER CLOSES YES NO

DISCHARGE AIR TEMP HEATING _____ COOLING _____

RETURN AIR TEMP HEATING _____ COOLING _____

NOTES:

TECHNICIAN _____ OWNER REP. _____ DATE _____

FILTER ACCESS	YES	<input type="checkbox"/>	NO	<input type="checkbox"/>	COMMENT
MAINTENANCE ACCESS	YES	<input type="checkbox"/>	NO	<input type="checkbox"/>	COMMENT

SECTION 230100 - MECHANICAL GENERAL EQUIPMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Flexible Pipe Connectors
- B. Pipe and Equipment Hangers and Supports
- C. Equipment Bases and Supports
- D. Sleeves and Seals
- E. Flashing and Sealing Equipment and Pipe Stacks
- F. Single Phase Electric Motors
- G. Three Phase Electric Motors
- H. Nameplates
- I. Tags
- J. Stencils
- K. Pipe Markers
- L. Vibration Isolation

1.2 REFERENCES

- A. UL 393 - Indicating Pressure Gauges for Fire and Protection Services
- B. ASTM F708 - Design and Installation of Rigid Pipe Hangers
- C. MSS SP58 - Pipe Hangers and Supports - Materials, Design and Manufacturer
- D. MSS SP69 - Pipe Hangers and Supports - Selection and Application
- E. MSS SP89 - Pipe Hangers and Supports - Fabrication and Installation Practices
- F. NFPA 13 - Installation of Sprinkler Systems
- G. NFPA 14 - Installation of Standpipe and Hose Systems
- H. NEMA MG 1 - Motors and Generators
- I. NFPA 70 - National Electrical Code

J. ASME A13.1 - Scheme for the Identification of Piping Systems

1.3 SUBMITTALS

- A. Submit in accordance with provisions of Section 230010.
- B. Product Data:
 - 1. Flexible Pipe Connectors: Indicate maximum temperature and pressure rating, face-to-face length, live length, hose wall thickness, hose convolutions per foot and per assembly, fundamental frequency of assembly, braid structure, and total number of wires in braid.
 - 2. Supports and Anchors: Provide manufacturers catalog data including load capacity.
 - 3. Motors: Provide wiring diagrams with electrical characteristics and connection requirements.
 - 4. Mechanical Identification: Provide manufacturers catalog literature for each product required.
 - 5. Vibration Isolation: Provide schedule of vibration isolator type with location and load on each.
- C. Shop Drawings: Indicate inertia bases and locate vibration isolators, with static and dynamic load on each.

1.4 REGULATORY REQUIREMENTS

- A. Conform to applicable electrical code.
- B. Products Requiring Electrical Connection: Listed and classified by Underwriters' Laboratories, Inc., as suitable for the purpose specified and indicated.

PART 2 - PRODUCTS

2.1 FLEXIBLE PIPE CONNECTORS

- A. Steel Piping:
 - 1. Manufacturers:
 - a. Flexonics Model 400
 - b. Mason Model BSS
 - c. Keflex Model KFCS
 - 2. Inner Hose: Stainless Steel
 - 3. Exterior Sleeve: Single braided stainless steel
 - 4. Pressure Rating: 200 psig WOG and 250°F
 - 5. Joint: As specified for pipe joints
 - 6. Size: Use pipe sized units
 - 7. Maximum offset: 3/4" on each side of installed center line
- B. Copper Piping:
 - 1. Manufacturers:
 - a. Flexonics Model 300
 - b. Mason Model BBF
 - c. Keflex Model KFCS
 - 2. Inner Hose: Bronze

3. Exterior Sleeve: Braided bronze.
4. Pressure Rating: 200 psig WOG and 250°F
5. Joint: As specified for pipe joints
6. Size: Use pipe sized units
7. Maximum offset: 3/4" on each side of installed center line

2.2 TEST PLUGS

- A. Test Plug: 1/4" or 1/2" brass fitting and cap for receiving 1/8" outside diameter pressure or temperature probe with Nordel core for temperatures up to 350°F.
- B. Test Kit: Carrying case, internally padded, and fitted containing one 2-1/2" diameter pressure gauges, one-gauge adapters with 1/8" probes, two 1" dial thermometers.

2.3 PIPE HANGERS AND SUPPORTS

- A. Manufacturers:
 1. Grinnell
 2. Other acceptable manufacturers offering equivalent products
 - a. or accepted substitute
- B. Hydronic Piping:
 1. Conform to ASTM F708, MSS SP58, MSS SP69, MSS SP89.
 2. Hangers for Pipe Sizes 1/2 to 12": Malleable iron adjustable swivel, split ring.
 3. Hangers for Cold Pipe Sizes 2" and Over: Carbon steel, adjustable, clevis.
 4. Hangers for Hot Pipe Sizes 2 to 4": Carbon steel, adjustable, clevis.
 5. Hangers for Hot Pipe Sizes 6" and Over: Adjustable steel yoke, cast iron roll, double hanger.
 6. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
 7. Multiple or Trapeze Hangers for Hot Pipe Sizes 6" and Over: Steel channels with welded spacers and hanger rods, cast iron roll.
 8. Wall Support for Pipe Sizes to 3": Cast iron hook.
 9. Wall Support for Pipe Sizes 4" and Over: Welded steel bracket and wrought steel clamp.
 10. Wall Support for Hot Pipe Sizes 6" and Over: Welded steel bracket and wrought steel clamp with adjustable steel yoke and cast-iron roll.
 11. Vertical Support: Steel riser clamp.
 12. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
 13. Floor Support for Hot Pipe Sizes to 4": Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
 14. Floor Support for Hot Pipe Sizes 6" and Over: Adjustable cast iron roll and stand, steel screws, and concrete pier or steel support.
 15. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

2.4 PIPE HANGER ACCESSORIES

- A. Hanger Rods: Mild steel threaded both ends, threaded one end, or continuous threaded.

2.5 INSERTS

- A. Manufacturers:
 - 1. Grinnell
 - 2. Other acceptable manufacturers offering equivalent products:
 - a. or accepted substitute
- B. Inserts: Malleable iron case of steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.

2.6 FLASHING

- A. Metal Flashing: 26-ga galvanized steel.
- B. Metal Counterflashing: 22-ga galvanized steel.
- C. Flexible Flashing: 47 mil thick sheet butyl; compatible with roofing.
- D. Caps: Steel, 22-ga minimum; 16-ga at fire resistant elements.

2.7 SLEEVES AND SEALANTS

- A. Sleeves for Pipes Through Non-fire Rated Floors: 18-ga galvanized steel.
- B. Sleeves for Pipes Through Non-fire Rated Beams, Walls, Footings, and Potentially Wet Floors: Steel pipe or 18-ga galvanized steel.
- C. Sleeves for Rectangular Ductwork: Galvanized steel.
- D. Firestopping Insulation: Glass fiber type, non-combustible.
- E. Sealant: Acrylic.
- F. Firestopping for non-plastic piping, ductwork shall be 3M, Dow, Corning fire caulk/packing or accepted substitute. Install steel angles around duct penetrations.
- G. Firestopping for polypropylene pipe penetrations shall be 3M Fire Barrier FS-195 Wrap/Strips with restraint collar or accepted substitute installed per manufacturers detail (UL System 64).

2.8 MOTORS

- A. Manufacturers:
 - 1. Century
 - 2. Westinghouse
 - 3. Lincoln
 - 4. Baldor
 - 5. Or accepted substitute
- B. General Construction and Requirements:

1. Motors Less Than 250 Watts, for Intermittent Service: Equipment manufacturer's standard and need not conform to these specifications.
2. Electrical Service:
 - a. Refer to Section 260180 for required electrical characteristics.
3. Type:
 - a. Open drip-proof except where specifically noted otherwise.
 - b. Motors: Design for continuous operation in 40°C environment.
 - c. Design for temperature rise in accordance with NEMA MG 1 limits for insulation class, service factor, and motor enclosure type.
 - d. All motors shall be high efficiency type.
4. Explosion-Proof Motors: UL approved and labeled for hazard classification, with over temperature protection.
5. Visible Nameplate: Indicating motor horsepower, voltage, phase, cycles, RPM, full load amps, locked rotor amps, frame size, manufacturer's name and model number, service factor, power factor, efficiency.
6. Wiring Terminations:
 - a. Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclose terminal lugs in terminal box sized to NFPA 70, threaded for conduit.
 - b. For fractional horsepower motors where connection is made directly, provide threaded conduit connection in end frame.

2.9 TAGS

- A. Plastic Tags: Laminated three-layer plastic with engraved black letters on light contrasting background color. Tag size minimum 12" diameter.
- B. Chart: Typewritten letter size list in anodized aluminum frame. Room numbers shall correspond to Owner's room numbering system.
- C. Ceiling grid tags shall be provided to indicate access point for service location for Fan-powered and Shutoff VAV boxes and other equipment above ceilings.

2.10 STENCILS

- A. Stencils: With clean cut symbols and letters of following size:
 1. 3/4 to 1-1/4" Outside Diameter of Insulation or Pipe: 8" long color field, 1/2" high letters.
 2. 1-1/2" to 2" Outside Diameter of Insulation or Pipe: 8" long color field, 3/4" high letters.
 3. 2-1/2" to 6" Outside Diameter of Insulation or Pipe: 12" long color field, 1-1/4" high letters.
 4. 8 to 10" Outside Diameter of Insulation or Pipe: 24" long color field, 2-1/2" high letters.
 5. Over 10" Outside Diameter of Insulation or Pipe: 32" long color field, 3-1/2" high letters.
 6. Ductwork and Equipment: 2-1/2" high letters.
- B. Stencil Paint: As specified in Section 09900, semi- gloss enamel, colors conforming to ASME A13.1.

2.11 PIPE MARKERS

- A. Color: Conform to ASME A13.1.

- B. Plastic Pipe Markers: Factory fabricated, flexible, semi-rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid being conveyed.
- C. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.
- D. Underground Plastic Pipe Markers: Bright colored continuously printed plastic ribbon tape, minimum 6" wide by 4 mil thick, manufactured for direct burial service.

2.12 VIBRATION ISOLATORS

- A. Neoprene Pad Isolators:
 - 1. Rubber or neoprene waffle pads.
 - a. 30 durometer
 - b. Minimum 1/2" thick.
 - c. Maximum loading 40 psi.
 - d. Height of ribs shall not exceed 0.7 times width.
 - 2. Configuration: Single layer.
- B. Rubber Mount or Hanger: Molded rubber designed for 0.5" deflection with threaded insert.
- C. Glass Fiber Pads: Neoprene jacketed pre-compressed molded glass fiber.

2.13 FIRESTOPPING

- A. Acceptable Manufacturer:
 - 1. EGS Nelson Firestop Product
 - 2. 3M
 - 3. Accepted Substitute
- B. Products:
 - 1. Nelson ES1399 Elastomeric Sealant: Water based acrylic latex, endothermic fire protective sealant. It is used for applications of through firestop penetrations and in construction joints. It is available in two grades, N/S (Non-Sag) for wall and overhead installations, and S/L (Self-Leveling) for floor installations.
 - 2. Nelson WRS+ Firestop Wrap Strips: To be used as a wrap-around PVC type pipe. After the pipe is covered with the correct number of wraps the WRS+ is covered with a field cut and fabricated collar cover used in conjunction with CLK or FSP which provide a smoke seal.
 - 3. Nelson PCS Pipe Choke System Collars: To be used on PVC type pipes and conduits to produce an immediate smoke and fire seal. Each PCS is pre-filled with a highly intumescent pliable putty material. Collars are furnished in exact sizes from 1.5" to 4". Collars are UL System Classified for through penetrations of drywall concrete/masonry assemblies.
 - 4. Nelson LBS+ Firestop Latex Based Sealant: A one part "Latex-Water Based" intumescent caulk that is of a non-sag formulation for use in all applications, wall, floor, and overhead.

2.14 STARTERS

- A. All starters shall be Hand/Off/Auto Type.

- B. Starters for rooftop equipment (HRU's, EF's, etc.) shall be mounted at the unit on the roof and shall be NEMA rated, weatherproof for exterior installation.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Mechanical Identification:

1. Install plastic nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.
2. Install tags with corrosion resistant chain.
3. Apply stencil painting in accordance with Section 09900.
4. Install plastic pipe markers in accordance with manufacturer's instructions.
5. Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.
6. Identify Air Handling Units, Pumps, Heat Transfer Equipment, Tanks, and Water Treatment Devices with stencil painting. Small devices, such as in-line pumps, may be identified with tags.
7. Identify control panels and major control components outside panels with plastic nameplates.
8. Identify thermostats relating to terminal boxes or valves with nameplates.
9. Identify valves in main and branch piping with tags.
10. Identify air terminal units and radiator valves with numbered tags.
11. Tag automatic controls, instruments, and relays. Key to control schematic.
12. Identify piping, concealed or exposed, with plastic pipe markers. Use tags on piping 3/4" diameter and smaller. Identify service, flow direction, and pressure. Install in clear view and align with axis of piping. Locate identification not to exceed 20' on straight runs including risers and drops, adjacent to each valve and Tee, at each side of penetration of structure or enclosure, and at each obstruction.
13. Provide ceiling grid tags to locate valves or dampers above T-bar type panel ceilings. Locate in corner of panel closest to equipment.
14. Provide Valve Identification Chart. Post framed chart in Boiler Room.
15. Install underground plastic pipe markers 6" to 8" below finished grade, directly above buried pipe.
16. Identify ductwork with stenciled painting. Identify with air handling unit identification number and area served. Locate identification at air handling unit, at each side of penetration of structure or enclosure, and at each obstruction.

B. Vibration:

1. Install isolation for motor driven equipment.
2. Bases:
 - a. Set steel bases for 1" clearance between housekeeping pad and base.
 - b. Set concrete inertia bases for 2" clearance between housekeeping pad and base.
 - c. Adjust equipment level.
3. Prior to making piping connections to equipment with operating weights substantially different from installed weights, block up equipment with temporary shims to final height. When full load is applied, adjust isolators to load to allow shim removal.
4. Connect wiring to isolated equipment with flexible hanging loop.
5. All vibration isolation devices, including steel bases and pouring forms, shall be supplied by a single manufacturer.

6. All piping located in Mechanical Room shall be isolated from the building structure by means of spring hangers.
7. For Air Handlers not located in the Mechanical Rooms, all piping 1" in diameter or greater shall be isolated with spring hangers having the same deflection, for the first three hangers as those for the machine to which it is connected.
8. Bases for all end suction pumps shall be sized to include supports for the suction and discharge elbows.
9. Flexible conduit shall be used for all electrical connections to isolated equipment. Flexible conduit shall be 50% longer than the actual distance between the rigid conduit and the equipment electrical connection locations.
10. The schedule of isolators required shall be as follows: Pumps – inertia bases, 2" (minimum) deflection springs; Heat Pumps and Air Handlers in Mechanical Rooms on grade – 1/4" deflection neoprene or fiberglass pads; Ceiling mounted air handling units or heat pumps - 1" deflection springs; piping – all piping in the mechanical rooms should have isolation hangers having the same deflection as those for the equipment in the rooms, or for 50' from the equipment, whichever is greater. For the ceiling mounted air handling units or heat pumps, any piping larger than 1" diameter should have the first three hangers of the same deflection as the equipment (1").
11. Spring hangers for piping shall consist of clevis type hangers with spring hanger similar to Grinnell Fig. 247 or Fig. B-268 installed in threaded rod.

C. Motors:

1. Install securely on firm foundation. Mount ball bearing motors with shaft in any position.
2. Check line voltage and phase and ensure agreement with nameplate.

D. Inserts:

1. Provide inserts for placement in concrete formwork.
2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4".
4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
5. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut above slab.

E. Pipe Hangers and Supports:

1. Support horizontal piping as scheduled.
2. Install hangers to provide minimum 1/2" space between finished covering and adjacent work.
3. Place hangers within 12" of each horizontal elbow.
4. Use hangers with 1-1/2" minimum vertical adjustment.
5. Support horizontal cast iron pipe adjacent to each hub, with 5' maximum spacing between hangers.
6. Support vertical piping at every floor. Support vertical cast iron pipe at each floor at hub.
7. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
8. Support riser piping independently of connected horizontal piping.
9. Provide copper plated hangers and supports for copper piping.
10. Design hangers for pipe movement without disengagement of supported pipe.
11. Provide additional supports for heavy valves and specialties and provide sway bracing where needed.
12. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.

13. Insulation protection saddles shall be installed at all pipe hangers and supports for insulated lines. Saddles shall be rolled with a radius to suit the insulation O.D. Saddles shall be #16-gauge galvanized steel and shall be 8" long.

F. Equipment Bases and Supports:

1. Provide housekeeping pads of concrete, minimum 4" thick and extending 4" beyond supported equipment, except where different requirements are noted on the drawings. Notes on the drawings shall take precedence.
2. Provide templates, anchor bolts, and accessories for mounting and anchoring equipment.
3. Construct supports of steel members. Brace and fasten with flanges bolted to structure.
4. Provide rigid anchors for pipes after vibration isolation components are installed.
5. Shall be by the contractor installing the related equipment.

G. Flashing:

1. Provide flexible flashing and metal counterflashing where piping and ductwork penetrate weather or waterproofed walls, floors, and roofs.
2. Provide curbs for mechanical roof installations 12" minimum high above roofing surface. Flash and counterflash with sheet metal; seal watertight. Attach counterflashing mechanical equipment and lap base flashing on roof curbs. Flatten and solder joints.

H. Sleeves:

1. Set sleeves in position in formwork. Provide reinforcing around sleeves.
2. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.
3. Extend sleeves through floors one inch above finished floor level. Caulk sleeves.
4. Where piping or ductwork penetrates floor, ceiling, or wall, close off space between pipe or duct and adjacent work with fire stopping insulation and caulk airtight. Provide close fitting metal collar or escutcheon covers at both sides of penetration.
5. Install chrome plated steel escutcheons at finished surfaces.

3.2 MANUFACTURER'S FIELD SERVICES

- A. Prepare and start systems under provisions of Section 230010.

3.3 SCHEDULES

A. Supports and Hangers:

PIPE SIZE INCHES	MAX. HANGER	SPACING (FT)	HANGER ROD DIAMETER
	HORIZONTAL	VERTICAL	INCHES
1/2 to 1-1/4	6	10	3/8
1-1/4 to 2	10	10	3/8
2-1/2 to 3	10	10	1/2
4 to 5	10	10	5/8
6	10	10	3/4
8 to 12	10	10	7/8
14 and Over	10	10	1
PVC-all sizes	4	10	3/8
C.I. Bell and Spigot (or No Hub) and at joints	5	15	3/4

3.4 APPLICATION

A. Motors:

1. Single phase motors for shaft mounted fans or blowers: Permanent split capacitor type.
2. Single phase motors for fans, pumps, blowers, air compressors: Capacitor start type.
3. Motors located in exterior locations: Totally enclosed type.
4. Motors located in outdoors: Totally enclosed weatherproof epoxy-sealed type.
5. All Motors - All motors shall be high efficiency type.

END OF SECTION 230100

SECTION 230250 – MECHANICAL INSULATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Piping Insulation
- B. Jackets and Accessories
- C. Equipment Insulation
- D. Covering
- E. Ductwork Insulation
- F. Duct Liner
- G. Insulation Jackets

1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM)
- B. National Fire Protection Association (NFPA)
- C. Underwriters Laboratories (UL)
- D. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA)
- E. ASHRAE Standard 90A-1980

1.3 SUBMITTALS

- A. Submit in accordance with provisions of Section 230010.
- B. Product Data: Provide product description, list of materials and thickness for each service, and locations.

1.4 QUALITY ASSURANCE

- A. Materials: Flame spread/smoke developed rating of 25/50 or less in accordance with ASTM E84, NFPA 255, UL 723.

PART 2 - PRODUCTS

2.1 PRODUCTS

- A. Manufacturers:
 - 1. Owens-Corning
 - 2. Johns Manville
 - 3. Certainteed
 - 4. Armstrong
 - 5. PPG
 - 6. Knauf

2.2 DUCT INSULATION

- A. Provide and install acoustic and thermal lining in all supply air, fresh air, transfer air, and return air ductwork as specified. Exhaust only ductwork does not need insulated unless specifically noted.
- B. Lining shall be fiberglass semi-rigid board type, or duct liner, 2.0 PCF density, with a thermal conductivity of approximately 0.16 BTU/Hr – sq ft - °F – inch and a minimum R-value of 6.0 or greater.
- C. All insulation shall meet the code required flame and smoke ratings and shall be suitable for plenums.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that piping, equipment, materials have been tested before applying insulation materials.
- B. Verify that surfaces are clean, foreign material removed, and dry.

3.2 INSTALLATION

- A. Install materials in accordance with manufacturer's instructions.
- B. On exposed piping, locate insulation and cover seams in least visible locations.
- C. For insulated pipes and equipment conveying fluids above ambient temperature:
 - 1. Provide standard jackets, with vapor barrier, factory applied, or field applied.
 - 2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe.
 - 3. PVC fitting covers shall be used.
- D. Do not insulate over nameplate or ASME stamps. Bevel and seal insulation around such.
- E. Install insulation for equipment requiring access for maintenance, repair, or cleaning, in such a manner that it can be easily removed and replaced without damage.

- F. External Duct Insulation Application:
 - 1. Secure insulation with vapor barrier with wires and seal jacket joints with vapor barrier adhesive or tape to match jacket.
 - 2. Secure insulation without vapor barrier with staples, tape, or wires.
 - 3. Install without sag on underside of ductwork. Use adhesive or mechanical fasteners where necessary to prevent sagging. Lift ductwork off trapeze hangers and insert spacers.
 - 4. Seal vapor barrier penetrations by mechanical fasteners with vapor barrier adhesive.
 - 5. Stop and point insulation around access doors and damper operators to allow operation without disturbing wrapping.

- G. Insulation including finishes and adhesive on the exterior surfaces of ducts and equipment shall have a flame spread rating of 25 or less and a smoke developed rating of 50 or less as determined by an independent testing laboratory in accordance with NFPA 255-1972 as required by NFPA 90A. Smoke development rating for pipe insulation shall not exceed 50. Duct covering shall not flame, glow, smolder or smoke when tested in accordance with ASTM C411.

- H. Linings in air ducts and equipment shall meet the Erosion Test Method described in Underwriter's Laboratories Publication No. 181. These linings, including coatings and adhesives and insulation on exterior surfaces of pipes and ducts in building spaces used as air supply plenums, shall have a flame spread rating of 25 or less and a smoke developed rating of 50 or less as determined by an independent testing laboratory in accordance with NFPA 255-1972 as required by NFPA 90A.

- I. Duct Insulation:
 - 1. All insulation surfaces shall be coated with a compound to prevent erosion, flaking, or peeling of liner material at air velocities of 2500 ft./minute.
 - 2. Insulation shall be applied using UL approved fire-retardant adhesive and mechanical fasteners. Adhesive shall be water-based Foster 85-17 or accepted substitute. Mechanical fasteners shall be Gripnail Corporation, or accepted substitute with self-locking washers, and shall be spaced not more than 6" apart on leading edges of liner.
 - 3. Top sheets of insulation in rectangular ducts shall lap the side sheets.
 - 4. All joints and seams in the lining shall be painted to a smooth surface with a fire-retardant insulation sealer, Foster 30-70, or accepted substitute.
 - 5. Duct liner shall be anti-microbial and impervious to dust and dirt.
 - 6. All exposed ductwork shall be lined. Ductwrap on exposed ductwork shall not be permitted.

END OF SECTION 230250

SECTION 230800 - HVAC SYSTEMS COMMISSIONING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Related Sections:
 - 1. Section 019100 - Commissioning Requirements

1.2 DESCRIPTION

- A. The HVAC systems to be commissioned are as follows:

HVAC Systems
Exhaust Fans

1.3 DEFINITIONS

- A. Calibrate: For the purpose of Commissioning this shall be defined as the following: Contractor shall check accuracy of sensors, motor operators, and other items by a means acceptable to the Commissioning Agent.

1.4 SCOPE OF WORK

- A. The HVAC Contractor, Controls and TAB Contractor shall perform as described in the execution section of this specification functional testing, calibrating field installed devices and verifying sequence of operation for all of equipment and devices or for the following percentages for the following equipment and devices that are a part of that equipment and systems:
 - 1. Exhaust Fans: 25%
 - 2. Controls related to Exhaust Fans: 25%

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT

- A. The HVAC Contractor shall provide all standard testing equipment required to perform startup, initial checkout, and testing requirements of Division 23.
- B. The Controls Contractor shall provide all standard testing equipment required to test the Building Automation and Automatic Temperature Control System (BAS), including calibration of valve and damper actuators and all sensors. Trend logs for functional testing shall be generated through the BAS interface, as requested by the CA. Otherwise, the CA will collect test data with data loggers.
- C. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the following tolerances. Temperature sensors and digital thermometers shall

have a certified calibration within the past year to an accuracy of 0.5°F and a resolution of $\pm 0.1^\circ\text{F}$. Pressure sensors shall have an accuracy of $\pm 2.0\%$ of the value range being measured (not full range of meter) and have been calibrated within the last year. All equipment shall be calibrated according to the manufacturer's recommended intervals and when dropped or damaged. Calibration tags shall be affixed or certificates readily available.

PART 3 - EXECUTION

3.1 RESPONSIBILITIES

- A. HVAC, Controls and TAB Contractors: The commissioning responsibilities applicable to each of the HVAC, Controls and TAB Contractors of Division 23 are as follows:
1. Construction and Acceptance Phases:
 - a. Attend the initial commissioning meeting conducted at the start of construction. The initial commissioning meeting initiated by the Commissioning Agent shall be held within 90 days of contract issuance.
 - b. Alert the Commissioning Agent a minimum of 60 days prior to startup of the primary equipment (Gas Fired Furnaces).
 - c. Attend all commissioning team meetings initiated by the Commissioning Agent.
 - d. Provide one copy of approved shop drawings, sequence of operations and startup reports for all commissioned equipment to the CA. Supplement the shop drawing data with the manufacturer's installation and start-up procedures. This material should be identical to the literature which will be included in the Operation and Maintenance Manuals. These shall be provided immediately upon the shop drawings are approved.
 - e. The Operation and Maintenance Manuals shall be submitted to the CA prior to the start of training (3 weeks before start-up and training and at least 60 days before substantial completion).
 - f. During the startup and initial checkout process, execute all portions of the manufacturer's start-up checklists, for all commissioned HVAC equipment.
 - g. Perform and clearly document all completed startup, pre-functional checklists, and system operational checkout procedures, providing a copy to the CA.
 - h. The CA writes, coordinates, witnesses, and conducts functional performance test procedures. Contractors for each trade shall provide the necessary support to the CA to complete functional testing.
 - i. Address current A/E punch list items and Commissioning corrective action items before functional testing. Air TAB shall be completed with discrepancies and problems remedied before functional testing of the respective air related systems.
 - j. Provide skilled technicians to execute starting of equipment and to perform tests in accordance with all Division 23 sections. Where specified, startup shall be performed by a factory authorized service representative. Ensure that they are available and present during the agreed upon schedules and for sufficient duration to complete the necessary tests, adjustments and problem-solving.
 - k. Correct deficiencies (differences between specified and observed performance) as interpreted by the CA and A/E and retest the equipment.
 - l. Provide training of Owner's operating staff as specified in Division 23 Sections. Use expert qualified personnel.
 - m. Coordinate with equipment manufacturers to determine specific requirements to maintain the validity of the warranty.

- n. Commissioning shall be completed per phase where equipment is turned over to the Owner and contractor warranty starts. Contractor shall provide Commissioning Agent with 60 day prior notice when equipment installation and start-up is complete for all equipment in each phase.
2. Warranty Period:
 - a. Correct deficiencies and make necessary adjustments to O&M manuals for applicable issues identified in any seasonal testing.
- B. HVAC Contractor: The responsibilities of the HVAC Contractor, during construction and acceptance phases in addition to those listed in (A) are:
 1. Provide startup for all HVAC equipment.
 2. Calibrations: The HVAC CONTRACTOR is responsible to calibrate all factory installed sensors and actuators. Sensors installed in the unit at the factory with calibration certification provided need not be field calibrated by the HVAC CONTRACTOR.
 3. Supervise all commissioning activities executed by subcontractors, including the Controls Contractor.
 4. List and clearly identify on the as-built duct and piping drawings the locations of all fire dampers, duct detectors, temperature sensors, relative humidity sensors, static and differential pressure sensors (air and building pressure).
- C. Controls Contractor: The commissioning responsibilities of the Controls Contractor, during construction and acceptance phases in addition to those listed in (A) are:
 1. Sequences of Operation Submittals. The Controls Contractor's submittals of control drawings shall include complete detailed sequences of operation for each piece of equipment, regardless of the completeness and clarity of the sequences in the specifications. They shall include:
 - a. An overview narrative of the system (1 or 2 paragraphs) generally describing its purpose, components, and function.
 - b. Logic diagrams detailing the flow of information for each control algorithm. These diagrams should include all inputs, outputs, and computations.
 - c. All interactions and interlocks with other systems.
 - d. Detailed delineation of control between any packaged controls and the building automation system, listing what points the BAS monitors only and what BAS points are control points and are adjustable.
 - e. Written sequences of control for packaged controlled equipment. (Equipment manufacturers' stock sequences may be included but will generally require additional narrative).
 - f. Start-up sequences.
 - g. Warm-up mode sequences.
 - h. Normal operating mode sequences.
 - i. Unoccupied mode sequences.
 - j. Shutdown sequences.
 - k. Capacity control sequences and equipment staging.
 - l. Temperature and pressure control: setbacks, setups, resets, etc.
 - m. Detailed sequences for all control strategies, e.g., economizer control, optimum start/stop, staging, optimization, demand limiting, etc.
 - n. Effects of power or equipment failure with all standby component functions.
 - o. Sequences for all alarms and emergency shutdowns.
 - p. Seasonal operational differences and recommendations.
 - q. Initial and recommended values for all adjustable settings, setpoints and parameters that are typically set or adjusted by operating staff; and any other

- control settings or fixed values, delays, etc. that will be useful during testing and operating the equipment.
- r. Schedules, if known.
- s. To facilitate referencing in testing procedures, all sequences shall be written in small statements, each with a number for reference. Where possible, the numbering sequence shall correspond with Section 230900 “ATC Systems”.
- 2. Control Drawings Submittal:
 - a. The control drawings shall have a key to all abbreviations.
 - b. The control drawings shall contain graphic schematic depictions of the systems and each component.
 - c. The schematics shall include the system and component layout of any equipment that the control system monitors, enables, or controls, even if the equipment is primarily controlled by packaged or integral controls.
 - d. Provide a full points list with at least the following included for each point:
 - 1) Controlled system
 - 2) Point abbreviation
 - 3) Point description
 - 4) Display unit
 - 5) Control point or setpoint (Yes / No)
 - 6) Input point (Yes / No)
 - 7) Output point (Yes / No)
 - e. The Controls Contractor shall keep the A/E, CA, HVAC, and TAB Contractor informed of all changes to this list during programming and setup.
- 3. Submit a written checkout plan indicating in a step-by-step manner, the procedures that will be followed to test, checkout and adjust the control system prior to functional testing. At minimum, the checkout plan shall include for each type of equipment controlled by the building automation system:
 - a. System name.
 - b. List of devices.
 - c. Step-by-step procedures for testing each controller after installation, including:
 - 1) Process of verifying proper hardware and wiring installation.
 - 2) Process of downloading programs to local controllers and verifying that they are addressed correctly.
 - 3) Process for performing and documenting point-to-point checkout for each digital and analog input and output.
 - 4) Process of performing operational checks of each controlled component.
 - 5) Plan and process for calibrating valve and damper actuators and all sensors.
 - 6) A description of the expected field adjustments for transmitters, controllers and control actuators should control responses fall outside of expected values.
 - d. A copy of the log and field checkout sheets that will document the process. This log must include a place for initial and final read values during calibration of each point and clearly indicate when a sensor, controller or command has “passed” and is operating within the contract parameters.
 - e. A description of the instrumentation required for testing.
 - f. Indicate the portion of the controls checkout plan that should be completed prior to TAB using the controls system for TAB work. Coordinate with the CA and TAB Contractor for this determination.
- 4. Point-to-Point Checkout: Include in the checkout plan a point-to-point checkout. Each control point tied to a central control system shall be verified to be commanding, reporting, and controlling according to its intended purpose. For each output, commands

shall be initiated and verified to be functioning by visually observing and documenting the status of the controlled device in the field (e.g. valve or damper actuator response, pump, or fan status). For each input, the system or conditions shall be altered to initiate the input response being tested and the response in the control system observed and recorded (e.g. high duct static pressure alarm).

5. Calibrations: The CONTROLS CONTRACTOR is responsible to calibrate all field installed sensors and actuators using test and documentation methods approved by the CA. The HVAC CONTRACTOR is responsible to calibrate all factory installed sensors and actuators.
 - a. Sensors installed in the unit at the factory with calibration certification provided need not be field calibrated by the HVAC CONTRACTOR.
 - b. Valve leak-by tests shall be conducted by the Contractor when shown on a construction checklist.
 - c. All procedures used shall be fully documented by the Controls Contractor on suitable forms, clearly referencing the procedures followed and written documentation of initial, intermediate, and final results.
6. Beyond the control points necessary to execute all documented control sequences, provide monitoring, control and virtual points as indicated in the Specifications.
7. Provide a signed and dated certification to the CA upon completion of the Building Automation and Automatic Temperature Control System (BAS) installation, including checkout and calibration of each controlled device, that all system programming and graphics is complete as to all respects of the Contract Documents. This shall be submitted by the Controls Contractor prior to the start of functional testing by the CA.

D. TAB Contractor: The scope of work for the TAB Contractor is provided in Section 230990.

3.2 SUBMITTALS

- A. The Contractor shall send one copy of product data, shop drawings and similar submittals to the CA at the same time they are submitted to the A/E. The CA will review the submittals and provide any comments to the A/E for inclusion in their comments. The Architect will transmit to the CA, for the CA's use in preparing functional test procedures; one reviewed and approved copy of product data, shop drawings and similar submittals received from the HVAC, Controls and TAB Contractors, pertinent to equipment and systems to be commissioned.

3.3 STARTUP

- A. The HVAC, Controls and TAB Contractors shall follow the start-up and initial checkout procedures listed in the Responsibilities list in this section. Equipment start-up is required to complete systems and sub-systems so they are fully functional, in compliance with the Contract Documents. The commissioning procedures and functional testing do not relieve or lessen this responsibility or shift that responsibility partially to the Commissioning Agent or Owner.
- B. Testing is intended to begin upon completion of a system. Refer to Section 019100 for additional information related to scheduling.

3.4 TESTS

- A. The HVAC and Controls Contractors shall provide the necessary support to the CA to complete functional testing. The Controls Contractor shall fully test and verify all aspects of the BAS

Contract Work on a point / system / integrated operational basis for all points, features and functions specified. The following requirements apply to all mechanical and control systems and features that are to be commissioned when referenced below. Tests shall:

1. Verify functionality and compliance with the basis of design for each individual sequence module in the sequence of operations. Verify proper operation of all control strategies, energy efficiency and self-diagnostics features by stepping through each sequence and documenting equipment and system performance. Tests shall include startup, normal operation, shutdown, scheduled 'on' and 'off', unoccupied, and manual modes, safeties, alarms, over-rides, lockouts, and power failure.
 2. Verify operation of systems and components that may be impacted during low, normal, and high load conditions and during combinations of environmental and interacting equipment conditions that could reasonably exist and potentially result in adverse system reaction.
 3. Verify all alarm and high and low limit functions and messages generated on all points with alarm settings.
 4. Verify integrated performance of all components and control system components, including all interlocks and interactions with other equipment and systems.
 5. Verify shutdown and restart capabilities both for scheduled and unscheduled events (e.g. power failure recovery and normal scheduled start / stop).
 6. Verify proper sequencing of heat transfer elements as required to prevent simultaneous heating and cooling, unless specifically required for dehumidification operation.
 7. Verify system response and stability of control loops under different load conditions and determine if additional loop tuning is required by the Controls Contractor.
 8. When applicable, demonstrate a full cycle from 'off' to 'on' and 'no load' to 'full load' and then to 'no load' and 'off'.
 9. Verify time of day schedules and setpoints.
 10. Verify all energy saving control strategies.
 11. Verify that all control system graphics are representative of the systems and that all points and control elements are in the same location on the graphic as they are in the field.
 12. Verify operator control of all adjustable control system points including proper access level as agreed to during the controls system demonstration.
- B. In addition to specific details, and/or standards referenced for acceptance testing indicated in other Division 23 sections, the following common acceptance criteria apply to all mechanical equipment, assemblies, and features:
1. For the conditions, sequences and modes tested, the equipment, integral components and related equipment shall respond to varying loads and changing conditions and parameters appropriately as expected, according to the sequence of operation, as specified, according to acceptable operating practice and the manufacturer's performance specifications.
 2. Systems shall accomplish their intended function and performance (e.g. provide supply air and water at designated temperature and flow rate, etc., and maintain space conditions in terms of air temperature, relative humidity, and CO₂ concentration) at specified levels at varying conditions.
 3. Control loops shall be stable under all operating conditions. Control loops shall exhibit a quarter decay ratio type responses to a step change or other upset and return to stable operation in a time frame that is reasonable and realistic for the system that they are associated with.
 4. All safety trips shall require a manual reset to allow a system restart, unless otherwise explicitly stated in the specified sequence of operation.

5. Resetting a manual safety shall result in a stable, safe, and predictable return to normal operation by the system.
 6. Safety circuits and permissive control circuits shall function in all possible combinations of selector switch positions (hand, auto, inverter, bypass, etc.).
 7. Additional acceptance criteria will be defined by the CA when detailed tested procedures are developed.
- C. At the CA's discretion, if large numbers or repeated deficiencies are encountered, the CA shall suspend functional testing until the Contractor corrects the deficiencies and troubleshoots all remaining systems at issue on their own. The Contractor shall be responsible for any resulting schedule delays that increase the overall time period to complete functional testing.

3.5 WRITTEN WORK PRODUCTS

- A. Written work products of Contractors will consist of the filled-out start-up, initial checkout, pre-functional checklists, and test documentation in accordance with all Division 23 sections.

END OF SECTION 230800

SECTION 230860 - VENTILATION EQUIPMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Exhaust Fans

1.2 REFERENCES

- A. AMCA 99 - Standards Handbook.
- B. AMCA 210 - Laboratory Methods of Testing Fans for Rating Purposes.
- C. AMCA 261 - Directory of Products Licensed to Bear the AMCA Certified Ratings Seal.
- D. NFPA 70 - National Electrical Code.
- E. NFPA 96 - Installation of Equipment for the Removal of Smoke and Grease Vapors from Commercial Cooking Equipment.
- F. UL 705 - Power Ventilators.

1.3 SUBMITTALS

- A. Submit in accordance with provisions of Section 230010.
- B. Product Data: Provide data on fans and accessories including fan curves with specified operating point clearly plotted, sound power levels at rated capacity, and electrical characteristics and connection requirements.

PART 2 - PRODUCTS

2.1 DIRECT DRIVE PREMIUM CABINET CENTRIFUGAL EXHAUST FANS (I)

- A. General Description:
 - 1. Base fan performance at standard conditions (density 0.075 Lb/ft³)
 - 2. Inline mounted applications
 - 3. Maximum operating temperature is 130°F (54.4°C)
 - 4. Fans shall be UL/cUL listed 507 - Electric Fans
 - 5. Each fan shall bear a permanently affixed manufacture's nameplate containing the model number and individual serial number.
- B. Wheel:
 - 1. Forward curved centrifugal wheel
 - 2. Constructed of galvanized steel or calcium carbonate filled polypropylene
 - 3. Statically and dynamically balanced in accordance with AMCA Standard 204-05.

- C. Motors:
 - 1. Electronically Commutated Motor
 - a. Motor enclosures: Open type
 - b. Motor to be a DC electronic commutation type motor (ECM) specifically designed for fan applications. AC induction type motors are not acceptable. Examples of unacceptable motors are: Shaded Pole, Permanent Split Capacitor (PSC), Split Phase, Capacitor Start and 3 phase induction type motors
 - c. Motors are permanently lubricated, heavy duty ball bearing type to match with the fan load and pre-wired to the specific voltage and phase.
 - d. Internal motor circuitry to convert AC power supplied to the fan to DC power to operate the motor.
 - e. Motor shall be speed controllable down to 20% of full speed (80% turndown). Speed shall be controlled by either a potentiometer dial mounted at the motor or by a 0-10 VDC signal
 - f. Motor shall be a minimum of 85% efficient at all speeds.
- D. Housing:
 - 1. Constructed of heavy gauge galvanized steel
 - 2. Interior shall be lined with 0.5" of acoustical insulation
 - 3. Profile as low as 9-1/4"
- E. Spring Loaded Aluminum Backdraft Damper:
 - 1. Prevents air from entering back into the building when fan is off
 - 2. Eliminates rattling or unwanted backdrafts.
- F. Outlet:
 - 1. Type of outlet: Square
 - 2. Field rotatable from horizontal to vertical discharge
 - 3. Shall include an aluminum backdraft damper
- G. Mounting Brackets: Fully adjustable for multiple installation conditions
- H. Access Panel: Once installed shall have easy access to internal components
- I. Options and Accessories:
 - 1. Vibration Isolation:
 - a. Available for suspended installations
 - b. Includes pre-punched hole for ease of installation and shall have all hardware to mount one unit.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Secure roof exhausters with lag screws to roof curb.
- C. Extend ducts to roof exhausters into roof curb.

- D. Install flexible connections where indicated.
- E. Provide sheaves required for final air balance.
- F. Install backdraft dampers on inlet to roof exhausters.
- G. Provide backdraft dampers on outlet from cabinet and ceiling exhaust fan and as indicated.
- H. Do not operate fans for any purpose until ductwork is clean, filters in place, bearings lubricated, and fan has been test-run under observation.
- I. Install all suspended fans with combination metal spring and neoprene isolator hangers with a static spring deflection on 1-inch.

END OF SECTION 230860

SECTION 230890 - DUCTWORK SYSTEMS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Metal Ductwork
- B. Air Turning Devices/Extractors
- C. Backdraft Dampers
- D. Duct Access Doors
- E. Flexible Duct Connections
- F. Volume Control Dampers
- G. Diffusers
- H. Registers/Grilles

1.2 REFERENCES

- A. ASTM A 90 - Weight of Coating on Zinc-Coated (Galvanized) Iron or Steel Articles.
- B. ASTM A 525 - General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
- C. ASTM A 527 - Steel Sheet, Zinc-Coated (Galvanized) by Hot-Dip Process, Lock Forming Quality.
- D. ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate.
- E. NFPA 90A - Installation of Air Conditioning and Ventilating Systems.
- F. SMACNA - HVAC Air Duct Leakage Test Manual.
- G. SMACNA - HVAC Duct Construction Standards - Metal and Flexible.
- H. UL 181 - Factory-Made Air Ducts and Connectors.
- I. ASHRAE Handbook - Systems Volume, Chapter "Sound and Vibration Control".
- J. ASHRAE 70 - Method of Testing for Rating the Air Flow Performance of Outlets and Inlets.

1.3 SUBMITTALS

- A. Submit in accordance with provisions of Section 230010.

- B. Ductwork:
 - 1. Shop Drawings:
 - a. Indicate duct fittings, particulars such as gauges, sizes, welds, and configuration prior to start of work for kitchen hood exhaust systems.
 - b. The contractor shall submit for checking and approval, copies of his shop drawings of ductwork for the main trunk duct systems and must receive approval of the Architects before any fabrication upon this ductwork is begun.
 - 2. Product Data: Provide data for duct materials and duct connectors.
- C. Ductwork Accessories:
 - 1. Shop Drawings: Indicate for shop fabricated assemblies including volume control dampers, duct access doors, fire dampers, duct silencers, etc.
 - 2. Product Data: Provide for shop fabricated assemblies including volume control dampers, duct access doors, fire dampers, duct silencers, etc.
- D. Air Outlets and Inlets: Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish, and type of mounting prior to submission. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with SMACNA - HVAC Duct Construction Standards - Metal and Flexible.
- B. Test and rate louver performance in accordance with AMCA 500.

1.5 REGULATORY REQUIREMENTS

- A. Construct ductwork to NFPA 90A and NFPA 96 standards.

PART 2 - PRODUCTS

2.1 DUCTWORK MATERIALS

- A. Galvanized Steel Ducts: ASTM A525 and ASTM A527 galvanized steel sheet, lock-forming quality, having G60 zinc coating of in conformance with ASTM A90.
- B. Aluminum Ducts: ASTM B209; aluminum sheet, alloy 3003-H14. Aluminum Connectors and Bar Stock: Alloy 6061- T6 or of equivalent strength.

2.2 DUCTWORK FABRICATION

- A. Fabricate and support in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated. Provide duct material, gauges, reinforcing, and sealing for operating pressures indicated.
- B. Construct T's, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Provide turning vanes in all elbows. Where acoustical lining is indicated, provide turning vanes of perforated metal with glass fiber insulation.

- C. Increase duct sizes gradually, not exceeding 15° divergence wherever possible; maximum 30° divergence upstream of equipment and 45° convergence downstream.
- D. Provide standard 45° lateral wye takeoffs unless otherwise indicated where 90° conical tee connections may be used.
- E. Exposed round and rectangular metal ductwork shall be supplied and prepared for field painting by HVAC Contractor for painting by General Contractor. Color selected by Architect.
- F. Size shall be as follows:
 - 1. Rectangular Duct

<u>Largest Duct Dimension</u>	<u>Steel U.S. Standard Gauge</u>
Up through 12"	26
13" through 30"	24
30" through 54"	22
 - 2. Round Duct (Exhaust System Only)

<u>Largest Dimension</u>	<u>Steel - U.S. Standard Gauge</u>
Up through 8"	26
9" through 22"	24
23" through 36"	22
37" through 50"	20

2.3 MANUFACTURED DUCTWORK AND FITTINGS

- A. Manufacture in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated. Provide duct material, gages, reinforcing and sealing for operating pressures indicated.
- B. Exposed round metal ductwork shall be field painted in color selected by Architect.

2.4 BACKDRAFT DAMPERS

- A. Gravity Backdraft Dampers, Size 18" x 18" (450 x 450 mm) or Smaller, Furnished with Air Moving Equipment: Air moving equipment manufacturer's standard construction.
- B. Damper manufacturer's printed application and performance data including pressure, velocity and temperature limitations shall be submitted for approval showing damper suitable for pressures to 2" wg, velocities to 2,000'/min and temperatures to 180°F. Testing and ratings to be in accordance with AMCA Standard 500D.

2.5 DUCT ACCESS DOORS

- A. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.
- B. Fabrication: Rigid and close-fitting of galvanized steel with sealing gaskets and quick fastening locking devices. For insulated ductwork, install minimum 1" (25 mm) thick insulation with sheet metal cover.
 - 1. Less Than 12" Square: Secure with sash locks.
 - 2. Up to 18" Square: Provide two hinges and two sash locks.

3. Up to 24 x 48": Three hinges and two compression latches with outside and inside handles.
4. Larger Sizes: Provide an additional hinge.

C. Access doors with sheet metal screw fasteners are not acceptable.

2.6 FLEXIBLE DUCT CONNECTIONS

A. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.

B. Connector: Fabric crimped into metal edging strip.

C. Fabric: UL listed fire-retardant neoprene coated woven glass fiber fabric to NFPA 90A, minimum density 30 oz per sq yd.

1. Net Fabric Width: Approximately 2" (50 mm) wide.
2. Metal: 3" wide, 24-ga (0.6 mm thick) galvanized steel.

2.7 VOLUME CONTROL DAMPERS

A. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.

B. Single Blade (up to 12" high) – 16-ga blade on rod.

C. Multi-Blade Damper (over 12" high): Fabricate of opposed blade pattern with maximum blade sizes 8"x72". Assemble center and edge crimped blades in prime coated or galvanized channel frame with suitable hardware.

D. End Bearings: Except in round ductwork 12" (300 mm) and smaller, provide end bearings. On multiple blade dampers, provide oil-impregnated nylon or sintered bronze bearings.

E. Quadrants:

1. Provide locking, indicating quadrant regulators on single and multi-blade dampers.
2. On insulated ducts mount quadrant regulators on stand-off mounting brackets, bases, or adapters.
3. Where rod lengths exceed 30" provide regulator at both ends.

2.8 SUPPLY REGISTERS (SR)

A. Manufacturers:

1. Tuttle & Bailey, AV54 with horizontal blade adjustment (front) and vertical adjustment (rear)
2. Approved equal: Anemostat, Titus, Carnes Metalair, Krueger, Price, Hart & Cooley

B. Type: Streamlined and individually adjustable blades, 3/4" minimum depth, 3/4" maximum spacing with spring or other device to set blades, vertical face, double deflection.

C. Frame: 1-1/4" margin with concealed mounting and gasket.

- D. Fabrication: Aluminum extrusions, with color to match attached surface or duct as selected by the Architect.
- E. Damper: Integral, gang-operated opposed blade type with removable key operator, operable from face.

2.9 WALL EXHAUST AND RETURN REGISTERS/GRILLES (ER, RR, TR)

- A. Manufacturer
 - 1. Titus & Bailey, Model T115
 - 2. Acceptable equal by Anemostat, Titus, Carnes, Metalaire, Krueger, Price, Hart & Cooley.
- B. Type: Heavy Duty, steel, single deflection blades, 1/2" minimum depth, 1/2" maximum spacing with 38° fixed bars, horizontal or vertical face with bars in shortest dimension.
- C. Frame: 1-1/4" margin with concealed mounting and gasket.
- D. Fabrication: 14-ga steel bars, with 16-ga steel margin, color to be selected by Architect.
- E. Damper: Integral, gang-operated, opposed blade type with removable key operator, operable from face.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Rectangular ductwork shall be galvanized unless otherwise noted.
- B. Install in accordance with manufacturer's instructions.
- C. Install and seal ducts in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible.
- D. Duct Sizes are inside clear dimensions. For lined ducts, maintain sizes inside lining.
- E. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
- F. Use double nuts and lock washers on threaded rod supports.
- G. Set plenum doors 6 to 12" above floor. Arrange door swings so that fan static pressure holds door in closed position.
- H. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.
- I. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA HVAC Duct Construction Standards - Metal and Flexible.
- J. Provide backdraft dampers on exhaust fans or exhaust ducts nearest to outside and where indicated.

- K. Provide flexible connections immediately adjacent to equipment in ducts associated with fans and motorized equipment.
- L. Provide balancing dampers at points on supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing. Install minimum 2 duct widths from duct take-off.
- M. Provide balancing dampers on duct take-off to diffusers, grilles, and registers, regardless of whether dampers are specified as part of the diffuser, grille, or register assembly.
- N. Check location of outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry, and lighting arrangement.
- O. Install diffusers to ductwork with airtight connection.
- P. Paint ductwork visible behind air outlets and inlets matte black.

3.2 SHEET METAL WORK

- A. Provide air duct systems as shown on the drawings. Construction methods, unless otherwise specified, shall conform with the recommendations in the latest edition of the ASHRAE Guide. Unless otherwise noted, ductwork shall be galvanized steel.
- B. All ductwork seams and joints shall be caulked with white silicone caulking and taped before caulking compound cures. In lieu of caulk and tape, ductwork may be sealed with Benjamin Foster #30-02 duct seal or Cadoprene #725 installed per manufacturer's instructions.
- C. For use on ductwork 18" size and larger in any dimension, the system shall consist of angles, corners, PCV cleats, gaskets, and corner clips. Install the system in accordance with the manufacturer's instructions and installation manuals. Joints shall meet SMACNA Type "J" connection for Systems 35 and SMACNA Type "E" for System 25. Duct connection system shall be similar to "Ductmate" by Ductmate Industries, Inc.
- D. All branch connections shall be made in a manner that leaves no exposed liner edges.
- E. No pipe or conduit and no hangers for ceilings or piping shall pass through ducts unless it is impossible to avoid doing so, in which case, the approval of the Architect shall be obtained before proceeding with the work.
- F. Should vibrations occur in ductwork while the system is in operation, this contractor shall install such additional stiffening members as are necessary to overcome this vibration. All ductwork where vibration occurs shall be isolated at points of contact with the building by felt pads neatly and securely held in place. The ductwork at a manually or automatically operated damper shall be reinforced to properly support the damper and prevent vibration. Curved elbows shall have a centerline radius of not less than 1-1/2 times the width of the duct.
- G. All work shall be designed and fabricated to keep resistance losses to a minimum. Use gradual transformation and long radius elbows. Where sharp turns are necessary, the elbow or plenum shall be fabricated with vanes concentric with the inside and outside radii.

- H. Where indicated and where required for proper system air balancing furnish and install opposed blade adjustable volume dampers as hereinafter specified.
- I. Volume dampers are to be key operated opposed blade type and are to be operable from the bottom.

3.3 HANGERS

- A. Ductwork shall be rigidly supported and secured in an approved manner to the structure, reinforced and braced to be free from vibration, rattle, and noise. Hangers shall be securely suspended from structure.
- B. Hanger schedule shall be as follows:
 - 1. Duct up to 20" wide: Galvanized band or strap iron not less than 12-ga not less than 1" wide - 8' centers.
 - 2. Ducts 21" to 36" wide: 1-1/2"x1-1/2"x1/8" angle iron and 3/8" threaded rod-8' centers.
 - 3. Ducts 36" wide: 1-1/2"x1-1/2"x3/16" angle iron and 1/2" threaded rod - 6' centers.

END OF SECTION 230890

SECTION 230990 - TESTING, ADJUSTING, AND BALANCING

PART 1 - GENERAL

- 1.1 THIS SECTION IS FOR REFERENCE ONLY. CONTRACTOR SHALL COORDINATE BALANCING WITH OWNERS BALANCING CONTRACTOR, AND THE COMMISSIONING AGENT.
- 1.2 SECTION INCLUDES
- A. Testing, Adjustment, and Balancing of Air Systems
 - B. Measurement of Final Operating Condition of HVAC Systems
- 1.3 REFERENCES
- A. AABC - National Standards for Total System Balance
 - B. NEBB - Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems
 - C. SMACNA - HVAC Systems Testing, Adjusting, and Balancing
- 1.4 SEQUENCING
- A. Sequence work to commence after completion of systems and schedule completion of work before Substantial Completion of Project.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION

- 3.1 AGENCIES
- A. Work shall be performed by HVAC Contractor who shall provide preliminary balancing. Preliminary balancing shall include adjusting airflow and waterflow to provide operational systems and allow Owner to occupy spaces with comfortable conditions until TAB Agency can perform work and make final adjustments to design airflow. Preliminary balancing shall not require any reporting.
 - B. HVAC Contractor shall coordinate with and cooperate with designated air balancing firm.
- 3.2 EXAMINATION
- A. Verify that systems are complete and operable before commencing work. Ensure the following conditions:
 - 1. Systems are started and operating in a safe and normal condition.

2. Temperature control systems are installed complete and operable.
3. Proper thermal overload protection is in place for electrical equipment.
4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
5. Fans are rotating correctly.
6. Fire and volume dampers are in place and open.
7. Access doors are closed, and duct end caps are in place.
8. Air outlets are installed and connected.
9. Duct system leakage is minimized.

B. Submit field reports. Report defects and deficiencies noted during performance of services which prevent system balance as soon as observed.

C. Beginning of work means acceptance of existing conditions.

3.3 PREPARATION

A. Provide instruments required for testing, adjusting, and balancing operations.

B. Provide additional balancing devices as required.

3.4 INSTALLATION TOLERANCES

A. Air Handling Systems: Adjust to within $\pm 5\%$ of design for supply systems and $\pm 10\%$ of design for return and exhaust systems.

3.5 ADJUSTING

A. Ensure recorded data represents actual measured or observed conditions.

B. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.

C. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.

D. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

E. Recheck points or areas as selected and witnessed by the Owner.

3.6 AIR SYSTEM PROCEDURE (by Owner Contracted TAB Firm)

A. Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities.

B. Make air quantity measurements in ducts by Pitot tube traverse of entire cross-sectional area of duct.

C. Measure air quantities at air inlets and outlets.

- D. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.
- E. Use volume control devices to regulate air quantities only to extend that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.
- F. Vary total system air quantities by adjustment of fan speeds. Provide drive changes required. Vary branch air quantities by damper regulation.
- G. Provide system schematic with required and actual air quantities recorded at each outlet or inlet.
- H. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50% loading of filters.
- I. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.
- J. Measure temperature conditions across outside air, return air, exhaust dampers to check leakage.
- K. Where modulating dampers are provided, take measurements and balance at extreme conditions.

3.7 COORDINATION WITH TAB AGENCY

- A. This work will be performed by an Independent Testing and Balancing Agency that is AABC or NEBB Certified.
- B. The HVAC Contractor shall coordinate the work of the contractors performing the HVAC, Electrical, Automatic Temperature Control, and Testing and Balancing work to provide complete properly tested and adjusted systems. The HVAC Contractor shall provide a start-up report for each piece of equipment that is installed on the project. The HVAC Contractor shall provide the Balancing Agency copies of the start-up reports for all of the HVAC equipment.
- C. The HVAC Contractor shall coordinate all mechanical work, including sheet metal and automatic temperature controls, to provide a complete, properly tested and adjusted system throughout. He shall furnish progress reports regarding this phase of the work on a regular basis as directed. At such time as the systems are started up, the contractor performing the mechanical work shall provide the Balancing Agency documentation that the duct systems have been tested to the satisfaction of the Duct Leak Test Specifications. The Mechanical Contractor shall insure that all components are installed and operating and that the major components such as fans, pumps, refrigeration machines and the like are capable of producing the schedule capacity requirements. This requirement does not relieve the Mechanical Contractor of any requirements specified elsewhere. Should any of these components or systems be found not capable of producing these requirements, he shall certify in writing that the systems are ready for final testing and balancing by the testing and balancing agency.
- D. The HVAC Contractor shall provide to the balancing agency any documentation and/or report for all systems that were required to have Factory Start-Up and/or System Commissioning performed.
- E. The contractor performing the electrical construction work shall coordinate all electric work to provide complete, properly tested and adjusted electrical systems throughout the complex. He shall

furnish progress reports on a regular basis as directed. He shall certify in writing when each system is electrically operable, including the check for proper rotation of all HVAC equipment.

- F. The Electrical Contractor will support the balancing agency in obtaining any data that is required by the specifications to be taken on any existing HVAC System as required.
- G. The contractor performing the automatic temperature control work shall coordinate all Automatic Temperature Control (ATC) work to provide complete, properly tested and adjusted ATC Systems for every point throughout the facility. He shall furnish progress reports on a regular basis as directed. He shall certify in writing when each system control is operable, including the check and calibration of all control devices.
- H. The Testing and Air Balancing Agency (TAB Agency) will be responsible for the following:
 - 1. HVAC Inspections: The TAB Agency will provide 18 random inspections during the construction phase of this project. They will coordinate, witness, verify and report to the Owner on construction, progress, quality, start-up and operation of all mechanical HVAC equipment systems and subsystems. Ensure that the HVAC System and Building Management Systems and equipment are installed in accordance with contract documents, and that they operate as intended and specified by the Project Engineer. The TAB Agency will be present at the Owner's request at meetings where the mechanical and electrical systems are accessed and discussed by the project design team.
 - 2. Testing and Balancing: The TAB Agency will provide testing and balancing of the Air and Hydronic Systems related to the HVAC Systems for this project. The testing and balancing will be performed in accordance with the Project Specifications. Where items are not identified in the Project Specifications, AABC or NEBB procedural standards for testing, adjusting, and balancing will be followed.
 - 3. Building Systems Commissioning: The TAB Agency will provide random commissioning to ensure the building system is complete and in compliance with the plans and specifications. This includes, but is not limited to:
 - a. Verifying the operation of system components under various conditions.
 - b. Verifying interactions between systems and subsystems.
 - c. Documenting system performance in reference to design criteria.
 - 4. The TAB Agency will:
 - a. Check the operation of all major mechanical equipment.
 - b. Provide 8 random inspections of Gas Fired Furnaces.
 - 5. Should any of these units not meet specifications as stated in the contract documents, it will be the contractor's responsibility to make all necessary repairs and provide, at their expense an independent TAB Agency (AABC or NEBB Certified) to recheck this equipment.

END OF SECTION 230990

SECTION 260010 - ELECTRICAL GENERAL REQUIREMENTS

PART 1 - GENERAL

1.1 GENERAL

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to all Division 26, 27 & 28 Specification Sections.

1.2 SCOPE OF PROJECT

- A. Provide a complete and operating electrical installation in accordance with these specifications and accompanying contract drawings. This includes all required labor, materials, apparatus, and supervision.

1.3 UNIT PRICE ITEMS

- A. Refer to Section 012129 and 012200

1.4 RULES AND REGULATIONS

- A. Perform in accordance with the rules and regulations of the National Electrical Code (NEC), International Building Code (IBC) and other Codes and Standards cited in this specification and the requirements of the utility companies serving the project site.
- B. Certificates of Approval in triplicate, for rough and finished wiring, from a Certified Inspection Service must be delivered to the Engineer before final payment can be authorized.
- C. Perform all work in accordance with the rules and regulations of the Pennsylvania Department of Labor and Industry, Federal Department of Labor (Occupational Safety and Health Administration) and any other national, state, or local authority having jurisdiction.
- D. Perform all Construction, design, fabrication, tests, rating, and installation in compliance with the regulations of all local, state, or national agencies having jurisdiction over the project. Pay all costs involved in work necessary to comply with these regulations.
- E. The Contractor assumes all responsibility and liability for any code violations, damage or injury which occurs as a result of a deviation from or a change to the requirements of these plans and specifications which has not been approved in writing by the Engineer.
- F. Consider the National Electrical Code, and the other codes and standards cited herein as providing the minimum construction standards for this project. Conform to all additional requirements and limitations contained in these plans and specifications as indicated.
- G. The intent of these drawings and specifications is to define the scope-of-work and standards of quality for the project. The Contractor is responsible for understanding and following the requirements of the codes and standards referenced by these documents. The Contractor shall be

responsible for costs associated with changes when a code enforcement official determines that work does not comply with referenced codes and standards.

1.5 DEFINITIONS

- A. General - Basic Contract definitions are included in the Conditions of the Contract.
- B. Indicated - The term indicated refers to graphic representations, notes, or schedules on the Drawings, or other Paragraphs or Schedules in the Specifications, and similar requirements in the Contract Documents. Terms such as shown, noted, scheduled, and specified are used to help the reader locate the reference. There is no limitation on location.
- C. Directed - Terms such as directed, requested, authorized, selected, approved, required, and permitted mean directed by the Architect, requested by the Architect, and similar phrases.
- D. Approved - The term approved, when used in conjunction with the Architect's action on the Contractor's submittals, applications, and requests, is limited to the Architect's duties and responsibilities as stated in the Conditions of the Contract.
- E. Regulation - The term regulation includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. Furnish - The term furnish means supply and deliver to the Project Site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. Install - The term install describes operations at the Project site including the actual unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. Provide - The term provide means to furnish and install, complete and ready for the intended use.
- I. Contractor - The Contractor or Electrical Contractor - The term means the Contractor responsible for all work under this Division.
- J. Installer - An installer is the Contractor, or another entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier, to perform a particular construction activity, including installation, erection, application, and similar operations. Installers are required to be experienced in the operations they are engaged to perform.
 - 1. The term experienced, when used with the term installer, means having a minimum of five previous projects similar in size and scope to this Project, being familiar with the special requirements indicated, and having complied with requirements of the authority having jurisdiction.
 - 2. Trades - Using terms such as carpentry is not intended to imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as carpenter. It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.
 - 3. Assigning Specialists - Certain Sections of the Specifications require that specific construction activities be performed by specialists who are recognized experts in those operations. The specialists must be engaged for those activities, and their assignments are

requirements over which the Contractor has no choice or option. However, the ultimate responsibility for fulfilling Contract requirements remains with the Contractor.

- a. This requirement is not to be interpreted to conflict with enforcing building codes and similar regulations governing the Work. It is also not intended to interfere with local trade union jurisdictional settlements and similar conventions.
- K. Project Site is the space available to the Contractor for performing construction activities either exclusively or in conjunction with others performing other work as part of the Project. The extent of the Project site is shown on the drawings and may or may not be identical with the description of the land on which the Project is to be built.
- L. Testing Agencies - A testing agency is an independent entity engaged to perform specific inspections or tests, either at the Project Site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.
- M. AHJ – Authority(ies) Having Jurisdiction
- N. Abbreviations and Names - Trade association names and titles of general standards are frequently abbreviated. The following acronyms or abbreviations, as referenced in Contract Documents, are defined to mean the associated names.
1. AAHTO American Association of State Highway and Transportation Officials
 2. ACI American Concrete Institute
 3. AISC American Institute of Steel Construction
 4. AISI American Iron and Steel Institute
 5. ANSI American National Standards Institute
 6. ASTM American Society for Testing and Materials
 7. AWS American Welding Society
 8. CBM Certified Ballast Manufacturers Assoc.
 9. CRSI Concrete Reinforcing Steel Institute
 10. EIA Electronic Industries Assoc.
 11. ETL ETL Testing Laboratories Inc.
 12. FM Factory Mutual Research Organization
 13. ICEA Insulated Cable Engineers Association, Inc.
 14. IEC International Electrotechnical Commission
 15. IEEE Institute of Electrical and Electronic Engineers
 16. IESNA Illuminating Engineering Society of North America
 17. IMSA International Municipal Signal Association
 18. ISA Instrument Society of America
 19. LPI Lighting Protection Institute
 20. NEC National Electrical Code
 21. NECA National Electrical Contractors Assoc.
 22. NEMA National Electrical Manufacturers Assoc.
 23. NETA International Electrical Testing Assoc.
 24. NFPA National Fire Protection Assoc.
 25. UL Underwriters Laboratories, Inc.
- O. Federal Government Agencies - Names and titles of federal government standard- or Specification-producing agencies are often abbreviated. The following acronyms or abbreviations referenced in the Contract Documents indicate names of standard- or Specification-producing agencies of the

federal government. Names and addresses are subject to change but are believed to be, but are not assured to be, accurate and up to date as of the date of the Contract Documents.

1. CFR Code of Federal Regulations
2. EPA Environmental Protection Agency
3. FAA Federal Aviation Administration (US Department of Transportation)
4. FCC Federal Communications Commission
5. FS Federal Specification (from GSA); Specifications Unit (WFSIS)
6. MIL Military Standardization Documents (US Department of Defense)
7. Naval Publications and Forms Center
8. OSHA Occupational Safety and Health Administration (US Department of Labor)
9. REA Rural Electrification Administration (US Department of Agriculture)

1.6 DRAWINGS

- A. The accompanying drawings are a part of the contract documents and are intended to show approximate and relative locations of services and equipment. Do not scale drawings to determine exact positions, locations, and clearances.
- B. Due to the diagrammatic layout and small scale of the drawings exact dimensions are not shown. Coordinate location and position of equipment with all other trades and the Engineer. Bring any discrepancies or interferences to the attention of the Architect and/or Engineer for clarification.
- C. All drawings and specifications pertaining to general construction, plumbing, HVAC, kitchen, electrical and other work shall be carefully examined. Where physical interferences with his work occur because of his failure to coordinate with other trade, this Contractor shall rearrange his work at his own expense.

1.7 SUBMITTAL OF SHOP DRAWINGS FOR REVIEW

- A. Submit shop drawings with a letter of transmittal to the Architect per requirements of the General Conditions and Architects instructions.
- B. Properly prepare submittals before transmitting to the designated reviewer.
 1. Prepare an individual submittal package for each related group of materials.
 2. Refer to individual 260000 Sections for materials to be submitted for review and approval.
 3. Collate all items to be submitted as required by Division 1 consisting of one copy of each item. Permanently bind together by staples or other means all pages in each set.
 4. Bind with each set a typed cover sheet showing the date, project name, project location, Engineer's name, Contractor's name, Specification Section, and an index of all items included.
 5. Provide space on the cover sheet for the approval stamps of the Subcontractor, Contractor, Engineer, and Architect. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.
 6. Clearly mark each page in the submittal set to show the manufacturer's name.
 7. When a page shows more than one item or catalog number, mark the item and catalog number which is proposed for use. Show all accessories, options and appurtenances which are required or which the Contractor desires to use.
 8. Improperly prepared submissions will be returned without action.

- C. All disapproved submittals shall be corrected as directed by the Architect/Engineer and resubmit the same quantity as originally submitted until approved. No work involving any materials or equipment covered by shop drawings shall be started until the respective shop drawings are approved.
- D. All items requiring shop drawing review shall not be installed until final approval has been given by the Architect/Engineer.

1.8 SUBSTITUTIONS

- A. All substitutions must be submitted in accordance with Division 1 requirements.
- B. Substitutions submitted not in accordance with Division 1 requirements will be returned without review.
- C. All costs involved in changes in the building, to the equipment, to the arrangement of equipment, or to the work performed or to be performed under other sections of the specifications, due to the substitution of equipment in lieu of that shown on the drawings or specified, shall be borne by the Contractor making such substitutions, and shall include, but not necessarily be limited to, costs or fees in connection with resubmission of drawings for approval, if required, by the Commonwealth of Pennsylvania, local authorities or insuring agencies having jurisdiction over the work.

1.9 SUBMITTALS FOR CLOSEOUT

- A. Record Drawings: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
 - 1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, Subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an acceptable drawing technique.
 - c. Record data as soon as possible after obtaining it.
 - d. Record and check the mark-up before enclosing concealed installations.
 - 2. Content: Types of items requiring marking include, but are not limited to, the following:
 - a. Dimensional changes to Drawings.
 - b. Revisions to details shown on Drawings.
 - c. Depths of foundations below first floor.
 - d. Locations and depths of underground utilities.
 - e. Revisions to routing of cable tray and conduits.
 - f. Revisions to electrical circuitry.
 - g. Actual equipment locations.
 - h. Locations of concealed internal utilities.
 - i. Changes made by Change Order.
 - j. Changes made following Architect's written orders.
 - k. Details not on the original Contract Drawings.
 - l. Field records for variable and concealed conditions.
 - m. Record information on the Work that is shown only schematically.

3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
 4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
 6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
 7. Provide one (1) hard copy and one (1) PDF electronic file on digital media acceptable to Architect/Engineer for Owner. Provide one (1) additional PDF electronic file for the Engineer.
- B. O&M Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
 2. File Names and Bookmarks: Enable bookmarking of individual documents based upon file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel upon opening file.
 3. Provide two (2) copies of the PDF electronic files on digital media acceptable to Architect/Engineer. One copy shall be for the Owner and the other shall be for the Engineer.
- C. O&M Manuals, Paper Copy: Submit manuals in the form of hard copy, bound and labeled volumes.
1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2" x 11" paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
 - a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders, if necessary, to provide essential information for proper operation or maintenance of equipment or system.
 - b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL", Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.
 2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
 3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment.
 4. Supplementary Text: Prepared on 8-1/2" x 11" white bond paper.
 5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
 - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
 - b. If drawings are too large to be used as foldouts, fold, and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

6. Provide three (3) hard copies for Owner. Submit to Architect/Engineer for review and approval.

D. The Contractor shall submit 3 copies of the final wiring certificates.

E. The Contractor shall submit a copy of the Project Warranty

1.10 WARRANTY

A. The Contractor shall submit the following guarantee:

1. Written one (1) year full warranty guarantees shall be submitted for the entire electrical installation installed under this project (except lamps). The warranty shall begin at substantial completion of the project. If the manufacturer's warranty begins when the equipment ships or is ordered, then the Contractor shall extend the warranty to cover the construction period plus the warranty specified under substantial completion. If the manufacturer's standard guarantee provides for a longer period, the longer period shall apply.
2. Where defects in the material, equipment and/or workmanship become evident within this guarantee period, the Contractor shall be responsible for providing new manufacturer approved material and equipment, and/or correcting the defective workmanship without any costs to the Owner.

1.11 INSPECTION

A. Inspections of electrical work will be made by an agency hired by the Contractor.

B. Contractor shall pay all inspection fees and submit 3 copies of final wiring certificates to Architect.

1.12 VISIT TO THE SITE

A. Prior to submission of bid, the Contractor is required to visit the site to become acquainted with existing conditions. Bids as submitted will be interpreted to include all costs and changes made necessary by such conditions. Refer to the pre-bid meeting schedule in invitation to bid.

1.13 COORDINATION OF WORK

A. Coordination and meetings: Coordinate the installation of all interior and exterior products and systems specified for this construction project including those specified under multiple prime contracts in accordance with Division 1.

B. Coordination with Various Trades: Contractor shall coordinate space and installation requirements of all work, including underground utilities, which is indicated diagrammatically on drawings, with the project manager, respective contractors, and Utility Company's prior to starting any work. In case of interference or problems, the Architect shall decide which work is to be relocated, regardless of which work is installed first, at no additional cost. See Division 1 General Requirements.

C. Coordinate with each utility which serves the facility being constructed under this contract.

1. Verify the utility company requirements indicated on Contract Drawings and in the Specifications and adjust as required.
2. Notify the utility company of the date of completion of those portions of the work which are provided for utility company use.
3. Make all other notifications requested by the utility.
4. Provide equipment submittals as necessary for Utility review and approval.

D. The Owner will pay all utility company service costs.

E. Contractor to verify with the various Utility Company's exact location of their facilities and exact location for terminating the service conduits before starting any work and adjust as required.

1.14 LOCATION OF EQUIPMENT AND OUTLETS

A. Request detailed and specific information regarding the locations of all equipment as the final location may differ from that indicated on the drawings.

1.15 MATERIAL QUALITY

A. Use the best grade and quality items in commercial practice. Provide the manufacturer's name, address, and catalog number on a plate securely affixed in a convenient place. All electrical equipment or apparatus of any one system must be the product of one manufacturer, or equivalent products of a number of manufacturers, which are suitable for use in a unified system.

B. Furnish products listed and classified by Underwriters Laboratories, Inc., or other testing firms acceptable to the authority having jurisdiction.

1.16 WORKMANSHIP

A. Execute all work utilizing qualified and competent employees in a manner consistent with good workmanship. Install all equipment in accordance with Engineer's approved shop drawings and manufacturer's recommendations.

B. Firmly support and secure to the building construction all materials and equipment. Use only approved hardware and methods as described in these Specifications.

1.17 PROTECTION OF EQUIPMENT AND MATERIALS

A. Responsibility for care and protection of electrical work rests with Contractor until it has been tested and accepted. Refer also to specific requirements in each section of this specification.

1.18 SCAFFOLDING AND HOISTING

A. The Contractor shall furnish and erect all scaffolding, hoists, shoring, platforms, railings, ladders, and other devices required by local, state, and federal laws to install all systems and equipment. Scaffolding and all other equipment shall be removed at completion of the work.

B. Contractor shall hoist or rig his own material and equipment into place or arrange for the rigging of it by others at his expense.

1.19 FOREMAN

- A. Contractor must provide a competent foreman, subject to approval of the Architect. The foreman shall be deemed the agent of the Contractor and must be on duty at the building during all working hours.
- B. Any instructions or notices given to the foreman shall have the same force as if given to the Contractor in person.

1.20 PAINTING

- A. All painting of electrical components and materials in finished area will be done under the general construction contract. If electrical components are installed after the area is painted or if no painting is scheduled by the General Contractor, the Electrical Contractor shall be responsible to paint the electrical components.
- B. Factory painted and galvanized finishes which are damaged before the Owner occupies the building shall be repaired with matching paint or cold galvanizing compound respectively. Touch-up of factory finishes shall be done by the Electrical Contractor.

1.21 CUTTING AND PATCHING

- A. This Contractor shall be responsible for all cutting and patching required for installation of work on this project. Cutting and patching methods shall conform to the requirements for new construction contained in other sections of this specification.
 - 1. Patching in surfaces that will remain visible when the project is finished shall be identical in appearance to the undisturbed surface.
 - 2. Patches in fire rated walls, ceilings and floors shall maintain the fire rating of these barriers by the use of approved materials including special fire rated sealing compounds or materials identical to the barrier materials. Refer to the Architectural Specifications for approved methods and materials.
 - 3. Refer to Division 1 for additional requirements.

1.22 WORK SEQUENCE

- A. Refer to Architectural Drawings and Specifications for Phasing Requirements for this Project and the approved Contractors Phasing Schedule. This Contractor shall plan and coordinate his work in accordance with those requirements. Provide any and all temporary electrical lighting, power and system modifications to keep the occupied areas in service and maintained by the respective contractor.

1.23 CLEANING AND FINISHING

- A. After all tests have been made and the system proven satisfactory to the Architect, the Contractor shall go over the entire project, clean all equipment and material installed by him, and leave in a clean and working condition.

1.24 PERFORMANCE OF EQUIPMENT

- A. Provide materials, equipment, and appurtenances of any kind, shown on the drawings, hereinafter specified, or required for the completion of the work in accordance with the intent of these specifications, which are completely satisfactory and acceptable in operation, performance, and capacity. Approval, either written or verbal, of any drawings, descriptive data or samples of such material, equipment, and/or appurtenance does not relieve the Contractor of his responsibility to turn over the same to the Owner in perfect working order at the completion of the work.
- B. Replace any materials, equipment, or appurtenances, the operation, capacity, or performance of which does not comply with the drawings and/or specification requirements or which is damaged prior to acceptance by the Owner with proper and acceptable items in working order, satisfactory to the Engineer and Architect without additional cost to the Owner.

1.25 ACCESS

- A. Furnish and erect all scaffolding and ladders required in the installation of wiring, equipment and fixtures.

1.26 ANCHOR BOLTS

- A. Provide and set in place, at the time of pouring of concrete foundations, all necessary anchor bolts as required for the equipment called for under these specifications. Provide anchor bolts of the hook type, of proper size and length to suit the equipment. The Contractor is responsible for proper emplacement of the bolts and must have representative present at the time foundations are poured.

1.27 INSERTS

- A. Where desired in cast in place concrete, provide and install inserts of an approved type. Where two or more parallel conduits are installed, continuous inserts may be used. Where required to distribute the load on the inserts, install a piece of reinforcing steel of sufficient length through the inserts.

1.28 SLEEVES

- A. Furnish to the General Contractor sleeves and locations where work of this contract must pass through new walls, floors, ceilings, roofs, and other construction. Extend each sleeve through the floor, wall or partition and cut flush with each surface unless otherwise required.
- B. For sleeves in bearing and masonry walls, floors, and partitions provide standard weight steel pipe finished with smooth edges. For other than masonry partitions, through suspended ceilings, and for concealed vertical piping, provide No. 22 U.S.G. galvanized iron, unless otherwise specified.
- C. Where conduits pass through the roof provide pre-molded synthetic rubber flashing boots or other approved means approved by the Roofing Contractor. Install as per Roofing Contractor.
- D. Provide any sleeve or opening not installed or made during construction under the requirements for cutting and patching.
- E. Provide sleeves as required in existing walls for renovation projects.

1.29 FIRESTOPPING

- A. The Contractor shall be responsible for providing permanent, UL approved firestopping systems for all penetrations through fire rated floor or fire rated wall assemblies. For areas that will require future access for the installation of additional cables, repair, or retrofit, the firestopping system shall consist of re-usable intumescent pillows or putty. All firestopping shall meet the requirements of ASTM E-814 and UL 1479.
- B. Subject to compliance with project requirements, firestopping materials may be provided by one of the following manufacturers:
 - 1. Specified Technologies Inc., (STI) Somerville, NJ (800) 992-1180
 - 2. Tremco, Beechwood, OH (800) 321-7906
 - 3. 3M, St. Paul, MN (800) 328-1687
 - 4. Hilti, Tulsa, OK (800) 879-8000
- C. Submit the following for review and approval:
 - 1. Product data sheets
 - 2. UL System drawings for each firestopping application
 - 3. Manufacturer's Certificates of Conformance for their products

1.30 ACCESS PANELS

- A. Provide panels with fire ratings equal to the surface in which they are installed and be 12" x 12" or 4" larger than each dimension of the enclosed box, whichever is greater.

1.31 TESTING, ADJUSTING, AND BALANCING

- A. Make all connections at panels and switches; make all splices and taps. Install fuses in all fuse holders. Complete all circuits from power sources to loads at the time of final inspection.
- B. Upon completion of the work, test all parts of the electrical installation to ensure that it is free of unwanted grounds and other defects. Preliminary testing with continuity meters will be permitted but will not be accepted in obtaining final results. Make final tests with a megger.
- C. Check load balance and rearrange connections so that the KW demand on each of the phase conductors does not vary by more than 10%.
- D. Set all overload devices, including equipment furnished under other contracts, and adjust to suit the load conditions. Make selections in accordance with NEC requirements and manufacturer's instructions.
- E. Ensure that all covers, closures, doors, and plates are in place.
- F. Ensure that all trims and covers are adjusted to be parallel or perpendicular to building lines, tight against surrounding architectural finishes, and devices are set flush.
- G. Check devices and controls for proper mechanical and electrical operation and set to normal or appropriate positions at the time of contract closeout.

1.32 EXAMINATION OF CONTRACT DOCUMENTS

- A. Carefully examine the architectural, civil, structural, heat-ventilating - air conditioning, plumbing and sprinkler drawings. If any discrepancies occur between the drawings or between the drawings and the specifications, report such discrepancies to the Engineer and the Architect in writing in a Request For Information (RFI) form and obtain written instructions as to the manner in which to proceed. Make no departures from the contract drawings without prior written approval of the Architect/Engineer.
- B. Report any discrepancies prior to the submission of bid. In the event such discrepancies are not reported and claims for extra charges to the contract result, such claims will be allocated to and paid for by the Contractor, who, in the opinion of the Engineer and the Architect, is the responsible party.

1.33 EQUIPMENT WIRING - GENERAL

- A. Unless otherwise mentioned herein or shown on the drawings, provide power wiring to all equipment, associated controls, and appurtenances. Refer to Specifications Section 260180 for further information on equipment provided under the electrical and other contracts.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION

3.1 MOUNTING HEIGHTS AND LOCATION

- A. Outlets, controls, and system components shall be mounted at the heights listed below unless otherwise indicated. Heights shall be measured to the centerline of the box from the finished floor unless otherwise noted.
 - 1. Wall Switches: 42"
 - 2. Receptacle Outlet (General): 1'-6" unless indicated otherwise
 - 3. Receptacle Outlet (Mechanical, Storage, Electrical, Unfinished Rooms): 42"
 - 4. Telephone Outlet: 1'-6" unless indicated otherwise
 - 5. Data Outlet: 1'-6" unless indicated otherwise
 - 6. Wall Intercom Station: 46"
 - 7. Raise/Lower Switch: 42"
 - 8. Clock Outlet: 8'-0" when possible. Allow space below ceiling to service or replace. Above doors, center between door trim and ceiling.
 - 9. Bells, Buzzers, Chimes: 8'-0" when possible. Allow space below ceiling to service or replace. Above doors, center between door trim and ceiling.
 - 10. Fire Alarm Devices: Refer to Fire Alarm Section.
 - 11. Television Outlet: 1'-6" unless indicated otherwise.
 - 12. Microphone Inlet: 1'-6" unless indicated otherwise.
 - 13. Receptacles above counters or benches with full height or no backsplashes: 0'-8" above countertop.
 - 14. Range Outlet: Verify location and mounting height with Architect before roughing-in.
 - 15. Water Cooler Outlet: Verify location and mounting height with Plumbing Contractor before roughing-in.

- B. Equipment shall be mounted as follows:
 - 1. Safety Switch 5'-0" to top of enclosure.
 - 2. Enclosed circuit breakers 5'-0" to top of enclosure.
 - 3. Enclosed Motor Controllers 5'-0" to top of enclosure.
 - 4. Enclosed Contactors: 5'-0" to top of enclosure.
 - 5. Time Controls: 5'-0" to top of enclosure.
 - 6. Combination Starters: 5'-6" – 6'-0" to top of enclosure.
 - 7. Panelboards 6'-6" to top of enclosure.
- C. When specifically detailed in the Architectural or Electrical drawings, mounting heights are to be as indicated. Consult architectural plans and elevations for individual areas where device locations may conflict with other work.
- D. In general, coordinate all device locations with approved Casework Drawings, Architectural Elevation, and Drawings, Mechanical, Plumbing, approved Kitchen and Room Equipment Drawings and other applicable drawings.
- E. In lavatories or rooms with casework or fixed cabinets, coordinate mounting heights and locations in the field with architectural elevations and adjust as required to avoid conflicts with mirrors, back splashes, fixtures, and hardware items.
- F. Field verify the final rough-in location for the actual equipment to be connected.
- G. Lighting Fixtures: As scheduled or indicated.
- H. Throughout new installation, all raceways and boxes shall be installed so that they are concealed in new construction. Any exceptions shall be approved by Architect before installation.

END OF SECTION 260010

SECTION 260060 - ELECTRICAL DEMOLITION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Electrical Demolition

1.2 RELATED WORK/DIVISIONS

- A. Division 2

1.3 SCOPE

- A. Refer to Drawings for Scope-of-Work

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- A. Provide materials and equipment for patching and extending work approved by Architect/Engineer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that building conditions are as shown on Drawings. Report discrepancies to Architect/Engineer before disturbing existing installation.
- B. Verify that abandoned wiring and equipment serve only abandoned facilities.
- C. Demolition Drawings are based on casual field observation. Report discrepancies to Architect/Engineer before disturbing existing installation.
- D. Beginning of demolition means installer accepts existing conditions.

3.2 COORDINATION

- A. All electrical removals shall be coordinated with the removal and construction schedules of the other contractors working on this project so that the construction schedule may proceed without delays and interferences. Removals shall be complete before new work is started except portions of the removal which are designated for temporary use.
- B. Coordinate with the Mechanical and Plumbing Contractors for exact quantities and location of equipment to be disconnected and removed. The Electrical Contractor is responsible for removal of all electrical items serving mechanical equipment that is to be removed.

- C. Coordinate with the Mechanical and Plumbing Contractors for exact quantities and location of equipment to remain and/or to be relocated. Provide new disconnects, wire and conduits, same size as existing, and reconnect equipment as required.
- D. Maintain electrical service and emergency power system as required during phasing. Provide rework of systems as required.
- E. Removals of system specific equipment shall be performed by installer of such equipment so that a phased switchover of systems is facilitated.

3.3 PREPARATION

- A. Disconnect and remove electrical systems in walls, floors, and ceilings scheduled for removal.
- B. Coordinate utility service outages with Utility Company and Owner.
- C. Provide temporary wiring, supporting devices and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.
- D. Maintain the following systems in service until new service is complete and ready for service. When system is to remain provide all rework required to maintain system operational. Systems shall only be disabled to make switchovers and connections. Provide temporary connections to maintain service in areas adjacent to work area. Obtain permission from Architect/Engineer at least 72 hours before partially or completely disabling systems, minimizing outage duration.
 - 1. Electrical Service
 - 2. Telephone Service
 - 3. CATV Service
 - 4. Fiber Service
 - 5. Fire Alarm System
 - 6. Telephone System
 - 7. Television System
 - 8. Computer Network System
 - 9. Security/Card Access Systems
 - 10. Sound Systems
 - 11. Program/Master Clock Systems
 - 12. Generator Systems

3.4 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

- A. Demolish and extend existing electrical work under provisions of Division 2 and Division 26.
- B. In areas where existing surfaces and structures are to remain, all electrical equipment and materials designated for removal shall be disassembled where possible and neatly cut where necessary to avoid damaging surfaces and structures. Where damage to existing surfaces and structures occurs, the contractor shall be responsible for repairs using proper materials as specified in other sections of this specification and as directed by the Architect/Engineer.
- C. Where items of equipment or materials are designated to be turned over to the Owner, such equipment and material shall be carefully removed and reassembled or packaged in order to avoid

damage and loss of parts. The Contractor shall be responsible for repair of damage and replacement of lost parts.

- D. Demolished equipment and materials shall be removed from the work area by the end of each workday and more frequently when necessary to avoid congestion and hazardous conditions. Demolished equipment and materials shall be removed from the site at least once a week and more frequently when necessary to avoid congestion and hazardous conditions. Materials shall be carefully stacked or boxed as they are removed to avoid the safety hazards associated with cluttered work areas and unstable stacks and piles.
- E. All demolished materials and equipment not designated to be turned over to the Owner shall become the property of the Contractor. The contractor shall dispose of these materials and equipment in accordance with the applicable requirements of local, state, and federal authorities having jurisdiction.
- F. Removals shall be complete and shall include all attachments, brackets, hangers, cables, clamps, hardware, bolts, and screws. Cast in place and expanded anchors do not need to be removed where they are flush with the surface, but protruding studs shall be cut off flush.
- G. Where removals disrupt service to existing circuits and equipment which is to remain, the Contractor shall restore service to the remaining equipment and outlets using the construction methods and materials permitted or required by the appropriate sections of this specification.
- H. Remove, relocate, and extend existing installations as required to accommodate new construction.
- I. Remove abandoned wiring to source of supply.
- J. Remove exposed abandoned conduit, including abandoned conduit and cables above accessible ceiling finishes. Cut conduit to 1" below surface of walls and floors, and patch surfaces.
- K. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit and cables servicing them is abandoned and removed. Remove the backbox and patch/paint the wall to match the existing surfaces.
- L. Disconnect and remove abandoned panelboards and distribution equipment.
- M. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.
- N. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.
- O. Repair adjacent construction and finishes damaged during demolition and extension work.
- P. Maintain access to existing electrical installations which remain active. Modify installation or provide access panel as appropriate.
- Q. Extend existing installations using materials and methods as specified.
- R. Remove any acoustical tile or ceiling material not removed by other trades, as required for the removal of existing and/or the installation of new electrical equipment. Contractor shall replace all

ceiling tiles damaged by him that are to remain. New ceiling tiles shall match existing type. Verify type with Architect before installing.

- S. Repair fire and smoke rated partitions surrounding electrical work as specified. Refer to the Architectural Plans for locations of smoke and fire partitions.
- T. Remove abandoned telecommunications and low voltage cables from terminal to outlet. Remove abandoned outlets and terminal cabinets.
- U. Where demolition of electrical equipment damages existing surfaces that are to remain, restore those surfaces to the same condition as the adjacent surfaces. All patches and repairs shall be subject to review and approval by the Architect. When the Room Finish Schedule shows that a room will be painted under another contract, prime the wall and ceiling patches ready for finish painting. Where room finishes are not part of another contract, prime and paint wall and ceiling patches to match existing surfaces. Blank plates will not be acceptable for removed equipment including flush panelboards.

3.5 POLYCHLORINATED BIPHENYL MATERIAL

- A. Testing:
 - 1. The Contractor shall be responsible for the proper testing of all waste and expendable materials, including PCB fluid in accordance with local, state, federal regulations, ASTM D923 and D4059.
 - 2. All PCB fluids and PCB contained materials shall be transported by an approved hazardous materials company. Receipts and certificates of testing for each container of fluid and contaminated waste shall be provided to the Owner.
- B. Disposal:
 - 1. All ballasts containing PCB's and batteries shall be treated as hazardous waste and be disposed of as regulated by the Environmental protection Agency's Universal Waste Rule. Any state regulations more stringent shall take precedence.
 - 2. All fluorescent and HID lamps shall be treated as hazardous waste and be recycled as regulated by the Environmental Protection Agency's Universal Waste Rule. Any state regulations more stringent shall take precedence.
 - 3. All transformers containing PCB's shall be treated as hazardous waste and be recycled as regulated by the Environmental Protection Agency's Universal Waste Rule. Any state regulations more stringent shall take precedence.
- C. Guarantee: The Contractor shall guarantee that all hazardous materials have been removed from the Owner's property and disposed of properly and that the existing structure is free of contamination by any hazardous materials removed for this project.

3.6 SALVAGE

- A. The items indicated on the drawings shall be carefully removed, protected, and turned over to the Owner in the condition which existed before their removal. The Contractor shall transport the salvaged items with his own manpower to the Owner designated place located on site or re-install the items as shown on the drawings.

3.7 CLEANING AND REPAIR

- A. Clean and repair existing materials and equipment which remain or are to be reused.
- B. Reused Luminaires: Provide new lamps, ballasts, lenses and replace all broken electrical parts. Clean entire luminaire as recommended by manufacturer.
- C. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangement.

3.8 INSTALLATION

- A. Install relocated materials and equipment under the provisions of Division 2.

END OF SECTION 260060

SECTION 260180 - EQUIPMENT WIRING SYSTEMS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Electrical Connections to Equipment Specified under other Sections

1.2 RELATED WORK/DIVISIONS

- A. Division 1
- B. Division 8
- C. Division 10
- D. Division 11
- E. Division 12
- F. Division 14
- G. Division 22
- H. Division 23

1.3 REFERENCES

- A. NEMA WD 1 - General Purpose Wiring Devices
- B. NEMA WD 6 - Wiring Device Configurations
- C. ANSI/NFPA 70 - National Electrical Code

1.4 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc., or a testing firm acceptable to authority having jurisdiction as suitable for purpose specified and shown.

1.5 COORDINATION

- A. Coordinate work under provisions of Section 260010.
- B. Obtain and review shop drawings, product data, and manufacturer's instructions for equipment furnished under other sections.

- C. Determine connection locations and requirements.
- D. Sequence rough-in of electrical connections to coordinate with installation schedule for equipment.
- E. Sequence electrical connections to coordinate with start-up schedule for equipment.

1.6 ELECTRICAL EQUIPMENT BY OTHERS

- A. Provide all power and control wiring for products furnished and installed under contracts for Divisions 2 through 14. Switches, pushbuttons, indicator lights and control panels are supplied as part of the equipment package unless otherwise noted on the drawings.
- B. Provide power wiring for equipment as provided under the Mechanical (Heating-Ventilating-Air Conditioning) and Plumbing Contracts. Complete all electrical power connections through the disconnect and starter to motor or load terminals. Control wiring and overload protection for this equipment is the responsibility of the Mechanical or Plumbing Contractors. Provide disconnect means for all mechanical and plumbing equipment as follows:
 - 1. Provide disconnect means for all 3- phase equipment. Mount switch adjacent to motor or load terminals.
 - 2. Provide thermal overload switches for all single-phase motors and single-phase equipment. Mount the switch adjacent to the motor or load terminals.
 - 3. Check three phase equipment for proper rotation. Change rotation as required.

1.7 DIVISION 23 POWER REQUIREMENTS

- A. Refer to Mechanical/Plumbing and Fire Protection Schedules on Drawings and Division 23 Specifications. For the power requirements which were the basis of design, confirm the actual power before ordering/installing, notify Architect/Engineer.

1.8 COORDINATION OF RESPONSIBILITIES

- A. Division of responsibility between Contractors shall be as indicated below.
- B. The respective contractor shall provide all items of material and equipment for the following:

		DIV 23	DIV 26
17.	Exhaust Fans, Supply Fans and Propeller Fans (EF) (SF) (PF)		
	a. Furnish and install unit	X	
	b. Thermal Toggle Switch / Fused Disconnect Switch	X	
	c. Power wiring thru wall switch, disconnect switch, starter to unit		X
	d. Control wiring	X	

		DIV 23	DIV 26
27.	Indoor Air Handlers (AH)		
	a. Furnish and install unit	X	
	b. Starter	X	
	c. Fused Disconnect switch		X
	d. Power wiring thru disconnect and starter to terminals		X
	e. Control wiring	X	
	f. Smoke detector connected to building fire alarm system		X
	g. Control power transformer at starter	X	

		DIV 22	DIV 26
33.	Water Heaters		
	a. Furnish and install unit	X	
	b. Fused disconnect switch fused per manufacturer/NEC		X
	c. Power wiring thru disconnect to unit		X

- C. The respective contractor shall provide all items of material and equipment for the equipment listed in the matrix.
- D. Any material and equipment not listed in the matrix shall follow the following requirements:
 1. Starter/Controls by Division 21/22/23.
 2. Fused disconnect switch by Division 26.
 3. Additional items required by Division 21/22/23.

1.9 ROUGHING-IN REQUIREMENTS

- A. The Contractor shall provide complete roughing-in requirements, including conduit, power, and control wiring, and etc. for items furnished under other divisions, unless otherwise indicated on the drawings.
- B. The equipment supplier shall provide wiring (point to point) diagrams where the Electrical Contractor is to make final connections.
- C. Refer to approved shop drawings for roughing-in requirements.
- D. Contractor is responsible for damaged equipment if it has been connected without consulting the equipment suppliers point to point wiring diagrams.
- E. Throughout new installation, all raceways and boxes shall be installed so that they are concealed in new construction. Any exceptions shall be approved by Architect before installation.

PART 2 - PRODUCTS

2.1 CORDS AND PLUG SETS

- A. Refer to Section 260726

2.2 RACEWAY AND POWER CONDUCTORS

- A. Refer to Sections 260533 and 260519 as appropriate.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that equipment is ready for electrical connection, wiring, and energization.
- B. Verify that all motors rotate in the correct direction. Correct the connections for motors which do not.
- C. Verify that unit requirements match specified circuit sizes. Notify mechanical contractor and engineer of any discrepancies.

3.2 ELECTRICAL CONNECTIONS

- A. Provide electrical connections in accordance with equipment manufacturer's instructions.
- B. Provide conduit connections to equipment using liquidtight flexible metallic conduit. Use liquidtight flexible metallic conduit with watertight connectors in damp or wet locations.
- C. Provide wiring connections using wire and cable with insulation suitable for temperatures encountered in heat producing equipment.
- D. Provide receptacle outlet where connection with attachment plug as indicated or required. Provide cord and cap where field-supplied attachment plug as indicated or required.
- E. Provide suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.
- F. Install disconnect switches, controllers, control stations, and control devices as indicated or required.
- G. Modify equipment control wiring with terminal block jumpers as indicated or required.
- H. Provide interconnecting conduit and wiring between devices and equipment as indicated or required.
- I. Modify as required for the installation of lug adapters, crimp-on reducers, and hardware, as necessary, to terminate conductors on equipment.

END OF SECTION 260180

SECTION 260518 – RESIDENTIAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Service Entrance Cable
- B. Nonmetallic Sheathed Cable
- C. Underground Feeder and Branch Circuit Cable
- D. Metal Clad Cable
- E. Wiring Connectors and Connections

1.2 REFERENCES

- A. ANSI/NFPA 70 - National Electrical Code.
- B. NETA - ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment (International Electrical Testing Association).

1.3 SUBMITTALS FOR REVIEW

- A. Submit a letter stating that all equipment is in compliance with the specifications.

1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years documented experience.

1.5 Regulatory Requirements

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc., or a testing firm acceptable to authority having jurisdiction as suitable for purpose specified and shown.

1.6 PROJECT CONDITIONS

- A. Verify that field measurements are as shown on Drawings.
- B. Conductor sizes are based on copper. Substitution of aluminum for conductors specified as copper is not permitted.

- C. Conductor sizes are based upon 75°C insulation temperature ratings. When the contractor furnishes equipment which is listed for use with conductors having temperature ratings of less than 75°C, he shall furnish conductors sized in accordance with the 60°C column of NEC Tables 310-16 or 310-17 and the appropriate conduit size.
- D. Wire and cable routing shown on Drawings is approximate unless dimensioned. Route wire and cable as required to meet Project Conditions. Include wire and cable lengths within 10' of length shown.
- E. Where wire and cable routing are not shown, and destination only is indicated, determine exact routing and lengths required.

PART 2 - PRODUCTS

2.1 SERVICE ENTRANCE CABLE

- A. Description: ANSI/NFPA 70, Type SER
- B. Conductor: Copper
- C. Insulation Voltage Rating: 600 volts
- D. Insulation Temperature Rating: 75°C
- E. Insulation Material: PVC
- F. Jacket: Sunlight Resistant PVC

2.2 NONMETALLIC SHEATHED CABLE

- A. Description: ANSI/NFPA 70, Type NM
- B. Conductor: Copper
- C. Insulation Voltage Rating: 600 volts
- D. Insulation Temperature Rating: 75°C
- E. Insulation Material: Thermoplastic
- F. Jacket: Thermoplastic
- G. Allowable Ampacity: 20 Amp Minimum

2.3 UNDERGROUND FEEDER AND BRANCH-CIRCUIT CABLE

- A. Description: ANSI/NFPA 70, Type UF
- B. Conductor: Copper

- C. Insulation Voltage Rating: 600 volts
- D. Insulation Temperature Rating: 75°C
- E. Insulation Material: Thermoplastic
- F. Jacket: Sunlight resistant thermoplastic
- G. Construction: Single conductor or cabled

2.4 METAL CLAD CABLE

- A. Description: ANSI/NFPA 70, Type MC
- B. Conductor: Copper
- C. Insulation Voltage Rating: 600 volts
- D. Insulation Temperature Rating: 75°C
- E. Insulation Material: Thermoplastic
- F. Armor Material: Steel or Aluminum
- G. Armor Design: Interlocked metal tape
- H. Jacket: None

2.5 WIRING CONENCTORS AND SPLICES

- A. UL-listed, factory-fabricated wiring connectors of size, ampacity rating, material and type and class for application and for service indicated.
- B. All wire connectors shall be manufactured in full compliance with UL 486A.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that interior of building has been protected from weather.
- B. Verify that mechanical work likely to damage wire and cable has been completed.

3.2 PREPARATION

- A. Completely and thoroughly swab raceway before installing wire.

3.3 WIRING METHODS

- A. Service Entrance Cable:
 - 1. Use in both wet and dry conditions.
 - 2. Use for the service drop cable in dwellings as permitted by the National Electrical Code.
- B. Nonmetallic Sheathed Cable:
 - 1. Use in dry conditions.
 - 2. May be installed in air voids of masonry block or tile walls where these walls are not subject to excessive moisture or dampness.
 - 3. Not permitted above suspended or drop ceilings.
 - 4. Use for branch circuits as permitted by the National Electrical Code.
- C. Underground Feeder and Branch-Circuit Cable:
 - 1. Use in both wet and dry conditions.
 - 2. Not permitted for service entrance cable.
 - 3. Use for underground feeders or branch circuits as permitted by the National Electrical Code.
- D. Metal Clad Cable:
 - 1. Use in dry conditions.
 - 2. Use for branch circuits where NM cable is not permitted by the National Electrical Code
- E. Wiring methods indicated on Drawings supercede the General Statements in this Section.
- F. Throughout new installation, all wiring, raceways, and boxes shall be installed so that they are concealed in new construction. Any exceptions shall be approved by Architect before installation.

3.4 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Use solid conductor for feeders and branch circuits 10 AWG and smaller.
- C. Use stranded conductors for control circuits.
- D. Use conductor not smaller than 12 AWG for power and lighting circuits.
- E. Use 10 AWG conductors for 20-ampere, 120-volt branch circuits longer than 75' from the panelboard to the last outlet.
- F. Pull all conductors into raceway at same time.
- G. Use suitable wire pulling lubricant for all building wire.
- H. Protect exposed cable from damage.
- I. Support cables in accordance with National Electrical Code requirements.
- J. Modify as required for the installation of lug adapters, crimp on reducers and hardware, as necessary, to terminate conductors on equipment.

- K. Neatly train and lace wiring inside boxes, equipment, and panelboards.
- L. Clean conductor surfaces before installing lugs and connectors.
- M. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
- N. Use split bolt connectors for copper conductor splices and taps No. 6 AWG and larger. Tape uninsulated conductors and connector with electrical tape to 150% of insulation rating of conductor.
- O. Use gutter taps for taps from parallel feeder cables.
- P. Use solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG and smaller.
- Q. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.
- R. Cover ends of spare conductors with electrical tape.
- S. Conductor Splices: Keep to minimum.
 - 1. Install splices and tapes that possess equivalent or better mechanical strength and insulation ratings than conductors being spliced.
 - 2. Use splice and tap connectors that are compatible with conductor material.
- T. Voltage Drop: All feeders on the project have been sized to limit voltage drop to 2% or less. It shall be the Contractor's responsibility to size branch circuits as necessary, based on their actual lengths, to limit branch circuit voltage drop to 3% or less. This will limit the overall voltage drop at each outlet to the 5% maximum allowed by the National Electrical Code.

3.5 FIELD QUALITY CONTROL

- A. Inspect wire and cable for physical damage and proper connection. Replace all conductors and cables with damaged, insulation, sheaths, or jackets.
- B. Measure tightness of bolted connections and compare torque measurements with manufacturer's recommended values.
- C. Verify continuity of each branch circuit conductor.

END OF SECTION 260518

SECTION 260519 – ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Conductors and Cables
- B. Metal Clad Cable
- C. Wiring Connectors and Connections

1.2 REFERENCES

- A. ANSI/NFPA 70 - National Electrical Code.
- B. NETA - ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment (International Electrical Testing Association).

1.3 SUBMITTALS FOR REVIEW

- A. Submit a letter on company letterhead stating that all equipment is in compliance with the specifications.

1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years documented experience.

1.5 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc., or a testing firm acceptable to authority having jurisdiction as suitable for purpose specified and shown.

1.6 PROJECT CONDITIONS

- A. Verify that field measurements are as shown on Drawings.
- B. Conductor sizes are based on copper. Substitution of aluminum for conductors specified as copper is not permitted.
- C. Conductor sizes are based upon 75°C insulation temperature ratings. When the contractor furnishes equipment that is listed for use with conductors having temperature ratings of less than 75°C, he shall furnish conductors sized in accordance with the 60°C column of NEC Tables 310-16 or 310-17 and the appropriate conduit size.

- D. Wire and cable routing shown on Drawings is approximate unless dimensioned. Route wire and cable as required to meet Project Conditions. Include wire and cable lengths within 10' of length shown.
- E. Where wire and cable routing are not shown, and destination only is indicated, determine exact routing and lengths required.

1.7 WARRANTY

- A. Provide the warranty specified in Section 260010.

PART 2 - PRODUCTS

2.1 POWER CONDUCTORS

- A. Description: Single conductor insulated wire.
- B. Conductor: Copper, 98% conductivity minimum.
- C. Insulation Voltage Rating: 600 volts.
- D. Insulation: ANSI/NFPA 70; Type THHN/THWN or XHHW insulation for feeders and branch circuits.

2.2 METAL CLAD CABLE (See Wiring Methods, Paragraph 3.3 of this Section for Restrictions)

- A. Description: ANSI/NFPA 70, Type MC.
- B. Conductor: Copper
- C. Insulation Voltage Rating: 600 volts.
- D. Insulation Temperature Rating: 75°C.
- E. Insulation Material: Thermoplastic
- F. Armor Material: Steel or Aluminum
- G. Armor Design: Interlocked metal tape
- H. Jacket: None

2.3 POWER & CONTROL SIGNAL METAL CLAD CABLE (See Wiring Methods, Paragraph 3.3 of this Section for Restrictions)

- A. Description: ANSI/NFPA 70, Type THHN/THWN power and ground conductors along with a control conductor assembly composed of a 30 mil PVC jacket covering two 16 AWG CU Type TFN control conductors.

- B. Conductor: Copper
- C. Insulation Voltage Rating: 600 volts.
- D. Insulation Temperature Rating: 75°C.
- E. Insulation Material: Thermoplastic
- F. Armor Material: Steel or Aluminum
- G. Armor Design: Interlocked metal tape
- H. Jacket: None
- I. Usage: LED lighting with 0-10V dimming

2.4 TWO HOUR FIRE RATED CABLE SYSTEM

- A. Cable – UL listed RHH/RHW-2, code compliant cable which is UL Classified for its fire rating and recognized in the manufacturers UL Electrical Circuit Protective System #25 (FHIT.25).
- B. Conduit System – Code compliant conduit system with the following restrictions:
 - 1. Must be all steel components or components that have been fire rated and approved. This excludes aluminum, die cast (zinc), plastics, etc.
 - 2. Conduit must be supported every five feet (60") in lieu of the code standard of ten feet unless a different spacing has been verified by manufacturer testing.
- C. Conduit Sizing – Use manufacturers' data to calculate conduit fill.
- D. Splices – Avoid cable splices in the fire zone. At present there are no approved cable splices. Use pull boxes and planning to achieve a continuous cable installation. See TIS #310 – Splicing, Repair and Long Length Installations” for additional information and alternate procedures.
- E. Vertical Cable Runs:
 - 1. The cable shall be supported at a maximum distance of 50 feet (smaller sizes) but never greater than the distance given in Table 300.19(A) of the National Electrical Code. The minimum conduit support distance is 72".
 - 2. The support may be any recognized method suitable for the purpose outside of the fire zone or an approved type of support when used in a fire rated enclosure within the fire zone.

2.5 WIRING CONNECTORS AND SPLICES

- A. UL-listed, factory-fabricated wiring connectors of size, ampacity rating, material and type and class for application and for service indicated.
- B. All wire connectors shall be manufactured in full compliance with UL 486A.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that interior of building has been protected from weather.
- B. Verify that mechanical work likely to damage wire and cable has been completed.

3.2 PREPARATION

- A. Completely and thoroughly swab raceway before installing wire.

3.3 WIRING METHODS

- A. Concealed Dry Interior Locations: Use only power conductors, type THHN/THWN or XHHW insulation, in raceway.
- B. Exposed Dry Interior Locations: Use only power conductor types THHN/THWN or XHHW insulation, in raceway.
- C. Above Accessible Ceilings:
 - 1. Home Runs: Use only power conductors, Type THHN/THWN or XHHW insulation, in raceway.
 - 2. In Corridors and for Circuits which extend to other rooms: Use only power conductors, type THHN/THWN or XHHW insulation in raceway.
 - 3. Branch Circuits which do not extend beyond the walls of the room: Use power conductors, type THHN/THWN or XHHW insulation in raceway or metal clad cable.
- D. Wet or Damp Interior Locations: Use only power conductors, type THHN/THWN or XHHW insulation, in raceway.
- E. Underground Installations: Use only power conductors, type XHHW in raceway.
- F. Exterior Locations: Use only power conductors, type THHN/THWN or XHHW insulation, in raceway.
- G. Wiring methods indicated on Drawings supersede the General Statements in this Section.
- H. Throughout new installation, all raceways and boxes shall be installed so that they are concealed in new construction. Any exceptions shall be approved by Architect before installation.
- I. In renovation projects, MC Cable shall be used for existing fishable walls for new recessed devices and equipment. For larger than 30A circuits use flexible metal conduit (Greenfield) with the appropriate conductors.
- J. In underslab branch circuit raceways, there should be no less than one raceway extension installed from electrical device to an above accessible ceiling location terminated in a junction box per room. The intent of this requirement is to give future access to this raceway and circuits.

3.4 INSTALLATION

- A. Install products in accordance with manufacturers' instructions.
- B. Use solid conductor for feeders and branch circuits 10 AWG and smaller.
- C. Use stranded conductors for control circuits.
- D. Use conductor not smaller than 12 AWG for power and lighting circuits.
- E. Use conductor not smaller than 16 AWG for control circuits.
- F. Use 10 AWG conductors for 20-ampere, 120-volt branch circuits longer than 75' from the panelboard to the last outlet.
- G. Use 10 AWG conductors for 20-ampere, 277-volt branch circuits longer than 200' from the panelboard to the last outlet.
- H. Pull all conductors into raceway at same time.
- I. Use suitable wire pulling lubricant for all building wire.
- J. Protect exposed cable from damage.
- K. Support cables above accessible ceiling, using spring metal clips or metal or plastic cable ties to support cables from structure. Do not support cables from ceiling suspension system. Do not rest cable on ceiling panels.
- L. Modify as required for the installation of lug adapters, crimp on reducers and hardware, as necessary, to terminate conductors on equipment.
- M. Neatly train and lace wiring inside boxes, equipment, and panelboards.
- N. Clean conductor surfaces before installing lugs and connectors.
- O. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
- P. Use split bolt connectors for copper conductor splices and taps No. 6 AWG and larger. Tape uninsulated conductors and connector with electrical tape to 150% of insulation rating of conductor.
- Q. Use gutter taps for taps from parallel feeder cables.
- R. Use solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG and smaller.
- S. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.
- T. Cover ends of spare conductors with electrical tape.
- U. Conductor Splices: Keep to minimum.

1. Install splices and tapes that possess equivalent or better mechanical strength and insulation ratings than conductors being spliced.
 2. Use splice and tap connectors that are compatible with conductor material.
- V. Voltage Drop: All feeders on the project have been sized to limit voltage drop to 2% or less. It shall be the Contractor's responsibility to size branch circuits as necessary, based on their actual lengths, to limit branch circuit voltage drop to 3% or less. This will limit the overall voltage drop at each outlet to the 5% maximum allowed by the National Electrical Code.
- W. Install fire rated cables per manufacturers' instructions.

3.5 INTERFACE WITH OTHER PRODUCTS

- A. Identify wire and cable under provisions of Section 260553.
- B. Identify each conductor with its circuit number or other designation indicated on Drawings.

3.6 FIELD QUALITY CONTROL

- A. Perform field inspection and testing. Provide a written report of all test results to the Engineer.
- B. Inspect wire and cable for physical damage and proper connection. Replace all conductors and cables with damaged, insulation, sheaths, or jackets.
- C. Measure tightness of bolted connections and compare torque measurements with manufacturer's recommended values.
- D. Verify continuity of each branch circuit conductor. Provide a written report of all test results to the Engineer.

END OF SECTION 260519

SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Grounding Electrodes and Conductors
- B. Equipment Grounding Conductors
- C. Bonding

1.2 REFERENCES

- A. ANSI/NFPA 70 - National Electrical Code
- B. NPFA 99 - Health Care Facilities
- C. NETA-ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment (International Electrical Testing Association)

1.3 GROUNDING ELECTRODE SYSTEM

- A. Metal underground water pipe if present
- B. Metal frame of the building
- C. Rod electrode
- D. Reinforcing steel in foundation footing when being installed,

1.4 PERFORMANCE REQUIREMENTS

- A. Grounding System Resistance: 5 ohms for equipment operation at 601 volts or higher, 25 ohms for equipment operating at 600 volts or less.

1.5 SUBMITTALS FOR REVIEW

- A. Submit a letter on Company letterhead stating that all equipment will be in compliance with the specifications.
- B. Test Report: Indicate overall resistance to ground.

1.6 SUBMITTALS FOR CLOSEOUT

- A. Submit under provisions of Section 260010.
- B. Accurately record actual locations of grounding electrodes.

1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this Section with minimum three years documented experience.

1.8 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Provide products listed and classified by Underwriters Laboratories, Inc., or a testing firm acceptable to authority having jurisdiction as suitable for purpose specified and shown.

1.9 WARRANTY

- A. Provide the warranty specified in Section 260010.

PART 2 - PRODUCTS

2.1 ROD ELECTRODE

- A. Material: Copper-clad steel.
- B. Diameter: 3/4"
- C. Length: 10'

2.2 MECHANICAL CONNECTORS

- A. Material: Bronze.

2.3 EXOTHERMIC CONNECTIONS

- A. Material: Copper alloy or copper

2.4 WIRE

- A. Material: Stranded copper.
- B. Foundation Electrodes: 2/0 AWG.
- C. Grounding Electrode Conductor: Size to meet NFPA 70 requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that final backfill and compaction has been completed before driving rod electrodes.

3.2 INSTALLATION

- A. Grounding counterpoise: Grounding counterpoise shall consist of three (3) ground rods spaced 8' minimum on center. Rods shall be installed with top of rod 12" below finished grade. Rods shall be interconnected with a #4/0 bare copper electrode with cadweld connections at each ground rod. Provide dedicated 2" conduit for #4/0 bare copper electrode conductor to switchgear ground bus. Locate grounding electrode in a grassy area as close to the building as possible.
- B. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- C. Bonding Straps and Jumpers: install so vibration by equipment mounted on vibration isolation hangers and supports is not transmitted to rigidly mounted equipment. Use exothermic-welded connectors for outdoor locations, unless a disconnect-type connection is required; then, use a bolted clamp. Bond straps directly to the basic structure taking care not to penetrate any adjacent parts. Install straps only in locations accessible for maintenance.
- D. Metal Water Service Pipe: Provide insulated copper grounding conductor in 2" conduit from the electrical main service entrance equipment grounding bus to the main metal water service entrances to building. Connect ground bonding conductors to main metal water service pipes by grounding clamp connectors where a dielectric main water fitting is installed, connect ground bonding conductor to street side of fitting. Bond grounding conductor to conduit or sleeve at each end.
- E. Generator Grounding: Provide generator ground per manufacturer and National Electric Code.
- F. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with grounding clamp connectors.
- G. Bond each aboveground portion of gas piping system upstream from equipment shutoff valve.
- H. Install Products in accordance with manufacturer's instructions.
- I. Install rod electrodes at locations indicated. Install additional rod electrodes as required to achieve specified resistance to ground.
- J. Provide grounding electrode conductor and connect to reinforcing steel in foundation footing.
- K. Provide bonding to meet Regulatory Requirements.
- L. Provide a grounding bushing and equipment grounding conductor on the terminal end of metallic conduit systems where any of the following conditions occur:
 - 1. A conduit carrying circuit conductors protected by an overcurrent device rated 50 amps or larger is connected to a metallic enclosure by concentric knockouts or reducing washers.
 - 2. Concentric knockout rings or bridges are broken.
 - 3. The enclosure is non-metallic and does not have an integral grounding strap.
 - 4. Conduits stub up through floors and foundations into switchboards, transformers, and other equipment without a metallic wall at the point of entrance.

- M. Equipment Grounding Conductor: Provide separate, insulated conductor within each feeder and branch circuit raceway. Terminate each end on suitable lug, bus or bushing or terminal.

3.3 CONNECTIONS

- A. General: Make connections so galvanic action or electrolysis possibility is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
 1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer to order of galvanic series.
 2. Make connections with clean, bare metal at points of contact.
 3. Make aluminum-to-steel connections with stainless steel separators and mechanical clamps.
 4. Make aluminum-to-galvanized steel connections with tin-plated copper jumpers and mechanical clamps.
 5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.
- B. Exothermic-Welded Connections: Comply with manufacturer's written instructions. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.
- C. All underground bonding connections shall be exothermic-welded connections.
- D. Equipment Grounding Conductor Terminations: For #8 AWG and larger, use pressure-type grounding lugs. #10 AWG and smaller grounding conductors may be terminated with winged pressure-type connectors.
- E. Noncontact Metal Raceway Terminations: If metallic raceways terminate at metal housings without mechanical and electrical connection to housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to grounding bus or terminal in housing. Bond electrically non-continuous conduits at entrances and exits with grounding bushings and bare grounding conductors, unless otherwise indicated.
- F. Tighten screws and bolts for grounding and bonding 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 and UL 486B.
- G. Compression-Type Connections: Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Use tools and dies recommended by connector manufacturer. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on grounding conductor.
- H. Moisture Protection. If insulated grounding conductors are connected to ground rods or grounding buses, insulate entire area of connections and seal against moisture penetration of insulation and cable.
- I. Provide #8 ground wire in $\frac{3}{4}$ " conduit and connect flammable storage cabinets and acid storage cabinets to building steel. Verify and adjust ground wire size to match manufacturers recommended wire size.

- J. Wire Rod Type Cable Tray (Section 260536): Provide #2 bare copper conductor, entire length of cable tray. Bond at 50' intervals.
- K. Identification: Provide tag on each ground conductor at bus to read as follows: "Caution – Ground Wire – Do not Remove". Provide I.D. marking of all conductors as per N.E.C.

3.4 FIELD QUALITY CONTROL

- A. Perform NETA-ATS testing and inspection of the grounding and bonding system.
- B. Inspect grounding and bonding system conductors and connections for tightness and proper installation.
- C. Use suitable test instrument to measure resistance to ground of system. Perform testing in accordance with test instrument manufacturer's recommendations using the fall- of-potential method. Provide a report of the results of the test of each grounding system. Where several grounding systems are tied together, test each system separately before making the interconnection.

END OF SECTION 260526

SECTION 260529 – HANGERS AND SUPPORTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Conduit and Equipment Supports
- B. Anchors and Fasteners
- C. Cable Supports

1.2 REFERENCES

- A. ANSI/NFPA 70 - National Electrical Code
- B. NECA - National Electrical Contractors Association

1.3 SUBMITTALS FOR REVIEW

- A. Submit a letter on Company letterhead stating that all equipment will be in compliance with the specifications.

1.4 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc., or a testing firm acceptable to authority having jurisdiction as suitable for purpose specified and shown.

1.5 WARRANTY

- A. Provide the warranty specified in Section 260010.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Provide supporting devices which comply with manufacturer's standard materials, design, and construction in accordance with published product information, and as required for complete installation; and as herein specified. Where more than one type of supporting device meets indicated requirements, selection is installer's option.

2.2 ANCHORS

- A. Provide anchors of types, sizes and materials indicated, with the following construction features:
 - 1. Toggle Bolts: Springhead; 3/16" x 4".

2. Expansion sleeve anchors by Hilti or Phillips Redhead: 2"

2.3 SLEEVES AND SEALS

- A. Provide sleeves and seals, of types, sizes and materials indicated, with the following construction features:
 1. Wall and Floor Seals: Provide factory-assembled watertight wall and floor seals, of types and sizes indicated; suitable for sealing around conduit, pipe, or tubing passing through concrete floors and walls. Construct seals with steel sleeves, malleable iron body, neoprene sealing grommets and rings, metal pressure rings, pressure clamps, and cap screws.
 2. Fire-Rated Walls and Floors: At all locations where conduits or cables penetrate a fire-rated wall or floor, provide firestopping in accordance with Division 7.

2.4 U-CHANNEL STRUT SYSTEMS

- A. Provide U-Channel strut system for supporting equipment supplied under this contract, 12-ga hot-dip galvanized steel, or types and sizes indicated with standard green finish, and with the fittings which mate and match with U-Channel.
- B. Auxiliary Steel Supports: Provide all required auxiliary steel to install any equipment supplied under this contract. The design and gauge of steel used shall be as required by the manufacturer's specifications.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Provide anchors, fasteners, and supports in accordance with NECA "Standard of Installation".
- C. Fasten hanger rods, conduit clamps, and outlet and junction boxes to building structure as required. Do not use spring steel clips and clamps.
- D. Use toggle bolts or hollow wall fasteners in hollow masonry, plaster, or gypsum board partitions and walls; expansion anchors or preset inserts in solid masonry walls; self-drilling anchors or expansion anchor on concrete surfaces; sheet metal screws in sheet metal studs; and wood screws in wood construction.
- E. Do not fasten supports to piping, ductwork, mechanical equipment, and conduit.
- F. Do not use powder-actuated anchors.
- G. Obtain permission from Architect before drilling or cutting structural members.
- H. Fabricate supports from structural steel or steel channel, rigidly welded, or bolted to present neat appearance with adequate strength and rigidity. Use hexagon head bolts with spring lock washers under all nuts.
- I. Install surface-mounted cabinets, enclosures, and panelboards with minimum of four anchors.

- J. In wet and damp locations use steel channel supports to stand cabinets and panelboards 1" off wall.
- K. Use sheet metal channel to bridge studs above and below cabinets and panelboards recessed in hollow partitions.
- L. Square cut and deburr all structural steel, strut, threaded rods, and similar items.
- M. Prime and paint all ferrous metals which are not factory finished.
- N. Strut and Hardware Finishes:
 - 1. Indoor dry locations: painted or pre-galvanized.
 - 2. Outdoor and indoor wet locations: post-galvanized.
- O. Coordinate with other mechanical, plumbing, sprinkler, and electrical work, including raceway and wiring work, as necessary to interface installation of supporting devices with other work.
- P. Install hangers, supports, clamps and attachments to support piping properly from building structure. Arrange for grouping of parallel runs of horizontal conduits to be supported together on trapeze type hangers where possible. Install supports in compliance with NEC requirements.
- Q. Torque sleeve seal nuts, complying with manufacturer's recommended values. Ensure that sealing grommets expand to form watertight seal.
- R. Remove burrs from ends of pipe sleeves.
- S. Do not use bridle rings or tie-wraps to support cables.

END OF SECTION 260529

SECTION 260533 – RACEWAYS AND BOXES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Metal Conduit
- B. Flexible Metal Conduit
- C. Liquidtight Flexible Metal Conduit
- D. Electrical Metallic Tubing
- E. Nonmetallic Conduit
- F. Fittings and Conduit Bodies
- G. Wireways
- H. Boxes
- I. Cabinets
- J. Enclosures

1.2 REFERENCES

- A. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated
- B. ANSI C80.3 - Electrical Metallic Tubing, Zinc Coated
- C. ANSI C80.6 – Intermediate Metal Conduit, Zinc Coated
- D. ANSI/NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies
- E. ANSI/NFPA 70 - National Electrical Code
- F. NECA "Standard of Installation"
- G. NEMA RN 1 - Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit
- H. NEMA TC 2 - Electrical Plastic Tubing (EPT) and Conduit (EPC-40 and EPC-80)
- I. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing
- J. NEMA TC 12 - Corrugated Polyvinyl Chloride Coilable Plastic Utilities Duct

- K. UL 94 - Vertical Flame Test
- L. NEMA FB 1 - Fittings and Supports for Conduit and Cable Assemblies
- M. NEMA OS 1 - Sheet-steel Outlet Boxes, Device Boxes, Covers, and Box Supports
- N. NEMA OS 2 - Nonmetallic Outlet Boxes, Device Boxes
- O. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum)

1.3 DESIGN REQUIREMENTS

- A. Conduit Size: ANSI/NFPA 70.

1.4 QUALITY ASSURANCE

- A. Fire rated pathways shall bear the UL Classification marking.
- B. Pathways shall be tested in accordance with ASTM E814 (ANSI/UL1479)

1.5 SUBMITTALS FOR REVIEW

- A. Submit a letter on Company letterhead stating that all equipment will be in compliance with the specifications.

1.6 SUBMITTALS FOR CLOSEOUT

- A. Submit under provisions of Section 260010.
- B. Accurately record actual routing of conduits larger than 1" which are installed underground or under a slab on grade.

1.7 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc., or a testing firm acceptable to authority having jurisdiction as suitable for purpose specified and shown.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect, and handle Products to site under provisions of Section 260010.
- B. Accept conduit on site. Inspect for damage.
- C. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.
- D. Protect non-metallic conduit from sunlight.

1.9 PROJECT CONDITIONS

- A. Verify that field measurements are as shown on Drawings.
- B. Verify routing and termination locations of conduit prior to rough-in.
- C. Conduit routing is shown on Drawings in approximate locations unless dimensioned. Route as required to complete wiring system.

1.10 WARRANTY

- A. Provide the warranty specified in section 260010.

PART 2 - PRODUCTS

2.1 CONDUIT REQUIREMENTS

- A. Minimum Size: 3/4" unless otherwise specified.
- B. Where control devices are provided with 1/2" knockouts or hubs, 3/8" or 1/2" flexible conduit not exceeding 3' in length may be installed between the device and a junction box or conduit fitting.
- C. Underground Installations: Use galvanized rigid steel conduit or nonmetallic conduit as indicated.
 - 1. Minimum Size: 1"
- D. Outdoor Locations, Above Grade: Use galvanized rigid steel conduit or intermediate metal conduit.
- E. Outdoor Locations, Below Grade: Use nonmetallic conduit, concrete encased or stone-dust encased per details on drawings. All elbows shall be long radius steel.
- F. Wet and Damp Locations: Use galvanized rigid steel or intermediate metal conduit.
- G. Dry Locations:
 - 1. Concealed: Use galvanized rigid steel, intermediate metal conduit or electrical metallic tubing.
 - 2. Exposed: Use galvanized rigid steel, intermediate metal conduit or electrical metallic tubing.

2.2 METAL CONDUIT

- A. Galvanized Rigid Steel Conduit (GRC): ANSI C80.1.
- B. Intermediate Metal Conduit (IMC): Rigid steel.
- C. Fittings and Conduit Bodies: ANSI/NEMA FB 1; material to match conduit.

2.3 FLEXIBLE METAL CONDUIT

- A. Description: Interlocked steel construction.

- B. Fittings: ANSI/NEMA FB 1.

2.4 LIQUIDTIGHT FLEXIBLE METAL CONDUIT

- A. Description: Interlocked steel construction with PVC jacket.
- B. Fittings: ANSI/NEMA FB 1.

2.5 ELECTRICAL METALLIC TUBING (EMT)

- A. Description: ANSI C80.3; galvanized tubing.
- B. Fittings and Conduit Bodies: ANSI/NEMA FB 1; steel or malleable iron, compression type. Indenter type may be substituted for 3/4" size tubing installed in dry locations.

2.6 NONMETALLIC CONDUIT

- A. Description: NEMA TC 2; Schedule 40 PVC.
- B. Fittings and Conduit Bodies: NEMA TC 3.

2.7 WIREWAY

- A. Description:
 - 1. Indoor Use: General Purpose
 - 2. Where Indicated: Oil-tight and Dust-tight
 - 3. Outdoor Use: Rain-tight
- B. Knockouts: Manufacturer's Standard
- C. Size: Size and length as indicated or required for installation.
- D. Cover: Hinged or screw covers. Provide full gasketing on oil-tight wireways.
- E. Connector: Slip-in or flanged.
- F. Fittings: Lay-in type with removable top, bottom, and sides.
- G. Finish: Rust inhibiting primer coating with gray enamel finish or pre-galvanized.

2.8 OUTLET BOXES

- A. Sheet Metal Outlet Boxes: NEMA OS 1, galvanized steel.
 - 1. Luminaire and Equipment Supporting Boxes: Shape and size shall suit the type of fixture or canopy and be rated for weight of equipment supported; include 1/2" male fixture studs where required.
 - 2. Minimum Depth – 2-1/8"
 - 3. Concrete Ceiling Boxes: Concrete type.
 - 4. Provide 4" square boxes for fire alarm signaling devices and similar devices.

- B. Nonmetallic Outlet Boxes: NEMA OS 2.
- C. Cast Boxes: NEMA FB 1, Type FD, aluminum or cast fer alloy. Provide gasketed cover by box manufacturer. Provide boxes with threaded hubs.
- D. Use cast outlet boxes in exterior and wet locations.

2.9 PULL AND JUNCTION BOXES

- A. Sheet Metal Boxes: NEMA OS 1, galvanized steel.
 - 1. Cover: Furnish with machine screws.
- B. Surface Mounted Cast Metal Box: NEMA 250, Type 4; flat-flanged, surface mounted junction box:
 - 1. Material: Galvanized cast iron or Cast aluminum.
 - 2. Cover: Furnish with ground flange, neoprene gasket, and stainless-steel cover screws.

2.10 HINGED COVER ENCLOSURES

- A. Manufacturers:
 - 1. Square D
 - 2. Hoffman Engineering
 - 3. Hammond Manufacturing
- B. Construction: NEMA 250, galvanized steel.
- C. Covers: Continuous hinge, held closed by perimeter clamps operated by screws.
- D. Provide interior metal panel for mounting terminal blocks and electrical components finish with white enamel.
- E. Enclosure Finish: Manufacturer's standard enamel.
- F. Provide accessory feet for free standing enclosures.
- G. Enclosure:
 - 1. Interior Dry Locations: Type 1
 - 2. Interior Wet Locations: Type 4
 - 3. Exterior Locations: Type 3R
 - 4. Kitchen: Stainless Steel
 - 5. Dishwashing Rooms/Areas: Stainless Steel

2.11 CABINETS

- A. Manufacturers:
 - 1. Square D Company
 - 2. Hoffman Engineering
 - 3. Hennesy Enclosures
- B. Boxes: Galvanized Steel

- C. Box Size: As indicated or as required to house the indicated quantity of cables and connections plus 20% spare.
- D. Backboard: Provide 3/4" thick plywood backboard for mounting terminal blocks. Paint matte white.
- E. Fronts: Steel, flush or surface type as indicated with concealed trim clamps, concealed hinge, and flush lock keyed to match branch circuit panelboard. Finish with gray baked enamel.
- F. Knockouts: As required.
- G. Provide metal barriers to separate compartments containing control wiring operating at less than 50 volts from power wiring.
- H. Provide accessory feet for free standing equipment.
- I. Enclosure:
 - 1. Interior Dry Locations: Type 1
 - 2. Interior Wet Locations: Type 4
 - 3. Exterior Locations: Type 3R
 - 4. Kitchen: Stainless Steel
 - 5. Dishwashing Rooms/Areas: Stainless Steel

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify locations of floor boxes and outlets prior to rough-in.

3.2 CONDUIT INSTALLATION

- A. Install conduit in accordance with NECA "Standard of Installation" except paragraphs on "Mounting Height".
- B. Install nonmetallic conduit in accordance with manufacturer's instructions.
- C. Arrange supports to prevent misalignment during wiring installation.
- D. Support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.
- E. Group related conduits; support using conduit rack. Construct rack using steel channel; provide space on each for 25% additional conduits.
- F. Fasten conduit supports to building structure and surfaces under provisions of Section 260010.
- G. Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports
- H. Do not attach conduit to suspended ceiling support wires.

- I. Arrange conduit to maintain headroom and present neat appearance.
- J. Route conduit parallel and perpendicular to walls.
- K. Route conduit installed above accessible ceilings parallel and perpendicular to walls.
- L. Route conduit in stone/gravel fill under slab from point-to-point.
- M. In underslab branch circuit raceways, there should be no less than one raceway extension installed from electrical device to an above accessible ceiling location terminated in a junction box per room. The intent of this requirement is to give future access to this raceway and circuits.
- N. Maintain adequate clearance between conduit and piping.
- O. Maintain 12" clearance between conduit and surfaces with temperatures exceeding 104°F.
- P. Cut conduit square using saw or pipe-cutter; de-burr cut ends.
- Q. Bring conduit to shoulder of fittings; fasten securely.
- R. Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum.
- S. Use conduit hubs or sealing locknuts to fasten conduit to sheet metal boxes in damp and wet locations and to cast boxes.
- T. Install no more than equivalent of three 90° bends between boxes. Use conduit bodies to make sharp changes in direction, as around beams. Use factory elbows for bends in metal conduit larger than 2".
- U. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.
- V. Provide suitable fittings to accommodate expansion and deflection where conduit crosses control and expansion joints.
- W. Provide suitable pull string in each empty conduit except sleeves and nipples.
- X. Use suitable caps to protect installed conduit against entrance of dirt and moisture.
- Y. Ground and bond conduit and wireways under provisions of Section 260526.
- Z. Identify conduit under provisions of Section 260553.
- AA. Do not install conduits in the topping on precast floor and roof planks and tees.
- BB. Wireway Supports: provide steel channel supports as required or indicated. Mount directly on suitable walls and structural elements.
- CC. Close ends of wireway.

3.3 BOX INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install boxes in accordance with NECA "Standard of Installation" except for mounting heights.
- C. Install in locations as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections and compliance with regulatory requirements.
- D. Set wall mounted boxes at elevations to accommodate mounting heights indicated.
- E. Electrical boxes are shown on Drawings in approximate locations unless dimensioned. Adjust box location up to 10' if required to accommodate intended purpose.
- F. Orient boxes to accommodate wiring devices oriented as specified in Section 262726.
- G. Maintain headroom and present neat mechanical appearance.
- H. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.
- I. Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 6" from ceiling access panel or from removable recessed luminaire.
- J. Install boxes to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Division 7.
- K. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes and beside lavatory partitions, mirrors, lavatory fixtures and changes in architectural finishes.
- L. Locate outlet boxes to allow luminaries positioned as shown on reflected ceiling plan.
- M. Align adjacent wall mounted outlet boxes which are indicated to be mounted at the same height.
- N. Use flush mounting outlet box in finished areas.
- O. Locate flush mounting box in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening. Provide minimum 24" separation or as required by code in fire rated walls.
- P. Do not install flush mounting box back-to-back in walls; provide minimum 6" separation. Provide minimum 24" separation in acoustic rated walls.
- Q. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness.
- R. Use stamped steel bridges to fasten flush mounting outlet box between studs.
- S. Install flush mounting box without damaging wall insulation or reducing its effectiveness.
- T. Use adjustable steel channel fasteners for hung ceiling outlet box.

- U. Do not fasten boxes to ceiling support wires.
- V. Support boxes independently of conduit.
- W. Use gang box where more than one device is mounted together. Do not use sectional box.
- X. Use gang box with plaster ring for single device outlets.
- Y. Use cast outlet box in exterior locations and wet locations.
- Z. Large Pull Boxes: Use hinged enclosure in interior dry locations, surface-mounted cast metal box in other locations.
- AA. Install enclosures and boxes plumb. Anchor securely to wall and structural supports at each corner.
- BB. Install cabinet fronts plumb.
- CC. Do not drill or punch cabinets and enclosures except where devices or hardware which have the same NEMA type rating are being installed.
- DD. Mount waterproof enclosures using the holes or brackets furnished by the manufacturer only.
- EE. Provide enclosures for all control devices, pilot devices, timers, starters, contactors, adjustable frequency drives and programmable logic controller.
- FF. Provide cabinets where indicated or as required.

3.4 INTERFACE WITH OTHER PRODUCTS

- A. Install conduit to preserve fire resistance rating of partitions and other elements, using materials and methods under the provisions of Division 7.
- B. Route conduit through roof, wall, floor and ceiling openings and repair as specified in Section 260010.
- C. Indoor Dry Type Transformers: Provide flexible conduits not exceeding 3' in length between the transformer enclosure and the end of all rigid conduits and non-flexible tubing. The flexible conduit shall be installed with a minimum 45° bend in its length.
- D. Motors: Provide flexible conduit not exceeding 4' in length between the motor junction box and the end of all rigid conduit and non-flexible tubing. Provide sufficient slack to permit the motor to be moved over the entire range of adjustment in the motor base and sub-base without stressing the flexible conduit or its connectors.
- E. Other Adjustable Devices: Provide flexible conduit at any device which has electrical connections and is adjusted for proper operation by sliding or rotating the mounting of the device. Provide flexible conduit of sufficient length to permit the full range of adjustment allowed by the device mounting.
- F. Prewired Furniture: provide liquid-tight metal conduit not exceeding 4' in length between floor/wall box and furniture connection point for power and telecommunications.

- G. At HVAC equipment on trapeze hangers or vibration isolators, provide sufficient length of flexible conduit to accommodate the full range of normal motion without stressing the conduit or transmitting excessive mechanical forces to rigidly mounted conduit or building structures. Install the flexible conduit in such a manner that a 90° bend is included in the length of flexible conduit.
- H. Provide flexible conduits that are of sufficient length so they allow the full range of movement for adjustment and vibration without stressing the flexible conduit or connectors.
- I. Coordinate installation of outlet box for equipment connected under Section 260180.
- J. Throughout new installation, all raceways and boxes shall be installed so that they are concealed in new construction. Any exceptions shall be approved by Architect before installation.

3.5 INTERFACE WITH CONCRETE SLABS

- A. Conduits are not permitted in concrete slabs or elevated slabs for this project.
- B. Concrete Floors on Grade: Install conduits under concrete slabs in stone base.
- C. Concrete Elevated Floors: Install conduits below slab in ceiling plenum of floor below.
- D. Review all underslab conduit interface with Architect/Engineer before installation.

3.6 ADJUSTING

- A. Test, adjust, and balance as required.
- B. Adjust floor box flush with finish flooring material.
- C. Adjust flush-mounting outlets to make front flush with finished wall material.
- D. Install knockout closures in unused box openings.

3.7 CLEANING

- A. Clean interior of boxes to remove dust, debris, and other material.
- B. Clean exposed surfaces and restore finish.

END OF SECTION 260533

SECTION 260553 – IDENTIFICATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Labels and Nameplates
- B. Color-Coding

1.2 REFERENCES

- A. ANSI/NFPA 70 - National Electrical Code

1.3 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc., or a testing firm acceptable to authority having jurisdiction as suitable for purpose specified and shown.

1.4 SUBMITTALS FOR REVIEW

- A. Submit a letter on Company letterhead stating that all equipment will be in compliance with the specifications.

1.5 WARRANTY

- A. Provide the warranty specified in Section 260010.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Thomas & Betts
- B. Ideal Industries, Inc.
- C. Lem Products, Inc.

2.2 RACEWAY AND CABLE LABELS

- A. Comply with applicable codes for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.
 - 1. Color: Black letters on orange field.
 - 2. Legend: Indicates voltage and service.

- B. Adhesive Labels: Preprinted, flexible, self-adhesive vinyl with legend over-laminated with a clear weather and commercial resistant coating.
- C. Pre-tensioned, Wraparound Plastic Sleeves: Flexible, preprinted, color-coded, acrylic band sized to suit the diameter of the line it identifies and arranged to stay in place by pre-tensioned gripping action when placed in position.
- D. Colored Adhesive Tape: Self-adhesive vinyl tape not less than 3 mils thick by 3/4" to 2" wide.
- E. Tape Markers: Vinyl or vinyl-cloth, self-adhesive, wraparound type with preprinted numbers and letters.
- F. Aluminum, Wraparound Market Bands: Bands cut from 0.014" thick aluminum sheet, with stamped or embossed legend, and fitted with slots or ears for permanently securing around wire or cable jacket or around groups of conductors.
- G. Plasticized Card-Stock Tags: Vinyl cloth with preprinted and field-printed legends. Orange background, unless otherwise indicated, with eyelet for fastener.
- H. Aluminum-Faced, Card-Stock Tags: Weather-resistant, 18-point minimum card stock faced on both sides with embossable aluminum sheet, 0.002" thick, laminated with moisture resistant acrylic adhesive, punched for fasteners, and preprinted with legends to suit each application.
- I. Brass or Aluminum Tags: 2 by 2 by 0.05" metal tags with stamped legend, punched for fastener.
- J. Telecommunication Cable Labels: Self-adhesive vinyl or vinyl-cloth wraparound tape markers, machine printed with alphanumeric cable designations.

2.3 NAMEPLATES AND SIGNS

- A. Engraved Plastic Nameplates and Signs: Engraving stock, melamine plastic laminate, minimum 1/16" thick for signs up to 20 sq. in. and 1/8" thick for larger sizes.
 - 1. Engraved legend with black letters on white face.
 - 2. Punched or drilled for mechanical fasteners.
 - 3. Provide outdoor rated plastic with UV Protection for outdoor or wet locations.
- B. Baked-Enamel Signs for Interior Use: Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend and size required for the application. 1/4" grommets in corners for mounting.
- C. Fasteners for Nameplates and Signs: Self-tapping, stainless-steel screws or No. 10/32, stainless-steel machine screws with nuts and flat and lock washers.

2.4 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Cable Ties: Fungus-inert, self-extinguishing, one-piece, self-locking, Type 6/6 nylon cable ties.
 - 1. Minimum Width: 3/16"
 - 2. Tensile Strength: 50 lb minimum.
 - 3. Temperature Range: Minus 40 to plus 185° F.

2.5 COLOR CODING OF SECONDARY CONDUCTORS

- A. Use the following colors for feeder and branch circuit phase conductors:
1. 120/208 or 120/240 Volt Systems:
 - Black – A-Phase
 - Red – B-Phase
 - Blue – C-Phase
 - White (Neutral)
 2. 277/480 Volt Systems:
 - Brown – A Phase
 - Orange – B Phase
 - Yellow – C Phase
 - Gray (Neutral)
 3. Factory apply color the entire length of conductors, except the following field-applied, color-coding methods may be used instead of factory-coded wire for sizes larger than No. 10 AWG:
 - a. Colored, pressure-sensitive plastic tape in half-lapped turns for a distance of 3" from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Use 3/4" wide tape in colors specified. Adjust tape bands to avoid obscuring cable identification markings.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Use Owner-furnished room numbers on all identifications. Room numbers on drawings are for reference only.
- B. Verify colors for color coding with Owner before proceeding and match existing color coding when applicable.
- C. Identification Materials and Devices: Install at locations for most convenient viewing without interference with operation and maintenance of equipment.
- D. Lettering, Colors, and Graphics: Coordinate names, abbreviations, colors, and other designations with corresponding designations in the Contract Documents or with those required by codes and standards. Use consistent designations throughout Project.
- E. Sequence of Work: If identification is applied to surfaces that require finish, install identification after completing finish work.
- F. Self-Adhesive Identification Products: Clean surfaces before applying.
- G. Circuits More Than 600V: Paint entire raceway orange and identify raceway with "DANGER—HIGH VOLTAGE" in black letters 2" high, stenciled with paint at 10' intervals over entire raceway.**
- H. Rooms containing equipment over 600V: Install engraved plastic laminated signs with black and red printing on a white background. Identify each door with "DANGER, HIGH**

VOLTAGE, AUTHORIZED PERSONNEL ONLY” using minimum 3/8" high lettering on a 14" wide by 10" high sign on each door entering the room(s).

- I. Color Junction Boxes and Coverplates: Paint all boxes and covers above accessible ceilings colors as listed below:
 - 1. Fire Alarm System: Red
 - 2. Security System: Blue
 - 3. Normal/Emergency and Emergency Only Distribution Systems: Yellow
- J. Caution Labels for Indoor Boxes and Enclosures for Power and Lighting: Install pressure-sensitive self-adhesive labels identifying system voltage with black letters on orange background. Install on exterior of door or cover.
- K. Circuit Identification on Junction Boxes and Coverplates: Mark ID externally on junction box, coverplates and on the back of each coverplate for receptacles and switches.
 - 1. Boxes: Finished Areas – Inside, Permanent Marker
 - 2. Boxes: Non-Finished Areas – Outside, Permanent Marker
 - 3. ID Legend: Permanent, waterproof listing of panel and circuit number or equivalent. (IE Panel HA cct. 1, 3, 5)
- L. Paths of Underground Electrical Lines: During trench backfilling, for exterior underground power, control, signal, and communication lines, install continuous underground plastic line marker located directly above line at 6 to 8" below finished grade. Where width of multiple lines installed in a common trench or concrete envelope does not exceed 16" overall, use a single line marker. For trenches wider than 16" install parallel tapes at 2'-0" intervals across the width of the trench.
- M. Power-Circuit Identification: Metal tags or aluminum, wraparound marker bands for cables, feeders, and power circuits in vaults, pull and junction boxes, manholes and switchboard rooms.
 - 1. Legend: 1/4" steel letter and number stamping or embossing with legend corresponding to indicated circuit designations.
 - 2. Tag Fasteners: Nylon cable ties.
 - 3. Band Fasteners: Integral ears.
- N. Apply identification to conductors as follows:
 - 1. Conductors to be extended in the future: Indicate source and circuit numbers.
 - 2. Multiple Power or Lighting Circuits in the Same Enclosure: Identify each conductor's source and circuit number using permanent marking and using color-coding to identify circuits' voltage and phase.
 - 3. Multiple Control and Communication Circuits in the Same Enclosure: Identify each conductor by its system and circuit designation. Use a consistent system of tags, color-coding or cable marking tape.
- O. Apply warning, caution and instruction signs as follows:
 - 1. Warnings, Cautions, and Instructions: Install to ensure safe operation and maintenance of electrical systems and of items to which they connect. Install engraved plastic-laminated instruction signs with approved legend where instructions are needed for system or equipment operation. Install metal-backed butyrate signs for outdoor items.
 - 2. Emergency Operation: Install engraved laminated signs with white legend on red background with minimum 3/8" high lettering for emergency instructions on power transfer, load shedding and other emergency operations.

- P. Equipment Identification Labels: Engraved plastic laminate. Install on each unit of equipment, including central or master unit of each system. This includes power, lighting, communication, signal, and alarm systems, unless units are specified with their own self-explanatory identification. Unless otherwise indicated, provide a single line of text with 1/2" high lettering on 1-1/2" high label; where two lines of text are required, use labels 2" high. Use black letters on a white face. Apply labels for each unit of the following categories of equipment using punched or drilled mechanical fasteners.
1. Transformers
 2. Switchboards (3/8" high letters)
 3. Panelboards
 4. Load Centers
 5. Enclosed Switches
 6. Enclosed Circuit Breakers
 7. Elevator Enclosed Switches
 8. Enclosed Contactors
 9. Enclosed Controllers
 10. Engine Generators (3/8" high letters)
 11. Fixed and Automatic Power Factor Equipment
 12. Transfer Switches (3/8" high letters)
 13. Area Protection Panels

END OF SECTION 260553

SECTION 260620 – SCHEDULES FOR ELECTRICAL DISTRIBUTION EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes the schedules for electrical distribution equipment.

1.2 SUBMITTALS FOR REVIEW

- A. Refer to the specific equipment section for submittals required.

1.3 EXTRA MATERIALS

- A. Refer to the specific equipment section for extra materials required.

1.4 MAINTENANCE MATERIALS

- A. Refer to the specific equipment section for maintenance materials required.

PART 2 - PRODUCTS

2.1 SCHEDULES FOR ELECTRICAL DISTRIBUTION EQUIPMENT

- A. Refer to Schedules attached to the following pages.

PART 3 - EXECUTION

3.1 STANDARD BRANCH CIRCUIT WIRE SIZING TABLE

A. Sizing Table:

STANDARD BRANCH CIRCUIT WIRE SIZING TABLE			
BREAKER TRIP RATING	1-POLE BREAKER	2-POLE BREAKER	3-POLE BREAKER
15-20A	2#12 + 1#12 GND IN 3/4" CONDUIT	3#12 + 1#12 GND IN 3/4" CONDUIT	4#12 + 1#12 GND IN 3/4" CONDUIT
25-30A	2#10 + 1#10 GND IN 3/4" CONDUIT	3#10 + 1#10 GND IN 3/4" CONDUIT	4#10 + 1#10 GND IN 3/4" CONDUIT
35-40A	2#8 + 1#10 GND IN 3/4" CONDUIT	3#8 + 1#10 GND IN 3/4" CONDUIT	4#8 + 1#10 GND IN 3/4" CONDUIT
45-50A	2#6 + 1#10 GND IN 3/4" CONDUIT	3#6 + 1#10 GND IN 3/4" CONDUIT	4#6 + 1#10 GND IN 1" CONDUIT
60-70A	2#4 + 1#8 GND IN 1" CONDUIT	3#4 + 1#8 GND IN 1-1/4" CONDUIT	4#4 + 1#8 GND IN 1-1/4" CONDUIT
80A	2#3 + 1#8 GND IN 1" CONDUIT	3#3 + 1#8 GND IN 1-1/4" CONDUIT	4#3 + 1#8 GND IN 1-1/4" CONDUIT
90A	N/A	3#2 + 1#8 GND IN 1-1/4" CONDUIT	4#2 + 1#8 GND IN 1-1/4" CONDUIT
100-110A	N/A	3#1 + 1#6 GND IN 1-1/2" CONDUIT	4#1 + 1#6 GND IN 1-1/2" CONDUIT

B. Table Notes:

1. Unless otherwise indicated, refer to this schedule for wire and conduit size for all circuits with identified breaker trip ratings.
2. Provide neutral conductor for 2 and 3 pole circuits as indicated above if the equipment requires a neutral.

PANEL			Bus:	100A Main Breaker	Additional Panel Notes								
A			Volts:	120/240V, 1PH, 3W	100% Neutral with Ground Bus								
			Poles:	30	Service Entrance Rated Panel								
			AIC:	10,000	Typical for One Bedroom Units - Add Alternate #1								
			Mounting:	Note 2	Note: Connect existing circuits to CAFCI and CAFCI/GFCI breakers per NEC Requirements								
CKT.	Breaker		Description	Notes	Load			Notes	Description	Breaker		CKT.	
	Amp	Pole			A	B	C			Pole	Amp		
1	20	1	Relocated Existing Circuit	3,8					4,8	Relocated Refrigerator Circuit	1	20	2
3	20	1	Relocated Existing Circuit	3,8					3,8	Relocated Existing Circuit	1	20	4
5	20	1	Relocated Existing Circuit	3,8					3,8	Relocated Existing Circuit	1	20	6
7	20	1	Relocated Existing Circuit	3,8					3,8	Relocated Existing Circuit	1	20	8
9	20	1	Relocated Existing Circuit	3,8					8	Relocated Existing Circuit	1	20	10
11	20	1	Relocated Existing Circuit	3,8					8	Relocated Existing Circuit	1	20	12
13	20	1	Relocated Existing Circuit	3,8					8	Relocated Dryer Circuit	2	30	14
15		2	Breaker for Water Heater by Others										16
17													18
19		2	Breaker for Air Handler by Others										20
21													22
23		2	Breaker for Heat Pump by Others										24
25													26
27		2											28
29													30
					0.0	0.0			Total Connected Load KVA: 0.0 KVA				
					Phase Totals								

PANEL			Bus:	125A Main Breaker	Additional Panel Notes								
A2			Volts:	120/240V, 1PH, 3W	100% Neutral with Ground Bus								
			Poles:	30	Service Entrance Rated Panel								
			AIC:	10,000	Typical for 2,3,4, and 5 Bedroom Units - Add Alternate #1								
			Mounting:	Note 2	Note: Connect existing circuits to CAFCI and CAFCI/GFCI breakers per NEC Requirements								
CKT.	Breaker		Description	Notes	Load			Notes	Description	Breaker		CKT.	
	Amp	Pole			A	B	C			Pole	Amp		
1	20	1	Relocated Existing Circuit	3,8					4,8	Relocated Refrigerator Circuit	1	20	2
3	20	1	Relocated Existing Circuit	3,8					3,8	Relocated Existing Circuit	1	20	4
5	20	1	Relocated Existing Circuit	3,8					3,8	Relocated Existing Circuit	1	20	6
7	20	1	Relocated Existing Circuit	3,8					3,8	Relocated Existing Circuit	1	20	8
9	20	1	Relocated Existing Circuit	3,8					3,8	Relocated Existing Circuit	1	20	10
11	20	1	Relocated Existing Circuit	3,8					3,8	Relocated Existing Circuit	1	20	12
13	20	1	Relocated Existing Circuit	3,8					8	Relocated Existing Circuit	1	20	14
15	20	1	Relocated Existing Circuit	8					8	Relocated Dryer Circuit	2	30	16
17		2	Breaker for Water Heater by Others										18
19													20
21		2	Breaker for Air Handler by Others										22
23													24
25		2	Breaker for Heat Pump by Others										26
27													28
29													30
					0.0	0.0				Total Connected Load KVA: 0.0 KVA			
					Phase Totals								

PANEL NOTES (Not all notes used)	
1	Provide groundfault breaker for personal protection.
2	Refer to drawings for mounting types
3	Provide combination type arc-fault breaker. (CAFCI)
4	Combination type arc-fault and ground fault (CAFCI/GFCI)
5	Provide Space Age Electronics Model ELOCK-FA for breaker to lock in the ON position and identify breaker.
6	Provide 2#10 + 1#10 gnd in 3/4" conduit for voltage drop.
7	Refer to power riser diagram on the drawings for wire/conduit
8	Relocate circuit from existing panel.

SECTION 260650 – LUMINAIRE SCHEDULE

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes the Luminaire Schedule.
- B. The luminaire manufacturers' catalog numbers scheduled hereinafter in the Luminaire Schedule may not include all the required accessories or hardware that is necessary for a complete installation. Provide all the required accessories or hardware that is necessary for a complete installation.
- C. Furnish luminaries with all associated appurtenances including, but not necessarily limited to, lamps, ballasts, drivers, reflectors, lenses and/or louvers, sockets, holders, suspension accessories, pendants, canopies, recessing boxes, plaster frames, and similar items completely wired, assembled, installed, and tested as specified and in the manner indicated.
- D. Every luminaire symbol shall have a luminaire number unless otherwise directed. In instances where a specific luminaire symbol has not been assigned a luminaire number, provide a complete luminaire of the type and wattage designated for a luminaire symbol of similar function and/or as directed by the Engineer.

1.2 LUMINAIRE SCHEDULE INTERPRETATION

- A. The first name luminaire manufacturer and catalog number is the Basis of Design for the intended usage. Additional luminaire manufacturers and catalog series of luminaries listed in the Luminaire Scheduled or added thru addenda are approved equals and may be subject to sample review, footcandle layout for rooms utilizing luminaire and/or a mock-up for Engineer review before final approval will be given.

1.3 MAINTENANCE MATERIALS

- A. Provide 2 of each special tool required for maintenance.

PART 2 - PRODUCTS

2.1 LUMINAIRE SCHEDULE

- A. Refer to Luminaire Schedule attached to the following pages.

PART 3 - EXECUTION – NOT USED

SECTION 260650

LUMINAIRE SCHEDULE

Mark	Manufacturer	Catalog Number	Description	Volts	Lamps			Driver		Mtg.	Mtg. Height	Notes
					No.	Watts	Type/Lumens	No.	Type			
SW1	Lumencia	LLFL5324D-A	2' vanity light	120	1	17	LED 1420	1	DLD	SW	Above Mirror	1,3,4
SC1	Lumencia	LL2-0346D	14"X14" surface ceiling fixture for kitchens	120	1	24	LED 2384	1	LD	SC		1,3
SC2	Leviton	Medium base lampholder with pull chain as required.	Lampholder	120			N/A			SC		1
SC3	Lightolier Prescolite Juno	S5R830K7 LBSLEDA series JSF series	LED slim surface downlight	120	1	14.4	LED 650	1	LD	SC		1,3
UC1	Williams	1SF-2'-L12-8-30-AF12125-WRS/120	Under cabinet fixture with rocker switch	120	1	11.4	LED 1200	1	LD	UC		1,2

Driver & Ballast Legend	
Symbol	Description
DLD	Dimming LED Driver, 0-10 volts.
LD	LED driver.
1LE	One lamp electronic
2LE	Two lamp electronic
3LE	Three lamp electronic
4LE	Four lamp electronic
FD	Fluorescent dimming as specified.
SD	Step Dimming

Mounting Legend			
Symbol	Description	Symbol	Description
RC	Recessed Ceiling	S	Suspended
RW	Recessed Wall	UC	Under Cabinet
SC	Surface Ceiling	PD	Per Detail on Drawings
SW	Surface Wall	PM	Pole Mounted
CH	Chain Hung	IG	Recessed In-Ground
AH	Aircraft Cable Hung	PT	Pole Top Mounted
P	Pendant	G	Ground Mounted
WB	Wall Bracket	B	Bollard

General Notes	
G1	Check descriptions against catalog numbers. Report any discrepancies prior to submitting a proposal for this work.
G2	Where the listed manufacturer of acceptable substitutes makes more than one grade of the fixture, provide the grade of fixture with equal or better construction, materials and performance as determined by the manufacturer.

G3	Engineer must approve all substitutes prior to bid.
G4	All drivers/ballasts shall be Universal 120-277 voltage. If universal driver is unavailable, furnish 120 volt type
G5	Refer to Specifications Sections 265100 and 260650 for additional requirements.

Luminaire Notes	
1	Provide all additional mounting accessories for each application.
2	Coordinate exact location of under counter lighting with casework. Review all field locations with Architect before rough-in.
3	Architect to select finish of luminaire. Provide color samples with submittals to Architect for review and selection..
4	Locations/Heights shown on Electrical Drawings are approximate. Coordinate exact mounting height and location with Architectural Elevations. Review with Architect before rough-in
5	Center luminaire in canopy. Review all field locations with Architect before rough-in.

END OF SECTION 265200

SECTION 262415 - EXISTING PANELBOARDS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Existing Branch Circuit Panelboards

1.2 REFERENCES

- A. NECA (National Electrical Contractors Association) "Standard of Installation"
- B. NEMA AB 1 - Molded Case Circuit Breakers
- C. NEMA ICS 2 - Industrial Control Devices, Controllers, and Assemblies
- D. NEMA KS 1 - Enclosed Switches
- E. NEMA PB 1 - Panelboards
- F. NEMA PB 1.1 - Instructions for Safe Installation, Operation, and Maintenance of Panelboards Rated 600 Volts or Less.
- G. NFPA 70 - National Electrical Code

1.3 SUBMITTALS FOR REVIEW

- A. Submit under provisions of Section 260010.
- B. Shop Drawings: The following items shall be submitted for review and approval:
 - 1. Submittal booklet to include the following:
 - a. Reference to Specification Section.
 - b. A list of all equipment to be provided and installed.
 - c. Data sheets to indicate circuit breakers and short circuit rating, with specific items or model numbers highlighted.

1.4 SUBMITTALS FOR CLOSEOUT

- A. Submit under provisions of Section 260010.
- B. Record actual branch circuit arrangement.
- C. Copy of Panelboard Schedules for Owners approval before installing in panelboard or O&M Manuals.
- D. Provide copies of all panel schedules to be included in O&M Manuals.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with NECA Standard of Installation except for mounting heights.
- B. Maintain each document on site.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

1.7 REGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70.
- B. Furnish products listed and classified by UL or testing firm acceptable to authority having jurisdiction as suitable for purpose specified and indicated.

1.8 FIELD MEASUREMENTS

- A. Verify that field measurements are as instructed by manufacturer.

1.9 MAINTENANCE MATERIALS

- A. Provide maintenance materials under provisions of Section 260010.

1.10 WARRANTY

- A. Provide the warranty specified in Section 260010.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Match existing manufacturer

2.2 GENERAL REQUIREMENTS FOR PANELBOARDS

- A. Handle Locks:
 - 1. Provide accessories which permit circuit breaker handles to be pad-locked in the OFF position where indicated for indicated circuit breakers.
 - 2. Provide accessories which prevent circuit breaker handles from being manually moved from the ON position for the handles of all circuit breaker which feed emergency lighting circuits, public address and intercom systems and uninterruptable power supplies.

2.3 ADDITIONAL BREAKERS FOR BRANCH CIRCUIT PANELBOARDS

- A. Minimum integrated short circuit rating: Match existing
- B. Molded Case Circuit Breakers: NEMA AB 1, bolt-on type thermal magnetic trip circuit breakers, with common trip handle for all poles. Provide circuit breakers UL listed as Type SWD for lighting circuits. Provide UL Class A ground fault interrupter circuit breakers where scheduled. Do not use tandem circuit breakers. Type HACR for heating and air conditioning and refrigeration equipment branch circuits.
- C. Provide circuit breaker accessory trip units and auxiliary switches as indicated.

2.4 GROUND BUS

- A. Provide a ground bus in the existing panelboard for termination of equipment grounding conductors.
- B. Provide ground bushing and conductor from panelboard feeder conduit to ground bus.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Remove existing label.
- B. Provide engraved plastic nameplates under the provisions of Section 260553.
 - 1. Indicate the panel designation, voltage, phase, wire and the designation and location of the panel, switchboard or disconnect device which feeds the panelboard.
- C. Tighten all bolted connections within all reused panelboards.
- D. Provide breaker closures for removed breakers and unused spaces in panelboards.
- E. Provide a new typed circuit directory for each existing branch circuit panelboard. Revise directory to reflect new and “existing to remain” circuits and circuiting changes required to balance phase loads.
- F. Ground and bond panelboard enclosure in accordance with Section 260526.
- G. Where replacing existing panels and existing conductors are to be connected to new CB's, provide extensions of conductors as needed using same color and size of wire using a butt-splice.
- H. Contractor shall trace all circuits listed as “Existing Circuits” and provide the correct description for the circuit. Existing Circuit will not be acceptable in the Final Panel Schedules.

3.2 FIELD QUALITY CONTROL

- A. Perform field inspection and testing.

- B. Visual and Mechanical Inspection: Inspect for physical damage, proper alignment, anchorage, and grounding. Check proper installation and tightness of connections.
- C. Inspect and test in accordance with NETA ATS, except Section 4.
- D. Perform inspections and tests listed in NETA ATS, Section 7.4 for switches, Section 7.5 for circuit breakers.

3.3 PANEL SCHEDULES

- A. As indicated in the Specifications or Drawings.
- B. Schedules show separate wire and conduit sizes for each individual branch circuit. The Contractor may install more than one circuit in a conduit and eliminate unused conduits. The Contractor is responsible for resizing the conduits and providing derated conductors per the requirements of NFPA 70 and N.E.C.

3.4 ADJUSTING

- A. Adjust installed work as required.
- B. Measure steady state load currents at each panelboard feeder; rearrange circuits in the panelboard to balance the phase loads to within 20% of each other. Maintain proper phasing for multi-wire branch circuits.

END OF SECTION 262415

SECTION 262430 – LOAD CENTERS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Load Centers

1.2 REFERENCES

- A. ANSI/NFPA 70 – National Electrical Code
- B. NECA (National Electrical Contractors Association) – Standard of Installation
- C. EMA AB 1 – Molded Case Circuit Breakers and Molded Case Switches
- D. NEMA PB 1 – Panelboards
- E. NEMA PB 1.1 – General Instructions for Safe Installation, Operation, and Maintenance of Panelboards Rated 600 Volts or Less
- F. Federal Specification W-P115C – Type 1, Class 1
- G. Federal Specification W-C-375B/Gen – Circuit Breakers, Molded Case, Branch Circuit, and Service
- H. Federal Specification W-C-37B – Molded Case Circuit Breakers

1.3 SUBMITTALS FOR REVIEW

- A. Submit under provisions of Section 260010.
- B. Shop Drawings: The following items shall be submitted for review and approval:
 - 1. Submittal booklet to include the following:
 - a. Reference to Specification Section.
 - b. A list of all equipment to be provided and installed.
 - c. Data sheets to indicate voltage, main bus ampacity, circuit breakers, short circuit rating with specific items or model numbers highlighted.

1.4 SUBMITTALS FOR CLOSEOUT

- A. Submit under the provisions of Section 260010.
- B. Record actual locations of products; indicate actual branch circuit arrangement.
- C. Submit record copy of all testing performed.
- D. Provide a copy of the approved Load Center Schedules included in the O&M Manuals.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

1.6 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by UL or testing firm acceptable to authority having jurisdiction as suitable for purpose specified and indicated.
- C. Provide UL service entrance equipment on all units used as service entrance equipment.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Inspect and report concealed damage to carrier within their required time-period.
- B. Handle carefully to avoid damage to load center internal components, enclosure, and finish.
- C. Store in a clean, dry environment. Maintain factory packaging and, if required, provide an additional heavy canvas or heavy plastic cover to protect enclosure(s) from dirt, water, construction debris and traffic.

1.8 MAINTENANCE MATERIALS

- A. Provide two keys for each load center installed.

1.9 WARRANTY

- A. Provide the warranty specified in Section 260010.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: Square D Company
- B. Alternate Manufacturers as listed below:
 - 1. Eaton
 - 2. Siemens

2.2 GENERAL REQUIREMENTS FOR LOAD CENTERS

- A. Ground Bus: Provide copper ground bus in enclosures and bond the bus to the enclosure.
- B. Neutral Bus: Provide insulated neutral bus in all enclosures where the feeder circuit contains a neutral conductor. Bond the neutral bus to the ground bus or enclosure when the enclosure

contains the service main disconnect or the disconnect at a building which receives its power from a service in another building. Provide bus with current carrying capacity of 100% except where otherwise indicated.

- C. Service Equipment Label: UL labeled for use as service equipment for load centers with main service disconnect switches.
- D. Load Side Terminations: Provide lugs on circuit breakers of sufficient size to terminate conductors scheduled or indicated on plans.
- E. Use only Owner-assigned room names/numbers in final Load Center Schedules.

2.3 LOAD CENTERS

- A. Load Centers: NEMA PB1, circuit breaker type.
- B. Interior:
 - 1. Bus bar connections to the branch circuit breakers shall be the distributed phase type and shall accept plug-on circuit breakers.
 - 2. Load Centers shall be suitable for use as Service Equipment when application requirements comply with UL 67 and NEC Articles 230-F and -G.
 - 3. A copper equipment ground bar shall be provided.
 - 4. Interior trim shall be of dead-front construction to shield user from energized parts. Dead-front trim shall have filler plates covering unused mounting spaces.
- C. Minimum Integrated Short Circuit Rating:
 - 1. Amperes Interrupting Current (AIC) Ratings: 120V, 208V, and 240V breaker – minimum AIC 10,000 amps unless otherwise noted on the Panel Schedules.
- D. Main Circuit Breaker:
 - 1. Main circuit breakers shall have an overcenter, trip-free, toggle mechanism which will provide quick-make, quick-break contact action. Circuit breakers shall have a permanent trip unit with thermal and magnetic trip elements in each pole. Each thermal element shall be true rms sensing and be factory calibrated to operate in a 40°C ambient environment. Thermal elements shall be ambient compensating above 40°C.
- E. Branch Circuit Breakers:
 - 1. Molded Case Circuit Breakers: NEMA AB 1, plug-on thermal magnetic trip, with an integral crossbar to ensure simultaneous opening of all poles in multi-pole circuit breakers.
 - 2. Circuit breakers shall have an overcenter, tripfree, toggle-type operating mechanism with quick-make, quick-break action, and positive handle indication.
 - 3. Handles shall have ON, OFF, and "Tripped" positions.
 - 4. Circuit breakers shall be UL Listed in accordance with UL standard 489 with current ratings.
 - 5. Single-pole, 15 and 20 ampere circuit breakers intended to switch lighting loads on a regular basis shall have the SWD marking.
 - 6. Two- and three-pole circuit breakers 15-60 amperes intended for use with air conditioning, heating, and refrigeration equipment having motor group combinations and marked as such shall have the HACR marking.
 - 7. Breaker Accessories: Provide when indicated on the Panel Schedules.
 - a. Ground Fault – Personal Protection (6-mA trip)

- b. Combination Type Arc-Fault (CAFCI)
 - c. Combination Type Arc-Fault and Ground Fault (CAFCI/GFCI)
 - d. Handle lock
8. Tandem circuit breakers not permitted.
- F. Enclosure: NEMA PB 1
- 1. Interior Locations: Type 1
 - a. Enclosure shall be fabricated of cold rolled steel.
 - b. Enclosures shall have a surface front and flush cylinder tumble-type lock, all keyed alike.
 - c. Finish to be gray baked enamel.
 - d. A directory label shall be provided with circuits identified as indicated on the schedule
 - 2. Exterior Locations: Type 3R
 - a. Enclosure shall be fabricated of galvanized steel or equivalent rust-resistant steel.
 - b. Enclosures shall have a surface front and flush cylinder tumble-type lock, all keyed alike.
 - c. Finish to be gray baked enamel.
 - d. A directory label shall be provided with circuits identified as indicated on the schedule

2.4 IDENTIFICATION

- A. Load Center Engraved Plastic Nameplates: Engraving stock, melamine plastic laminate, minimum 1/16" thick for nameplates up to 20 sq. in. and 1/8" thick for larger sizes.
 - 1. Engraved legend shall be black letters on white face.
 - 2. Punched or drilled for mechanical fasteners.
- B. Fasteners for Nameplates: Self-tapping, stainless-steel screws, or #10/32 stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install load centers in accordance with NEMA PB 1.1.
- B. Install load centers plumb.
- C. Install recessed load centers flush with wall finishes.
- D. Provide supports in accordance with Section 260529.
- E. Mount load centers 6'-6" to the top of enclosure.
- F. Provide filler plates for unused spaces in load centers.
- G. Provide typed circuit directory for each branch circuit load center.
 - 1. Revise directory to reflect circuiting changes required to balance phase loads.

2. Contractor to submit a copy of all load center directory schedules to the Owner, showing correct room name and/or number, for his approval. Contractor to make changes recommended by the Owner before final typed directories are installed in load centers.
- H. Provide engraved plastic nameplates for each load center with 1/2" high lettering. Label shall include the following:
 1. Load Center Name
 2. Voltage, Phase, Wire
 3. Location of the panel, switchboard, or disconnect device which feeds the load center.
- I. Provide spare conduits out of each recessed load center to an accessible location above ceiling. Minimum spare conduits: 1 empty 1" per 4 poles of spare breakers and spaces. Identify each as SPARE.
- J. Ground and bond load center enclosure in accordance with Section 260526.

3.2 FIELD QUALITY CONTROL

- A. Perform field inspection and testing.
- B. Inspect for physical damage, proper alignment, anchorage, and grounding. Check proper installation and tightness of connections.
- C. Measure steady state load currents at each load center feeder; rearrange circuits in the load center to balance the phase loads within 10% of each other. Maintain proper phasing for multi-wire branch circuits.
- D. Check tightness of bolted connections, and circuit breaker connections using calibrated torque wrench or torque screwdriver per manufacturer's written specifications.
- E. Apply ANSI 61 (or other appropriate color paint) as needed.

3.3 LOAD CENTER SCHEDULES

- A. As indicated in the Specifications or Drawings.
- B. Schedules show separate wire and conduit sizes for each individual branch circuit. The Contractor may install more than one circuit in a conduit and eliminate unused conduits. The Contractor is responsible for resizing the conduits and providing de-rated conductors per the requirements of ANSI/NFPA 70 – National Electrical Code.

3.4 ADJUSTING

- A. Measure steady state load currents at each load center feeder; rearrange circuits in the load center to balance the phase loads to within 20% of each other. Maintain proper phasing for multi-wire branch circuits.

END OF SECTION 262430

SECTION 262727 – RESIDENTIAL GRADE WIRING DEVICES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Wall Switches
- B. Receptacles
- C. Wall Plates

1.2 REFERENCES

- A. NECA - Standard of Installation
- B. NEMA WD 1 - General Requirements for Wiring Devices
- C. NEMA WD 6 - Wiring Device -- Dimensional Requirements
- D. NFPA 70 - National Electrical Code
- E. UL486A & UL486B
- F. WC-596
- G. WC-896

1.3 SUBMITTALS FOR REVIEW

- A. Submit under provisions of Section 260010.
- B. Shop Drawings: The following items shall be submitted for review and approval:
 - 1. Submittal booklet to include the following:
 - a. Reference to Specification Section.
 - b. A list of all equipment to be provided and installed.
 - c. Data sheets to indicate voltage ratings, current rating, color and configuration with specific item and model numbers highlighted.

1.4 SUBMITTALS FOR CLOSEOUT

- A. Submit under provisions of Section 260010.
- B. Submit record copy of all testing performed.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

1.6 REGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70.
- B. Provide Products listed and classified by Underwriters Laboratories, Inc., or a testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

1.7 COORDINATION

- A. Receptacles for General Contractor or Owner Furnished Equipment: Match plug configurations and ratings.
- B. Cord and Plug Sets: Match equipment requirements.

1.8 EXTRA MATERIALS

- A. Furnish extra materials as described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.
 - 1. Wall Plates: Furnish 10 of each style, size and finish installed. Furnish at least 2 of each style, size and finish installed.
 - 2. Switches: Furnish 10 of each style, size and finish installed. None required for Wall Dimmers and Ceiling Fan Controls.
 - 3. Receptacles: Furnish 10 of each style, size and finish installed. None required for Range and Dryer receptacles.

1.9 WARRANTY

- A. Provide the warranty specified in Section 260010.

PART 2 - PRODUCTS

2.1 WALL SWITCHES

- A. Humidity Sensor Switch: 120V
 - 1. Leviton DHDO5-1LW
- B. Single Pole Switch: 120/277V, 15A:
 - 1. Hubbell Model RSD115W
 - 2. Pass & Seymour Model TM870-W
 - 3. Provide 2-pole, 3-way and 4-way switches of the same series as required.
- C. 3 Single Pole Switches: 120/277, 15A:
 - 1. Hubbell Model RCD111W
 - 2. Pass & Seymour Model TM8111-WCC

- D. Jam Switch: 120A, 3A:
 - 1. Hubbell Model RDS50
 - 2. Pass & Seymour Model 1200
- E. Color: White unless directed otherwise by Architect.

2.2 RECEPTACLES

- A. Single Convenience Receptacle: 125V, 15A:
 - 1. Hubbell Model RRD151X
 - 2. Pass & Seymour Model 5361-X
- B. Tamper Resistant Duplex Receptacle: 125V, 15A:
 - 1. Hubbell Model RRD15SXTR
 - 2. Pass & Seymour Model 885TR-X
- C. Tamper Resistant GFI Receptacle: 125V, 15A:
 - 1. Hubbell Model GFTRST15X
 - 2. Pass & Seymour Model 1595-TRXCC4
- D. Tamper Resistant Combination AFCI/GFI Duplex Receptacle
 - 1. Hubbell Model AFR20TRx
 - 2. Pass & Seymour Model AFGF202TRx
- E. Range Receptacle (NEMA 14-50R):
 - 1. Hubbell Model RR450F
 - 2. Pass & Seymour Model 3894
 - 3. Range receptacles shall be complete with matching cord/plug set and cover plate. (Verify location and mounting heights with Architect before roughing-in.)
- F. Dryer Receptacles (NEMA 14-30R):
 - 1. Hubbell Model RR430F
 - 2. Pass & Seymour Model 3864
 - 3. Dryer receptacles shall be complete with matching cord/plug set and cover plate. (Verify location and mounting heights with Architect before roughing-in.)
- G. Color: White unless directed otherwise by Architect.

2.3 WALL PLATES

- A. Nylon Receptacle Cover Plate: Interior Finish Walls – White.
 - 1. Hubbell Model NP26 Series
 - 2. Pass & Seymour Model TP26 Series
- B. Nylon Switch Cover Plate: Interior Finish Walls – White.
 - 1. Hubbell Model NP26 Series
 - 2. Pass & Seymour Model TP26 Series
- C. Weatherproof GFI Receptacle Cover Plate: All exterior building mounted receptacles unless otherwise noted.

1. Hubbell Model RW57300
 2. Pass & Seymour Model WIUFCIOS or W
 3. Rating shall be maintained while in use.
 4. Provide horizontal cover if receptacle is mounted horizontally.
- D. Provide all additional combination cover plates of the same series required for the entire project. All devices in the project shall have a cover plate.
- E. Provide all devices, outlet boxes, junction boxes, etc with the appropriate type cover plate.
- F. Provide 1-gang adapter blanks as required to fill unused openings.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Coordinate all device rough-in heights and locations with all other trades and finished room schedules as applicable. Report any conflicts to Architect/Engineer before rough-in.
- B. Verify conditions prior to beginning work.
- C. Verify that outlet boxes are installed at proper height.
- D. Verify that wall openings are neatly cut and will be completely covered by wall plates.

3.2 PREPARATION

- A. Provide extension rings to bring outlet boxes flush with finished surface.
- B. Clean debris from outlet boxes.

3.3 INSTALLATION

- A. Install in accordance with NECA "Standard of Installation" except for mounting heights. Refer to Section 260010 for mounting heights.
- B. Devices termination may not be used to carry continuity of the branch circuit. All branch circuit wiring must be spliced and tailed out to devices.
- C. Install devices and assembly's plumb and level.
- D. Install switches with OFF position down.
- E. Install ganged wall dimmers as recommended by manufacturer to achieve full rating specified.
- F. Install dedicated neutral conductors online-and load side of dimmers.
- G. Install receptacles with grounding pole on top.
- H. Group adjacent switches or receptacles in single multi-gang wall plates.

- I. Connect wiring devices by wrapping solid conductor around screw terminal. Connect solid and stranded wires by inserting in screw tension pressure plate connectors. Provide solid tails or solderless connectors for stranded conductors where screw tension pressure plates are not available. Use of spring tension back wired terminals is unacceptable.
- J. Coordinate with trade responsible for painting to ensure final coat has been applied before installing wall plates.
- K. Provide all devices, outlet boxes, junction boxes, etc. with the appropriate type cover plate.
- L. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on devices installed in surface mounted boxes.

3.4 CONNECTIONS

- A. Ground equipment per the National Electric Code.
- B. Wire all devices per the National Electric Code.
- C. 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 and UL-486B.

3.5 FIELD QUALITY CONTROL

- A. Provide field inspection, testing, adjusting, and balancing.
- B. Inspect each wiring device for defects.
- C. Operate each wall switch with circuit energized and verify proper operation.
- D. Verify that each receptacle device is energized.
- E. Perform the following field tests and inspections:
 - 1. After installing wiring devices and after electrical circuitry has been energized, test for proper polarity, ground continuity, and compliance with requirements.
 - 2. Test GFCI operation with both local and remote fault simulations according to manufacturer's written instructions.
- F. Remove malfunctioning units, replace with new units, and retest as specified above.

3.6 ADJUSTING

- A. Adjust installed work as required to meet field conditions.
- B. Adjust devices and wall plates so they are flush and level.

3.7 CLEANING

- A. Clean installed work as required.

- B. Clean exposed surfaces to remove splatters and restore finish.

END OF SECTION 262727

SECTION 262813 – FUSES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Fuses

1.2 REFERENCES

- A. ANSI/NFPA 70 - National Electric Code
- B. NEMA FU 1 - Low Voltage Cartridge Fuses

1.3 SUBMITTALS FOR REVIEW

- A. Submit under provisions of Section 260010.
- B. Shop Drawings: The following items shall be submitted for review and approval:
 - 1. Submittal booklet to include the following:
 - a. Reference to Specification Section.
 - b. A list of all equipment to be provided and installed.
 - c. Data sheets to indicate electrical characteristics, time curves, fuse coordination on a 11"x17" time curve graph paper with specific item or model number highlighted.

1.4 SUBMITTALS FOR CLOSEOUT

- A. Submit under provisions of Section 260010.
- B. Record actual fuse sizes.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.6 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by UL or testing firm acceptable to authority having jurisdiction as suitable for purpose specified and indicated.

1.7 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.

1. Fuses: Furnish 3 of each size and type installed.

1.8 WARRANTY

- A. Provide the warranty specified in Section 260010.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Cooper Bussman
- B. Littlefuse, Inc.
- C. Mersen

2.2 FUSE REQUIREMENTS

- A. Dimensions and Performance: NEMA FU 1, Class as specified or indicated.
- B. Voltage: Provide fuses with voltage rating suitable for circuit phase-to-phase voltage.
- C. All fuses in the power distribution system shall be by the same manufacturer.
- D. Main Service Switches Larger than 600 amperes: Current Limiting Class L (time delay).
- E. Motor Load Feeder Switches: Current Limiting Class RK1 (time delay).
- F. Motor Branch Circuits: Class RK5. (time delay).
- G. Parallel service and feeder cables - cable limiters.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install fuses in accordance with manufacturer's instructions.
- B. Install fuse with label oriented such that manufacturer, type, and size are easily read.
- C. Provide an adhesive label inside each enclosure or compartment indicating the size and type of replacement fuse to be installed. Where multiple sizes or types of fuses are installed in a single enclosure placement or coding of labels shall clearly indicate the fuses to which the labels refer.
- D. Install cable limiters on both ends of each parallel cable in the designated set.

END OF SECTION 262813

SECTION 262816 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Fusible Switches
- B. Non-Fusible Switches
- C. Enclosed Circuit Breakers

1.2 REFERENCES

- A. NECA - Standard of Installation (Published by the National Electrical Contractors Association)
- B. NEMA FU1 - Low Voltage Cartridge Fuses
- C. NEMA KS 1 - Enclosed Switches
- D. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems (published by the International Electrical Testing Association).
- E. NEMA AB 1 Molded Case Circuit Breakers
- F. NFPA 70 - National Electrical Code

1.3 SUBMITTALS FOR REVIEW

- A. Submit under provisions of Section 260010.
- B. Shop Drawings: The following items shall be submitted for review and approval:
 - 1. Submittal booklet to include the following:
 - a. Reference to Specification Section.
 - b. A list of all equipment to be provided and installed.
 - c. Data sheets to indicate type, switch ratings, dimensions and enclosure with the specific items or model numbers highlighted.

1.4 SUBMITTALS FOR CLOSEOUT

- A. Submit under provisions of Section 260010.
- B. Maintenance Data: Include spare parts data, recommended maintenance procedures and intervals.
- C. Submit record copy of all testing performed.

1.5 QUALITY ASSURANCE

- A. Manufacturer's Installation Instructions: Install in accordance with application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Store, handle, protect, examine, prepare, install, and start the product in accordance with the manufacturer's instructions.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this Section with minimum three years documented experience.

1.7 REGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70.
- B. Furnish products listed and classified by UL or testing firm acceptable to authority having jurisdiction as suitable for purpose specified and shown.

1.8 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage and are identified with labels describing contents.
 - 1. Fuses: Provide 3 of each size and type of fuse installed.

1.9 WARRANTY

- A. Provide the warranty specified in Section 260010.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Square D Company
- B. Eaton (Cutler Hammer / Westinghouse)
- C. Siemens Energy and Automation

2.2 ENCLOSED SWITCHES

- A. Fusible Switch Assemblies: NEMA KS 1, Type HD load interrupter enclosed knife switch with externally operable handle interlocked to prevent opening front cover with switch in ON position. Handle lockable in OFF position. Fuse clips: Designed to accommodate specified fuses.

- B. Non-fusible Switch Assemblies: NEMA KS 1, Type HD load interrupter enclosed knife switch with externally operable handle interlocked to prevent opening front cover with switch in ON position. Handle lockable in OFF position.

2.3 MOLDED CASE CIRCUIT BREAKERS

- A. Circuit Breaker: NEMA AB 1.
- B. Service Conditions:
 - 1. Temperature: 104°F
 - 2. Altitude: 6000'
- C. Interrupting Rating: As indicated on the drawings.

2.4 MOLDED CASE CIRCUIT BREAKERS - TRIP UNITS

- A. Permanent (fixed) Trip Circuit Breaker: Provide circuit breakers with frame sizes 100 Amps and larger with permanent thermal and magnetic trip units in each pole.
- B. Provide type HCAR circuit breakers for air conditioning and refrigeration branch circuits.

2.5 MOLDED CASE CIRCUIT BREAKERS - OPTIONS AND FEATURES

- A. Provide accessories as scheduled, to NEMA AB 1.
- B. Handle Lock: Include provisions for padlocking.
- C. Load Side Terminations: Provide lugs on circuit breakers of sufficient size to terminate conductors scheduled or indicated on plans.
- D. Provide grounding lug in each enclosure.
- E. Provide Products suitable for use as service entrance equipment where so applied.
- F. Minimum Integrated Short Circuit Rating: Adjusted per Fault-Current Study:
 - 1. Amperes Interrupting Current (AIC) Ratings: 120V, 208V, and 240V breaker – minimum AIC 10,000 amps unless otherwise noted on the Drawings or Specifications.
 - 2. Amperes Interrupting Current (AIC) Ratings: 277V and 480V breaker – minimum AIC 18,000 amps unless otherwise noted on the Drawings or Specifications.
 - 3. The Contractor shall verify the AIC of panelboards with the fault current study and adjust as required to comply with the study.

2.6 ENCLOSURE

- A. Enclosures: NEMA KS 1.
 - 1. Interior Dry Locations: Type 1
 - 2. Interior Wet Locations: Type 4
 - 3. Exterior Locations: Type 3R
 - 4. Kitchen: Stainless Steel
 - 5. Dishwashing Rooms/Areas: Stainless Steel

2.7 FUSES

- A. Refer to Section 262813.

2.8 LOAD SIDE TERMINATIONS

- A. Provide lugs on switches of sufficient size to terminate conductors scheduled or indicated on plans.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install disconnect switches where indicated and in accordance with NECA "Standard of Installation".
- B. Install fuses in fusible disconnect switches.
- C. Provide adhesive label on inside door of each switch indicating UL fuse class and size for replacement.
- D. Install enclosed circuit breakers where indicated, in accordance with manufacturer's instructions.
- E. Install enclosed circuit breakers plumb. Provide supports in accordance with Section 260529.
- F. Refer to Section 260010 for mounting heights.
- G. Provide engraved plastic nameplates under the provisions of Section 260553.

3.2 FIELD QUALITY CONTROL

- A. Field inspection, testing, adjusting as required.
- B. Inspect and test in accordance with NETA ATS, except Section 4.
- C. Perform inspections and tests listed in NETA ATS, Section 7.5.
- D. Test and inspect each circuit breaker.
- E. Inspect and test each circuit breaker to NEMA AB 1.
- F. Inspect each circuit breaker visually.
- G. Perform several mechanical ON-OFF operations on each circuit breaker.
- H. For record - verify circuit continuity on each pole in closed position.

3.3 ADJUSTING

- A. Adjust work as required.

END OF SECTION 262816